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MUTUAL FUND REVENUE SHARING IN 401(K) PLANS

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ABSTRACT

Recordkeepers in DC pension plans are often paid indirectly in the form of revenue sharing from third-party funds on the menu. We show that these arrangements affect the investment menu of 401(k) plans. Revenue-sharing funds are more likely to be added to the menu and are less likely to be deleted. Overall, revenue-sharing plans are more expensive as higher expense ratios are not offset by lower direct fees or by superior performance. Rebates increase with the market power of the recordkeeper suggesting that third-party funds may revenue share to gain access to retirement assets.

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1 Introduction

The mutual fund industry often uses intermediaries to connect investors to portfolio managers. According to the Investment Company Institute, the majority of households that invest in mutual funds obtain these shares through intermediaries such as brokers, fund supermarkets, financial advisors, or retirement plans.[1] Given the large share of intermediated assets, it is important to understand how intermediary compensation affects the fees that fund investors pay and the investment choices that are available to them.

In this paper we focus on 401(k) plans to examine the practice of 'revenue sharing,' a popular form of *indirect* compensation for intermediaries in the mutual fund industry. Retirement plans are among the most important distribution channels for mutual funds. In 2021, mutual funds managed around two-thirds of the $7.7 trillion invested in 401(k) plans.[2] In addition, some fund families are hired by employers sponsoring 401(k) plans as 'recordkeepers' to help establish and administer the set of investment options offered to participants.

401(k) plans typically adopt an open architecture whereby the menu includes third-party investment options along with options affiliated with the recordkeeper. Recordkeepers typically collect compensation through a mix of *direct* and *indirect* payments. The former represents an arrangement whereby the sponsor or participants pay the recordkeeper directly to cover administrative expenses. Indirect payments occur in the form of rebates made by third-party mutual funds to the recordkeeper. Such rebates arise, for example, when third-party fund expense ratios include a charge for administrative services, though these services are outsourced to the plan recordkeeper. Thus recordkeepers receive these payments indirectly from plan investments through the expense ratios of the third-party funds. Although indirect payments have garnered significant criticism, surprisingly little is known about their

[1] `https://www.ici.org/system/files/2022-05/2022_factbook.pdf` (figure 7.8).
[2] See `https://www.ici.org/system/files/2022-06/per28-06.pdf`.

overall impact on 401(k) plans, and whether revenue sharing increases the overall costs to participants.

Since indirect compensation is more opaque, intermediaries may be able to overcharge some of their customers as discussed by Stoughton et al. (2011) and Inderst and Ottaviani (2012). Consistent with this, a 2011 study on 401(k) plans by the Government Accountability Office (GAO) suggests that due to sponsors' and participants' lack of understanding of indirect fees, recordkeepers may charge participants a direct fee for providing recordkeeping for a third-party fund, even when the fund compensates the intermediary for the same service through revenue sharing. Therefore, if direct and indirect payments do not offset each other, recordkeepers may collect more revenue in the presence of indirect compensation and participants may pay higher fees in these plans. Additionally, if recordkeepers are better off when they receive compensation indirectly, they may influence 401(k) sponsors to include and subsequently keep funds on the menu that pay a higher rebate, even when these funds are dominated by other options. Therefore revenue sharing may impose costs on participants through its effect on the menu design.

To investigate the incentives arising from indirect compensation and their effects on 401(k) plans, we use data on mutual fund level revenue sharing, which became available in 2009 when the Department of Labor (DOL) extended reporting requirements on these arrangements. We hand collect menu options for the 1000 largest 401(k) plans in the U.S. for the 2009 to 2013 sample period from annual plan-level Form 5500 disclosures filed by plan sponsors.

The rich structure of our data has several advantages. First, mutual fund families play different roles across plans: a family may serve as the recordkeeper in one plan, but may only participate as an investment manager in another. Second, funds often contemporaneously appear on several 401(k) menus that are administered by different fund families. Finally, compensation arrangements also vary within a fund, within a plan, and within a recordkeeper.

For example, the same fund may revenue share in one plan but not in another and not all funds revenue share within a plan. Similarly, the same recordkeeper may only receive direct compensation in one plan but may receive rebates from revenue sharing in another.

Indirect compensation arrangements are common among the largest 401(k) plans in the U.S. during our sample period. In approximately 54% of our plans, recordkeepers receive a rebate in the form of a revenue-sharing arrangement from at least one fund on the menu. We label these plans 'revenue-sharing plans.' Most recordkeepers administer both revenue-sharing and non-revenue sharing plans. Recordkeepers revenue share as well when included as third-party investment managers in plans administered by other recordkeepers.

On average, about 55% of the third-party ('unaffiliated') funds in revenue sharing plans offer revenue sharing rebates. Among the unaffiliated funds that revenue share, the average rebate is about 18bps. Perhaps not surprisingly, expense ratios are higher for revenue-sharing funds. This result also holds within fund suggesting that the same fund will use a higher expense ratio share class in plans where the rebate is higher.

We begin our empirical analyses by examining the relation between revenue sharing and menu design. We first study menu changes, such as deletions and additions, and test whether mutual funds that pay a higher rebate are treated preferentially at the extensive margin. We find that funds that revenue share are significantly less likely to be deleted from revenue-sharing plans. For example, the average deletion rate is around 20% for revenue sharing funds and 28% for non-revenue sharing funds.

We run similar tests for fund additions. We find that funds that tend to revenue share on other menus and tend to pay higher rebates are significantly more likely to be added to revenue-sharing plans. For example, funds with an above-median propensity to revenue share have an average addition rate of 0.16%, whereas funds with a below-median propensity have an average addition rate of 0.10%. We provide additional support for these findings by

running an analogous fund addition model using a placebo sample of non-revenue sharing plans. We find that there is no significant relation between a fund's tendency to revenue share and its addition outcomes. Overall, our results suggest that revenue sharing affects the investment choices offered to plan participants.

Having shown that revenue sharing affects participants through its impact on plan design, we next investigate whether revenue sharing is associated with higher participant costs. The main hypothesis is that, given the lack of transparency, recordkeepers are able to extract extra rents from revenue sharing plans. To examine whether revenue sharing is associated with higher participant costs, we calculate total fees paid by participants as the sum of direct plan fees and the value-weighted average expense ratios of the investment options in the plan. We control for all observable plan and participant characteristics and use year, plan, and recordkeeper fixed effects. Our results indicate that rebates are associated with higher expense ratios in the retirement setting while direct fees are not significantly different across revenue sharing and non-sharing plans. Consequently, participants face higher all-in fees in revenue sharing plans.

A natural follow up question to this analysis is whether higher fees are offset by higher returns. Christoffersen et al. (2013) argue that revenue sharing may align the incentives of brokers and those of their clients because these payments are generally proportional to the size of the fund and thus expose brokers to the fund's realized returns. In our context, recordkeepers in revenue sharing plans may promote better performing funds for the same reason. We find that this is not the case. The future performance of revenue-sharing funds is weaker than that of non-sharing funds. The bulk of the under-performance is driven by higher fees, though revenue sharing funds display lower performance even after accounting for fees. These results are consistent with the well-documented negative correlation between mutual fund fees and performance (e.g., Gil-Bazo and Ruiz-Verdu (2009)).

In the final analyses of the paper we examine whether the market power of the recordkeeper affects the nature of the compensation scheme. Since recordkeepers also act as gatekeepers in the retirement channel, third-party funds may agree to revenue share in order to gain access to retirement assets. Overall, we hypothesize that third-party funds are more likely to revenue share and pay a higher rebate when the plan has a more powerful recordkeeper.

We show that the influence of the recordkeeper on the management company, which we measure by calculating the proportion of the total 401(k) assets of the management company included in plans administered by the recordkeeper, is significantly positively related to the size of the revenue share. Using network centrality measures to capture the market power of the recordkeeper, we find similar results: recordkeepers that are more central in the network of families that service 401(k) plans receive higher rebates.

Additionally, consistent with our 'negotiating power' hypothesis, we show that third-party funds with investment mandates that correspond to those also offered in the recordkeeper's own proprietary lineup are more likely to pay a rebate. We also find that reciprocal relationships that arise when two management companies work together in two or more plans in which they take turns being the recordkeeper reduce the size of revenue sharing. These results reveal the complex nature of indirect payments in 401(k) plans. They suggest that revenue sharing arrangements not only reflect a contractual agreement between the plan and the recordkeeper, but also between the recordkeeper and the third-party management companies.

2 Related Literature and Contribution

Our study contributes to an important literature that examines the incentives of financial intermediaries in the mutual fund industry. Papers in this literature often focus on brokers and financial advisors. For example, Bergstresser et al. (2009) study broker-sold and direct-sold funds and fail to find that brokers deliver substantial tangible benefits. Del Guercio and

Reuter (2014) show that actively managed funds sold through brokers face weaker incentives to generate alpha and significantly underperform index funds. Hamdani et al. (2017) and Sokolinski (2021) study a 2013 policy change in Israel which reduced commissions and led to a major decline in fund expense ratios. Egan et al. (2019) investigate the extent of misconduct among financial advisors and the associated labor market consequences. Chalmers and Reuter (2020) study the costs and benefits of conflicted advice using individual-level data from the University of Oregon optional retirement plan. Roussanov, Ruan, and Wei (2021) estimate a structural model of mutual fund marketing. Their estimates suggest that eliminating marketing and distribution costs substantially improves welfare, as capital shifts towards cheaper funds and competition decreases fees.

Evidence on revenue sharing is scarce in the literature largely due to the lack of direct data on these arrangements. Evidence on whether it benefits or harms investors is also generally mixed. Christoffersen et al. (2013) infer the existence of revenue sharing in broker-sold funds from defensive 12b-1 fees. They argue that unlike fund loads, revenue sharing can incentivize brokers to promote well-performing funds because these payments are generally proportional to the size of the fund and thus expose brokers to the fund's realized returns. Boyson (2022) uses ADV filings to infer whether a fund family engages in revenue sharing and argues that revenue sharing in the advice channel is not paid from fund assets (i.e., by fund investors) directly, but rather from fund profits. She documents that dual-registered investment advisors consistently place their clients in under-performing funds that also pay revenue sharing. Cookson et al. (2021) examine mutual fund platforms in the U.K. and show that revenue sharing funds are more likely to be recommended by the platform but these recommended funds generally have lower expense ratios and better performance.

In the retirement context, Doellman and Sardarli (2016) examine the relation between the total administrative expenses of the plan and certain plan characteristics that may imply potentially higher revenue share. In a recent paper, Badoer et al. (2020) study the size of

indirect compensation in 401(k) plans. Since they only observe total indirect compensation and not the actual rebate that funds pay to the recordkeeper, they focus on 12b-1 fees to capture revenue sharing by mutual funds. We show, using observations at the payor-payee level, that the correlation between revenue sharing in the retirement industry and fund 12b-1 fees is low and therefore revenue sharing is not well-captured by 12b-1 fees.

In summary, due to the lack of data and the unique role of intermediaries in retirement plans, the effects and nature of revenue sharing are not well-understood. Using disclosures of indirect compensation at the payor-payee level, our paper provides the first analysis of how revenue sharing affects the investment menu and participant costs. We track revenue sharing payments of the same fund across different plans and recordkeepers, allowing us to effectively capture the complex nature of indirect payments in 401(k) plans at the micro level. In addition to examining participant outcomes, this also enables us to highlight the role of market power in this setting.

Our research also contributes to other important areas in financial economics. First, several studies in the retirement literature recognize the role of menu design in facilitating the efficiency of participants' savings in defined contribution plans. For example, some papers examine whether DC plan menus offer adequate choices to participants.[3] Others investigate the role of employer stock as an investment option.[4] Finally, extant research also shows that menus can frame the participants' allocation choices.[5] We contribute to these studies by analyzing how menus are affected by revenue sharing arrangements and the network of providers participating in maintaining the plan.

[3]See, for example, Elton et al. (2006), Angus et al. (2007), Tang et al. (2010), and Egan et al. (2022).

[4]See, for example, Benartzi and Thaler (2001), Poterba (2003), Huberman and Sengmueller (2004), Rauh (2006), and Brown et al. (2006).

[5]See, for example, Madrian and Shea (2001), Choi et al. (2002, 2004), Agnew et al. (2003), Huberman and Jiang (2006), Brown et al. (2007), Carroll et al. (2009), Choi et al. (2009, 2010), Tang et al. (2010), Sialm et al. (2015), and Parker et al. (2022), and Parker et al. (2022).

Second, our study also contributes to the literature that examines the role of mutual fund providers in DC pension plans. For example, Davis and Kim (2007) and Cohen and Schmidt (2009) study conflicts of interest and argue that to protect the valuable business relation that arises between the sponsoring company and the fund family that maintains the plan, fund families cater to the sponsors while compromising their own fiduciary responsibilities. Pool et al. (2016) investigate whether mutual fund families acting as service providers of 401(k) plans display favoritism toward their own funds. Andonov and Mao (2022) analyze the role of financial sophistication of participants and plan governance in reducing conflicts of interest in 401(k) plans. We contribute to these studies by examining the compensation arrangements of the plan's recordkeeper and showing that plan service providers have a first-order effect on the fees participants pay in 401(k) plans.

Finally, while provider networks in DC pension plans have not been investigated in previous studies, the relationship measures we introduce to the retirement setting come from a literature on the analysis and characterization of networks. For example, Hochberg et al. (2007) analyze the networks established by venture capital syndicates. Closer to our setup, Rossi et al. (2018) show that managers employed by defined benefit plan sponsors take more portfolio risk and receive higher inflows when they are more central in the network. Our approach introduces a new angle to plan design that focuses on the plan's compensation structure, the role various providers play in shaping a particular plan architecture design, and the impact on retirement savings accumulation.

3 Institutional Background

Sponsors of 401(k) pension plans typically outsource the administration of the plan to a large financial institution that helps to establish and maintain it. 401(k) menus are jointly determined by the plan sponsor (i.e., employer) and the plan's service provider (i.e.,

recordkeeper). Service providers frequently offer bundled arrangements through which the same entity provides not only recordkeeping but also trustee, custodian, and educational services, for example.[6] In addition to these administrative services, recordkeepers often also serve as investment managers by offering their own funds on the menu.

The compensation of the recordkeeper varies across plans. Figure 1 illustrates the relation between the different parties and the flow of payments. In some plans, these service providers only receive *direct* compensation for administering the plan (typically, a fixed fee per participant), paid either by the sponsor or the participants. Frequently however they are compensated through *indirect* payments, such as revenue sharing payments. As shown in the figure, indirect payments occur through fund expense ratios.[7] They are nevertheless distinct from 12b-1 distribution fees, which are standardized charges that are more salient to fund investors. Revenue sharing payments are more discretionary charges that are negotiated separately for each pension plan and are therefore more opaque to fund investors.

For example, Table A.1 in the Internet Appendix shows the investment menu of Protective Life Corporation in 2012. It includes a dozen investment options offered by third-party fund families. The expense ratios and the revenue share percentages differ substantially across options. Whereas the Vanguard Total Bond Market Index Fund does not share any revenues, the Neuberger Berman Genesis Fund pays 40bps to the recordkeeper. Thus, the indirect compensation of the recordkeeper is 40bps for this fund, which corresponds to around one-third of its expense ratio. The plan also includes investment options affiliated with the recordkeeper, the common stock of the sponsor, and participant loans.

[6]In this paper we use the term service provider to refer to the recordkeeper of 401(k) plans. Over 90% of the mutual fund recordkeepers in our sample are also trustees of the same plan. A description of the services provided is available at: `http://www.ici.org/pdf/per19-04.pdf`.

[7]The U.S. Government Accountability Office (GAO) (2011) documents "revenue-sharing payments from hundreds of share classes of different investment funds that ranged from 5 to 125 basis points" (pages 16-17) (`http://www.gao.gov/assets/670/664391.pdf`).

These revenue sharing arrangements may increase the incentives to include third-party investment options on the plan. Recordkeepers also collect the expense ratios they generate from their own proprietary funds on the menu, which may also include a charge for record-keeping.[8] In addition, recordkeepers receive implicit compensation, which arises from the indirect benefits that fund families obtain from administering a 401(k) plan. These benefits include the ability to influence the set of proprietary fund options on the menu. Service providers also obtain access to participants and can build a long-term relation with these employees. For example, such access allows them to motivate plan participants to roll over their 401(k) assets to an affiliated Individual Retirement Account (IRA) after they retire or leave their jobs.[9]

A 2011 Deloitte survey of 401(k) fees finds that negotiations between sponsors and service providers include the number and type of investment options offered on the menu, the choice of offering proprietary vs. non-proprietary funds, or whether and what type of educational services may be offered to participants.[10] Sponsors may benefit from structuring provider compensation in the form of indirect fees in combination with implicit compensation arrangements, if their employees do not recognize the potential conflicts of interest in the 401(k) plan design.[11]

There are safeguards to mitigate conflicts of interest in 401(k) plans. In particular, sponsors face pressure to offer 401(k) plans that satisfy legal and regulatory requirements. Employer-sponsored 401(k) plans are subject to regulatory and legal constraints imposed by

[8]The DOL disclosure requirement does not extend to proprietary funds. Therefore, we do not observe when proprietary funds collect indirect recordkeeping fees through the expense ratio.

[9]The GAO (2013) report states that "the opportunity for service providers to sell participants their own retail investment products and services, such as IRAs, may create an incentive for service providers to steer participants toward the purchase of such products and services even when they may not serve their participants' best interests" (page 22).

[10]See, `www.ici.org/pdf/rpt_11_dc_401k_fee_study.pdf`.

[11]Many sponsors are not aware of the exact terms of the revenue sharing arrangements between the recordkeeper and the third-party funds on the menu, as argued in the 2011 401(k) study by the Government Accountability Office.

the Employee Retirement Income Security Act (ERISA). ERISA requires that plan fiduciaries act "solely in the interest of the participants and beneficiaries and (...) for the exclusive purpose of (...) providing benefits to participants and their beneficiaries." ERISA fiduciary actions are those involving discretionary plan administration, asset or plan management, or investment advice. Over the last decade numerous lawsuits have been filed against plan sponsors and service providers alleging excessive or hidden fees or improper monitoring of options.[12] These legal and regulatory constraints and the sponsor's involvement in the plan's design significantly contribute to the prevalence of open architecture 401(k) plans.[13] For example, providers are motivated for legal reasons to outsource funds from third-party families if their own fund offerings are limited or specialized, as ERISA mandates plans to offer a diversified menu, or if their own fees are not competitive, as this reduces the risk of costly litigation. Most recent lawsuits, however, have been focused on excessive fees (Mellman and Sanzenbacher (2018)), prompting a wave of repricing. The fee litigation started in 2006, but it was not until 2012 when the DOL required plan providers to fully disclose their compensation to plan sponsors.[14]

4 Data and Summary Statistics

In this section, we describe the data sources and provide summary statistics.

4.1 Data Sources

Our data collection involves the 1000 largest plans in the U.S. from 2009 to 2013. To obtain this sample, we rank plans based on their total assets as of the end of 2008 using electronic

[12]ERISA rules are given in `http://www.law.cornell.edu/uscode`, which we cite following Muir (2013). The U.S. DOL's Employee Benefits Services Administration website includes additional information on fiduciary obligations in DC plans (`http://www.dol.gov`).

[13]See Ruiz-Zaiko and Williams (2007) on the effect of growing litigation uncertainty in the industry.

[14]See, for instance, `https://www.wsj.com/articles/the-lawyer-on-a-quest-to-lower-your-401-k-fees-1497000607?st=7g1yscrihstclti`. These new rules are independent of participant disclosures on fees and performance, which were also mandated by DOL in 2012.

disclosures from Form 5500 filed annually with the DOL. Our sample period is guided by the disclosure of revenue sharing arrangements, which became mandatory in 2009. Given their large size, the benefits divisions of our plans may be more sophisticated, have more resources, and more bargaining power than smaller plans.

Form 5500 provides an overall description of the plan, identifies the recordkeeper, the investment options offered to participants along with the accumulated investment in each option.[15] We hand-collect this information and we cross check the name of the recordkeeper with information available in the compensation disclosure schedules of Form 5500 (described below).[16] We further limit our sample to those plans whose recordkeepers have an investment management arm.

Information on plan fees, recordkeeper compensation, revenue sharing arrangements, and other items from the plans' balance sheet and income statement, such as total assets and total administrative fees, are collected from Schedule C and Schedule H of Form 5500. Information on the total direct compensation that the recordkeeper receives comes from Part 1/2 of Schedule C, while fund level indirect compensation comes from Part 1/3 of Schedule C. Section 1/2 of Schedule C also contains a field for indirect compensation, however this is an incomplete and unreliable metric to consistently capture indirect compensation. This is because when indirect compensation arrangements exist for the plan, it often opts to report them using a 'formula' on Part 1/3 at the 'payor-payee' level, instead of as a total dollar figure in Part 1/2. Finally, since Part 1/3 is at the payor-payee level, we observe the actual amount of revenue sharing paid to the recordkeeper by each individual fund. In analyses where we use plan-level aggregates of indirect compensation, we aggregate across the more granular data.

[15]The set of investment choices available to participants (or the menu) are described in the table labeled 'Schedule of Assets,' which is typically included in the attachments to Form 5500. In most cases, the table reports the complete set of investment options offered by the plan, including the employers' own stock, mutual funds, stable value funds, separate accounts, commingled trusts, or guaranteed investment contracts.

[16]These schedules contain a variable that identifies the provider, albeit the field is often incomplete.

The revenue sharing disclosure is not standardized. The DOL requires sponsors to disclose the formula that they receive from service providers to describe the indirect compensation arrangement.[17] Some plans report these rebates as a percentage of assets, while others in dollars. When the revenue sharing amount is disclosed in dollars, we convert it to a percentage of assets by dividing the dollar amount by the end of fiscal year total investment in the corresponding fund. Additionally, some of the revenue sharing disclosures are non-specific: although the indirect compensation arrangement between the parties exists, the actual details are not disclosed (for example, the corresponding entry may only say 'revenue sharing,' 'basis points of assets,' or 'see attached'). The non-specific disclosures are typically at the plan-level. We discard these plan-year observations since we do not observe the specific amount of revenue share paid, which is required in most of our analyses. Finally, in some cases the revenue sharing arrangement is at the recordkeeper-management company level even though the given third-party management company offers several options on the menu. In these cases, we assume that the same revenue share is applicable to all investment options offered by the corresponding management company.

As mentioned above, the DOL extended the reporting requirements to revenue sharing disclosures in 2009. Based on our conversations with the DOL, the agency identifies three main concerns with the current reporting regime in terms of missing information. First, some providers fail to provide the appropriate disclosure. The DOL maintains a file for these delinquent providers, which we cross-check with our data. Second, the DOL is concerned about the non-standard nature of the current disclosures, specifically about the level of transparency of the formulas that providers report in Part 1/3 of Schedule C. This is not a concern in our data as we hand check each entry and convert all disclosures to a percentage of assets so they can be compared and analyzed in a systematic manner across a large number of plans.

[17] The specific instruction is to 'Describe the indirect compensation, including any formula used to determine the service providers' eligibility for or the amount of indirect compensation.'

Finally, the DOL points out that some fees are not captured on Schedule C. The DOL requires compensation reports by all entities that receive $5,000 or more in 'reportable' compensation from the plan. Some indirect compensation is not considered for reporting purposes however. In particular, the form differentiates between two types of indirect compensation: 1) 'eligible indirect' compensation and 2) 'other' indirect compensation. Providers are not required to disclose the amount of eligible indirect compensation that they receive on Form 5500.[18]

Part 1/1 of Schedule C lists the providers that only receive eligible indirect compensation. For these providers, no further disclosure is required. If the provider receives both eligible and other indirect compensation, Part 1/1 of the schedule is left blank. These providers fill in Part 1/2 of the schedule instead, which asks whether the indirect compensation that the recordkeeper receives also includes eligible indirect compensation (question f). We use both Part 1/1 and Part 1/2 of Schedule C to identify recordkeepers who receive eligible indirect compensation. As we show below however the tendency to receive eligible indirect compensation does not differ between revenue sharing and non-sharing plans.

Finally, a potential concern is that Schedule C may overstate the true magnitude of revenue sharing due to 'fee credits.' Specifically, some revenue-sharing plans use an ERISA fee capture account (also referred to as 'ERISA spending account,' 'ERISA budget account,' or 'ERISA expense reimbursement account,' among others) to administer revenue sharing. In these plans, the revenue-share received by the recordkeeper is deposited in the ERISA fee capture account, which is then used to pay for services rendered to the plan. At the end of the plan year, unused payments can be credited back to plan participants (fee credit). According to the DOL, reportable indirect compensation for Schedule C only includes the portion of

[18]For example, 'the investment of plan assets and payment of premiums for insurance contracts, however, are not in and of themselves payments for services rendered to the plan for purposes of Schedule C reporting, and the investment and payment of premiums themselves are not reportable compensation for purposes of Part I of the Schedule C.' See DOL instructions for a thorough treatment of indirect compensation (https://www.dol.gov/sites/default/files/ebsa/employers-and-advisers/plan-administration-and-compliance/reporting-and-filing/form-5500/2016-instructions.pdf).

the revenue-share that is retained by the recordkeeper. That is, the revenue share we collect from Schedule C is not inflated by those charges that ultimately get credited/refunded to participants when the plan utilizes an ERISA fee capture account.[19] Also, fee reimbursements are not very common in our sample period. Deloitte's 401(k) benchmark survey indicate that during our 2009-2013 sample period, less than 5% of 401(k) plans allocate credit back to participants through an ERISA fee capture account.[20]

To obtain information on the mutual funds included in DC plans, we match the menu data to the CRSP Survivorship Bias-Free U.S. Mutual Fund database by fund name. When we know the exact share class of the fund offered in the plan, we match the fund to the appropriate CRSP fund number ('crsp-fundno') that reflects the corresponding share class. When the share class is not known, we establish the link at the fund-level.

We calculate fund-level characteristics by combining information on the fund's share classes into fund-level variables. Accordingly, fund age is calculated as the age of the oldest share class, fund size is the sum of the total net assets (TNA) of all share classes, and fund returns are calculated as the TNA-weighted average returns of the share classes, respectively. For fund-level expense ratios, we adopt two measures. We use the expense ratio of the cheapest share class as well as the TNA-weighted average expense ratio of the share classes. We also classify each mutual fund as 'balanced,' 'bond,' 'domestic equity,' 'international equity,' or 'other.' We create separate indicator variables for money market, target date, and

[19]This is discussed under 'Q13' of the following DOL document: https://www.dol.gov/sites/dolgov/files/EBSA/about-ebsa/our-activities/resource-center/faqs/supplemental-2009-schedule-c.pdf. Generally, ERISA fee capture accounts create additional concerns about transparency, the timing of the rebates, and the potentially unfair redistribution of assets across participants. While we do not observe whether the plan uses a fee capture account, its existence adds an additional layer of complexity and opacity to revenue sharing arrangements, further contributing to the conflict of interest concerns associated with indirect compensation arrangements. These issues are described in https://www.mercer.us/content/dam/mercer/attachments/north-america/us/us-2020-dc-revenue-sharing-considerations.pdf.

[20]https://www.iscebs.org/documents/pdf/15dcbenchmarking.pdf

index funds. We manually group funds into target date and index fund categories based on their fund names.

While some analyses are at the fund level, we perform several of our tests at the share class level using the subsample of options for which we can identify the correct share class. Share class information comes from several sources. First, for a subsample of plans, share class information is available from the 'Schedule of Assets' table. Second, in some of the cases, the 'Schedule of Assets' contains information on the number of shares held by the plan in addition to the market value of the position. This allows us to calculate the net asset value (NAV) of the position on the report date. When the NAV information is available, we match the menu choice to the CRSP mutual fund files by NAV and date, which allows us to identify the correct share class. Third, in some cases the revenue sharing disclosure in Part 1/3 of Schedule C specifies the share class of the fund ('payor'), even when the 'Schedule of Assets' table does not. Finally, some funds only have one share class. All together, we are able to identify the correct share class for over 60% of our funds. The non-disclosure of share class information may lead to selection bias if plans that include more expensive share classes are less likely to report the identity of those share classes. This bias would cause us to underestimate fund fees in such plans.

4.2 Summary Statistics

Our final sample contains the investment menu for 3,416 plan-year observations corresponding to 73,685 plan-fund-year observations. In most of our analyses we only include third-party funds on the menu further reducing our sample to 40,429 plan-fund-year observations. Although we only focus on the 1000 largest plans,[21] our sample covers $0.82 trillion in

[21] There are more than 37,000 plans with asset manager recordkeepers in Form 5500 in 2008.

retirement assets in 2013 and approximately 14 million participants. This represents roughly 20% of all 401(k) assets reported by ICI in 2013.[22]

The average plan offers 22 investment options to participants from about seven different investment companies. About 40% of mutual funds offered on the menu are proprietary (affiliated) funds of the recordkeeper. Around 45% of the funds in our sample are domestic equity funds, 35% are balanced funds, and 13% are bond funds. The majority of the balanced funds are target date funds. These funds became popular especially after the passage of the Pension Protection Act (PPA) of 2006, as documented by Mitchell and Utkus (2021).[23]

Table 1 describes the plan-level characteristics of our sample. The average (median) plan size is $1.09 billion ($548 million).[24] The average participant in our sample has $79,290 in their 401(k) account. Employees contribute $5,040 to the plan per year while employers make an additional contribution of $2,864 resulting in an average employer matching contribution of about 58%. The mean percentage of assets invested in employer stock is 9%, but can range as high as 52%. About 18% of our plans are collectively negotiated (i.e., unionized).

The table also reports information about total all-in participant costs, as a percentage of plan assets. Participants pay approximately 62 basis points in total fees, which we calculate as the sum of the average administrative fee (expressed as a proportion of plan assets) paid to the recordkeeper (about 6 basis points) and the asset-weighted average expense ratio paid to third-party funds (about 56 basis points). Comparing the mean administrative fee in our sample to that of the universe of Form 5500 filers, which is approximately 20 basis points, it is clear that the costs associated with retirement savings are lower for participants with access to the very largest 401(k) plans, which make up our sample.

[22]According to the ICI, total assets in 401(k) plans amounted to $4.1 trillion at the end of 2013 (https://www.ici.org/info/ret_ 19_ q4_ data.xls). Mutual funds accounted for 64% of these assets.

[23]Following the PPA, the DOL added a new fiduciary protection to ERISA for Qualified Default Investment Alternatives (QDIA), such as target-date funds, traditional balanced funds, and managed account advice services.

[24]Not surprisingly, the average plan in our sample is much larger than the average Form 5500 filer (with an asset manager recordkeeper), which only has approximately $86.3 million in assets.

In terms of recordkeeper compensation, beyond the administrative expenses, the recordkeeper also receives indirect payments from third-party funds. Specifically, the average unaffiliated fund pays 10bps in indirect/revenue-sharing payments to the plan's recordkeeper in revenue-sharing plans calculated as a percent of fund assets. Conditional on the fund revenue sharing, the average revenue share is 18bps. Recordkeepers may also receive compensation for recordkeeping services from their proprietary funds, but this is not reported on Form 5500. That is, we only observe the total expense ratio of proprietary funds, and not its various components. This explains why we focus on third-party investment options. We use the share of affiliated assets in the plan as a control variable in our plan-level analyses to address this concern.

In the vast majority of the plans (83%), recordkeepers receive some *eligible* indirect compensation. As we discuss above, information on the size of eligible indirect compensation is not disclosed on Form 5500. Schedule C simply contains an indicator on whether such compensation is received. As mentioned in Section 3, service providers frequently offer bundled arrangements through which the same entity provides not only recordkeeping but also trustee, custodian, or educational services, for example. The table shows that the recordkeeper performs on average 2.47 different services for the plan. We collect the service codes associated with the recordkeeper from Part 1/2 of Schedule C.

About 54% of plans in our sample report indirect compensation on Schedule C and we classify them as revenue-sharing plans. For these plans, we are able to extract detailed revenue sharing information at the payor-payee level.[25]

It is important to note that not all funds offer rebates in revenue sharing plans. Table 2 provides statistics at the menu level. In plans that revenue share, only approximately 55%

[25]Our final sample includes 3,416 plan-years. Although we have menu information for an additional 518 plan years of our initial sample of the largest 1,000 ERISA plans, we are not able to collect the corresponding revenue sharing information. These plans do have revenue sharing arrangements but these arrangements are not fully disclosed.

of the funds report paying indirect compensation to the recordkeeper. Unconditionally, the average revenue sharing payments vary from 13.1bps in 2009 to 8.1bps in 2013.

Some mutual fund families do not share revenues with the recordkeeper. The fact that some funds revenue share and some do not within the same plan raises the concern that plan expenses are not fairly distributed across participants. For instance, less sophisticated participants, who are more likely to invest in more expensive funds, may be cross-subsidizing more sophisticated participants. Unfortunately, in the absence of participant level data we are unable to investigate these issues.

5 Menu Design

We start by examining whether revenue sharing is related to the design of the menu. Investment allocations in 401(k) accounts are driven by the plan sponsor, the service providers, and plan participants. In a first step, plan sponsors along with the service providers select the menu of investment options for the plan. In a second step, participants allocate their retirement savings and the employer contributions across these options. To ensure that the plan continuously offers a suitable set of investment choices, 401(k) plans adjust their menus by deleting some investment options and adding others.

We investigate whether indirect payments incentivize recordkeepers to favor certain funds. In particular, both the tendency to revenue share and the magnitude of the rebate vary *within* a revenue-sharing plan. We therefore hypothesize that funds that are willing to pay a higher rebate are more likely to be added to and kept on the menu.

5.1 Univariate Deletion and Addition Rates

Using our sample of revenue-sharing plans, Panels A and B of Table 3 examine whether the propensity to delete or add a fund depends on whether the fund has a revenue sharing arrangement with the plan's recordkeeper.

To calculate deletion rates, we count the number of revenue-sharing plans on which a given third-party (unaffiliated) fund pays a rebate to the plan's recordkeeper and the number of menus on which it does not, respectively, in a given year. We then count within each category the number of menus from which the fund is delisted during the year. This allows us to determine the rate at which a fund is deleted from plans on which it revenue shares as well as the corresponding deletion rate from plans on which it does not. Panel A of Table 3 reports the average fund deletion rates by revenue-sharing status across all plans. Generally, funds are more likely to be deleted from plans on which they do not pay rebates to the recordkeeper. The exception is 2012, where the difference, albeit having the right sign, is not statistically significant. The 2012 result may be driven by participant- and provider-level disclosure requirements by the DOL that came to effect in 2012, as discussed by Badoer et al. (2020) and Kronlund et al. (2021).

Panel B investigates how a fund's propensity to be added to a menu is related to revenue sharing. Two issues arise when calculating addition propensities. For deletions, the choice set is well defined: plans can only delete those funds that are in the existing set of menu options. For additions, the true choice set from which funds are selected is not observable. Additionally, for funds that are not added to the menu, we cannot observe the revenue share that they would have paid had they been added. To overcome these issues, we classify funds into revenue-sharing and non-sharing funds using a metric that captures the fund's past tendency to revenue share. In particular, for each fund in our sample, we first calculate the proportion of the menus on which the fund revenue shared in the past two years. A fund

is then classified as a revenue sharing fund if its propensity to revenue share is above the median fund's propensity in our sample. Therefore, unlike in the deletion analyses, we are not able to compare addition frequencies by revenue sharing status within fund as this status does not vary for fund f at time t across plans. Additionally, we can only calculate revenue sharing propensities at time t for funds that are in our sample of 401(k) plans in the previous years. Therefore, we limit the choice set for additions to these funds.

We then define the addition frequency of a fund as the number of times the fund is added to a menu divided by the number of menus where it is currently not offered. We then ask whether the addition frequency varies by the fund's revenue sharing status. Consistent with our deletion results, we find that revenue-sharing funds are significantly more likely to be added to a plan in three of the four years.

5.2 Deletion Propensities

While our univariate statistics suggest that revenue-sharing funds are treated preferentially, these results may be driven by certain fund or menu characteristics that the univariate analyses do not capture.

To extend the univariate results, we use the following logit model:

$$Prob(DEL_{p,f,t} = 1) = \Lambda(\beta RevenueShare_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1}), \tag{1}$$

where $DEL_{p,f,t}$ is an indicator variable that takes the value of one if third-party mutual fund f is deleted from plan p during year t and zero otherwise. $RevenueShare_{p,f,t-1}$ is measured in two different ways: 1) a continuous variable for the amount of rebate that fund f pays to plan p's recordkeeper in year $t-1$ or 2) as an indicator variable that takes the value of one if fund f revenue shares in plan p in year $t-1$. Finally, $\mathbf{Controls}_{f,p,t-1}$ is the vector of relevant control variables, which includes year dummies. Favoritism toward high-rebate funds implies that, all else equal, these funds are less likely to be delisted (i.e., $\beta < 0$). Our

unique data structure and the fact that the very same fund can be deleted from menus where it revenue shares and where it does not, allows us to run this analysis with fund fixed effects.

The first set of control variables describes the characteristics of the funds offered in the plan. These include the fund's prior performance (measured by its percentile performance among funds of the same style in the CRSP fund universe using the past three-year returns), expense ratio, the amount of plan assets invested in the fund, fund age, turnover. In models without fund fixed effects, we also include indicators for fund style.

The second set of controls describes the plan, the sponsoring company, and its employees. These include the number of options offered on the investment menu, the logarithm of total assets in the retirement plan, the logarithm of the average account size per participant, and the logarithm of plan age. To characterize the governance of the sponsoring company, we use an indicator variable that captures whether the company is part of a bargaining agreement with a union. We use two variables to proxy for sponsor attitudes towards employees: First, we include the match that the sponsor provides. Sponsors that are more generous with their contributions may also advocate employee savings through offering a more economical plan. Second, we also control for the proportion of total assets in the plan invested in employer stock. Plans that motivate their employees to invest a larger portion of their retirement savings in employer stock may exhibit more significant conflicts of interest than other plans. We also include a measure that captures the percentage of total assets invested in proprietary funds. If implicit compensation is a substitute for direct compensation, recordkeepers may be less concerned about revenue sharing when they benefit from significant plan investments in their own funds. Additionally, we control for other plan characteristics such as whether the recordkeeper offers bundled services to plan participants, whether the recordkeeper receives eligible indirect compensation, and how actively participants change their allocations.

Table 4 reports the results. For our explanatory variable of interest, in Columns 1-3 we use an indicator for whether the fund revenue shares with the plan's recordkeeper. In Columns 4-6, we replace the indicator with the rebate the fund pays to the recordkeeper, expressed as a percentage of assets. Revenue sharing funds are significantly less likely to be deleted. This is also true using the continuous revenue sharing variable, though the results are not statistically significant in the specification with plan fixed effects. Importantly, our results hold within fund as well suggesting that the very same fund is more likely to be deleted from plans in which it does not pay a rebate to the recordkeeper. It is not surprising that the results are weaker using plan fixed effects since revenue sharing varies more across plans than within plans.

The coefficient estimates on the additional control variables are largely consistent with previous findings. For example, funds with better past performance or those that are cheaper are less likely to be deleted. Additionally, large investment options are less likely to be deleted and plans with more active participants are more likely to delete a specific fund.

Our baseline specifications in Table 4 adopt the logit framework, which limits the use of fixed effects.[26] For robustness, we reproduce Table 4 using the linear probability model in Table A.2 in the Internet Appendix. Furthermore, in Table A.3 of the Internet Appendix we add additional fixed effects to our linear probability model, including recordkeeper, recordkeeper and fund, plan and fund, and fund-year fixed effects. The linear probability analyses show that our results are robust to alternative model specifications.

[26]For robustness, we also consider the fixed effects logit model, which provides qualitatively identical results.

5.3 Addition Propensities

In this section we extend the univariate results and investigate the relation between fund addition and revenue sharing using the following model:

$$Prob(ADD_{p,f,t} = 1) = \Lambda(\beta RevenueShare_{f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1}), \tag{2}$$

where $ADD_{p,f,t}$ is an indicator variable that takes the value of one if third-party mutual fund f is added to the plan, using all funds in our choice set. Since we cannot observe the revenue share that a fund would have paid had it been added to the menu for those funds that are not added, in these analyses $RevenueShare_{f,t-1}$ captures a fund's ex ante likelihood that it would revenue share with the plan's recordkeeper. We use two measures: 1) the proportion of the menus on which fund f revenue shared and 2) the average revenue share that fund f paid to plan recordkeepers in the past two years. Our results are unchanged when we use the past year or all years in our sample to calculate funds' revenue-sharing propensities.[27]

As mentioned in Section 5.1, there are several issues that arise for additions. First, since in any year, a fund's likelihood to revenue share is only defined for those funds that are in our 401(k) sample in prior years, the choice set that we adopt in the additions analyses is limited to these funds. Second, in contrast to the deletion analyses, *RevenueShare* is measured by past propensities and therefore it does not vary within a fund across plans. Finally, addition rates of revenue sharing funds are much higher than those of non-sharing funds, and even more so in the true choice set. Because of this difference in baseline probabilities, the logit framework is especially helpful for analyzing additions as odd ratios are scaled probabilities that take away the level effect and focus on the relative effects.

Column 1 of Table 5 tabulates the results using the probability of revenue share as our explanatory variable of interest. In column 2 we use the same measure but add plan fixed

[27]For robustness, and similar to fund deletions, we also consider the fixed effects logit model, which provides qualitatively identical results.

effects. We re-estimate these results in columns 3 and 4 by defining *RevenueShare* as the average revenue share paid by the fund in prior years. We find that the probability of a fund being added to a revenue-sharing plan is significantly positively related to the ex-ante probability that the fund will revenue share with the plan recordkeeper. The probability that the fund is added to the plan also significantly increases with the average revenue share the fund paid on previous menus.

These results suggest that the tendency to revenue share positively affects the fund's addition probability in revenue-sharing plans. This should not be the case however for non-revenue sharing plans, as they are unlikely to obtain revenue sharing from potential future additions. Therefore, as a placebo test, we rerun our model for the sample of non-revenue sharing plans.[28] The results from this analysis are shown in Table 6. The table confirms the conjecture and shows that additions to non-revenue sharing menus are not sensitive to the probability or the amount of revenue share associated with the fund in other plans.

In sum, the results in this section provide support for the hypothesis that revenue sharing affects menu design in 401(k) plans.

5.4 Additional Results

In this subsection we provide some additional analyses studying the role of plan heterogeneity, affiliated funds, and 12b-1 fees.

5.4.1 Plan Heterogeneity

We next examine whether the effects of revenue sharing differ across plans with different sizes. Larger plans are more likely to have large benefits departments and generally more

[28]It is important to note that a similar placebo analysis using the subsample of non-revenue sharing plans is not available for the deletion analyses since each fund included in a non-revenue sharing plan does not share revenue with the recordkeeper (i.e., is a non-revenue sharing fund) by definition.

resources devoted to the oversight of the plan. Furthermore, they also receive more scrutiny from regulators and the general public.

Though our sample only includes the 1,000 largest 401(k) plans, there is considerable heterogeneity: the average size of below median plans in our sample is 314 million dollars, whereas the corresponding average for above median plans is 1.7 billion dollars. Table A.4 in the Internet Appendix reports results for our baseline deletion analyses for below- and above-median plans, respectively. The coefficient estimates on our revenue sharing variables are smaller in larger plans though the difference is only statistically significant in models 1 and 2 in Panel A. Similarly, Table A.5 tabulates the results for our baseline addition analyses for the two size subsamples. We find that the role of revenue sharing is statistically significantly lower in the addition decisions of larger plans in all of our specifications. Overall, these findings are consistent with the argument that menu distortions due to indirect compensation are less prevalent in larger plans, with more transparency and higher sophistication.

5.4.2 Affiliated Funds

We focus on unaffiliated funds in our baseline analyses since our aim is to examine how the indirect compensation that the recordkeeper receives from these funds affects the menu. Naturally, the choice to delete unaffiliated funds from a menu or add them to a menu is not independent from the choice to delete/add affiliated funds however. Therefore, we re-estimate our baseline deletion and addition analyses by including affiliated funds. Since our main variable of interest, revenue sharing, is not available for affiliated funds, we set it to zero and include an indicator variable for affiliated funds. Thus, the coefficients on revenue sharing are identified for unaffiliated funds. Furthermore, the coefficient on the affiliated fund variable captures not only the direct effect of affiliated funds on deletion and addition probabilities but also the indirect effect through the internal "revenue sharing" within a family.

We report the results for deletions and additions in Tables A.6 and A.7 in the Internet Appendix. The tables confirm that including affiliated funds does not affect our results. The finding that revenue sharing funds are less likely to be deleted from and are more likely to be added to plan menus continues to hold in our extended sample.

5.4.3 12b-1 Fees and Revenue Sharing

Finally, Badoer et al. (2020) highlight the role of 12b-1 fees in the retirement context. Therefore, a potential concern is that the indirect compensation we collect from Part III of Schedule C of Form 5500 simply captures the 12b-1 fees of unaffiliated funds. A cursory look suggests that this is unlikely the case, as the two measures are not very strongly correlated in our sample.[29] Nonetheless, we report our baseline deletion and addition analyses including 12b-1 fees as an additional control in Tables A.8 and A.9 in the Internet Appendix.[30]

The results show that the coefficient estimates on our revenue sharing variables are not affected by the inclusion of 12b-1 fees both in terms of economic magnitude and statistical significance. Interestingly, while revenue sharing funds are less likely to be deleted from and more likely to be added to 401(k) plans, funds with higher 12b-1 fees are generally more likely to be deleted and less likely to be added. This is consistent with the higher salience of 12b-1 fees in contrast to revenue sharing arrangements.

6 Plan Expenses and Performance

Our favoritism hypothesis in the previous section is motivated by the extant literature that argues that indirect compensation arrangements may allow intermediaries to extract higher fees (Stoughton et al. (2011) and Inderst and Ottaviani (2012)), and therefore recordkeepers

[29]The correlation between the fund's 12b-1 fee and the corresponding revenue share we collect from Form 5500 is only 0.2.

[30]To be consistent between the deletion and addition estimations, the 12b-1 control is measured as the value-weighted 12b-1 fee of the fund.

may prefer these arrangements over direct compensation. In this section we provide evidence on this by examining plan expenses.

6.1 Revenue Sharing and Plan Costs

Participants pay the expense ratio of the options they choose from the investment menu as well as plan administrative expenses. Therefore, we define all-in fees as the total paid through these channels. In the presence of indirect compensation arrangements, third-party funds collect recordkeeping fees as part of their expense ratios but pass these fees back to the recordkeeper. As discussed in the Introduction, any indirect fees that participants pay through the expense ratios of third-party funds should serve as substitutes for direct fees (administrative fees). Therefore, the all-in fees participants face should be similar across revenue-sharing and non-sharing plans. However, a 2011 study on 401(k) plans by the Government Accountability Office (GAO) suggests that due to sponsors and participants lack of understanding of indirect fees, recordkeepers may not reduce direct fees sufficiently. If direct and indirect payments do not offset each other, recordkeepers may collect more revenue in the presence of indirect compensation and participants may pay higher fees in these plans.

A key assumption for testing this hypothesis is that revenue-sharing plans and those that do not revenue share are not different in plan maintenance costs. Otherwise, the use of rebates could simply indicate differences in plan expenses rather than non-competitive pricing. Specifically, it is possible, for example, that when providing recordkeeping services is more expensive in some plans, these plans opt to cover the extra costs through indirect payments. To investigate this issue, Table 7 compares a host of plan and participant characteristics across revenue sharing and non-revenue sharing plans.

We use several plan characteristics to capture plan maintenance costs. For example, we use plan size and the average account size of participants to capture economies of scale, which likely affect the recordkeeping costs. We use several metrics to assess the complexity

of recordkeeping. For instance, participants that engage in dynamic portfolio management may incur higher recordkeeping costs than their more passive peers. We measure participant activity by the volatility of investment flows in the plan. More complex plans, having a larger number of third-party investment options, working with several third-party families or featuring a large variety of investment categories, may also be more expensive to maintain. Possibly plans that invest more of their assets in the recordkeeper's proprietary funds are cheaper. We also measure the variety of different investment categories by counting the asset categories listed on the fund's balance sheet in Schedule H.

Finally, we consider the possibility that recordkeepers that provide bundled services to the plan (which we measure by counting the service codes listed on Part 1/2 of Schedule C) may be choosing one compensation arrangement over the other. In addition, we compare plan age, the matching contribution the sponsor offers to participants, the proportion of assets invested in the employer's stock, and indicators on whether the plan is unionized, whether the plan has outstanding participant loans, and whether the recordkeeper receives eligible indirect compensation.

The last column in the table displays the difference in the average characteristics of revenue-sharing and non-sharing plans. The standard errors are clustered at the plan level. The results reveal that revenue sharing plans are similar to non-sharing plans with respect to most observable plan and participant characteristics. While total assets are marginally smaller in revenue-sharing plans, account sizes are generally not different, suggesting that economies of scale are not driving revenue sharing. Additionally, the likelihood of unionization and allocations to proprietary funds are different across these plans. The latter is actually higher for revenue sharing plans, which is the opposite from what we expect given that offering proprietary funds may also represent a source of indirect compensation for the recordkeeper. Therefore, these tests indicate that revenue sharing is unlikely to proxy for plan maintenance

costs. Nonetheless, we control for these plan and participant characteristics in the rest of our analyses and also utilize various fixed effects to further alleviate this concern.

To compare total participant fees across revenue-sharing and non-sharing plans we use the following regression framework estimated at the *plan-year* level:

$$PlanCost_{p,t} = \beta RSplan_{p,t} + \mathbf{\Gamma'Controls}_{p,t} + \epsilon_{p,t}. \tag{3}$$

Our main measure of $PlanCost_{p,t}$ is the all-in fee paid by participants in plan p at time t, which is calculated as the sum of the administrative (direct) expense (measured as percent of total plan assets) and the asset weighted average expense ratio of the plan.[31] However, we also run the model using the asset weighted average expense ratio as $PlanCost_{p,t}$, as discussed below. $RSplan_{p,t}$ is an indicator that takes the value of one if plan p is a revenue-sharing plan in year t and zero otherwise. $\mathbf{Controls}_{p,t}$ is a vector of control variables. These controls are identical to those included in our previous analyses with the exception of the variables that describe fund characteristics. Since the unit of observation in these analyses is plan-year, fund characteristics are expressed as value-weighted averages within the plan.

We report the results of the plan-cost analyses in Table 8. Before we turn to our main cost measure, we begin by examining the expense-ratio component of participant fees in columns 1-4. The estimates in columns 1 and 2, in which our explanatory variable of interest is an indicator variable that takes the value of one if the plan revenue shares and zero otherwise, confirm that the average expense ratio is significantly higher in revenue sharing plans. This is perhaps not surprising as these funds collect additional fees that are passed on to the plan recordkeeper. Higher expense ratios alone may not necessarily hurt participants as long as they are offset by lower direct fees. Therefore, in the next four columns we turn to the analysis of total plan costs. In all specifications in columns 5-8 the coefficient estimates on

[31] The average expense ratio is based on funds on the menu for which we know the exact share class.

the revenue share indicator are positive and significant indicating that participants do face higher all-in fees in revenue-sharing plans.

We provide further robustness in Table A.10 in the Internet Appendix where we rerun the model using recordkeeper, and recordkeeper and plan fixed effects. Additionally, Table A.11 reestimates the models from Table 8 and Table A.10 using administrative expenses as our dependent variable.

Overall, our findings suggest that plan participants pay more in revenue-sharing plans and, consequently, recordkeepers receive more revenue in these plans. While expense ratios of revenue-sharing funds are higher than those of similar non-revenue sharing funds, plan administrative expenses are not lower in these plans.

6.2 Revenue Sharing and Fund Expense Ratios

In the previous section we compared aggregate, plan-level fees across revenue sharing and non-sharing plans. It is interesting to focus on variation in fund fees *within* revenue sharing plans as well.

Panel A of Figure 2 shows the distribution of expense ratios at the share class level for both revenue sharing and non-revenue sharing third-party funds in our subsample of revenue-sharing plans. Overall, the figure reveals that revenue sharing funds are more expensive. This also holds in Panel B where we plot share class level expense ratios for the domestic equity subsample, indicating that the difference in expense ratios is not driven by differences in investment strategies.

To further explore how much of these differences in expense ratios are explained by other fund, plan, or recordkeeper characteristics, we investigate the relationship between fund expense ratios and revenue sharing using the following model:

$$ExpenseRatio_{p,f,t} = \beta RevenueShare_{p,f,t} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}, \tag{4}$$

where $ExpenseRatio_{p,f,t}$ is the expense ratio of the share class of fund f included in plan p in year t. Our explanatory variable is either an indicator variable that takes the value of one if the fund revenue shares with the recordkeeper and zero otherwise or a continuous variable given by the actual rebate fund f pays to plan p's recordkeeper. $\mathbf{Controls}_{p,f,t}$ is a vector of relevant control variables, identical to those used in Section 5.

Table 9 summarizes the results. Consistent with Figure 2, the table shows that the actual expense ratio that participants pay to invest in the fund is significantly related to the size of the rebate that the fund pays to the plan's recordkeeper. This is not driven by differences in fund characteristics across revenue-sharing and non-sharing funds.

We provide additional robustness in Table A.12 in the Internet Appendix using alternative fixed effects that include recordkeeper, recordkeeper and fund, plan and fund, and fund-year fixed effects. These are analogous to those in Table A.3 in our plan-fund level deletion analyses. Our coefficient estimates on revenue sharing remain significantly positive even after we include fund-year fixed effects indicating that the very same fund will use a higher expense ratio share class in plans where the rebates paid to the recordkeeper are higher.

6.3 Future Performance

Although participants face higher fees in revenue-sharing plans, high fees may not lead to lower retirement savings if they are offset by better fund performance. To explore this possibility, we compare the performance of funds that revenue share to those that do not. Accordingly, every month we rank each fund in the CRSP fund universe based on its performance within its investment style to determine the fund's performance percentile (between 0 and 1) among its peers. We then form value-weighed portfolios of revenue-sharing and non-revenue sharing funds separately in each plan at the end of each calendar year. We calculate monthly portfolio performance in the following year as the weighted average performance rank, keeping the portfolios' composition fixed for 12 months. We rebalance our portfolios annually.

Using the monthly portfolio returns, we estimate the following model to examine the relation between revenue sharing and future performance:

$$PerfRank_{p,b,t} = \beta_0 + \beta_{RS} RS_{b,t-1} + EXP_{p,b,t-1}\beta_{EXP} + \epsilon_{p,b,t} \tag{5}$$

where $PerfRank_{p,b,t}$ is the weighted average monthly percentile performance rank of the funds in portfolio b and $RS_{b,t-1}$ is an indicator that takes the value of one if the portfolio is formed using revenue-sharing funds and zero otherwise. $EXP_{p,b,t-1}$ is the weighted average expense ratio of the funds in the portfolio, where the expense ratio corresponds to the minimum fee share-class of each fund. Standard errors are clustered at the plan level.

Table 10 shows the results of this estimation. The future performance of revenue sharing funds is significantly weaker than that of non-sharing funds. The majority of the underperformance is driven by higher fees. These results are consistent with the well-documented negative correlation between fees and performance in the mutual fund literature (see, for instance Gil-Bazo and Ruiz-Verdu (2009)). Overall, our evidence suggests that the performance of revenue-sharing funds is not superior to that of non-sharers, consistent with Stoughton et al. (2011) and Boyson (2022).

7 Fund Networks

Our results thus far suggest that recordkeepers receive higher fees when their compensation includes indirect payments, implying that they may prefer these arrangements. Since they also act as gatekeepers in the retirement channel, third-party funds may agree to revenue share in order to gain access to retirement assets. The tension for third party funds is that collecting a charge for recordkeeping services translates into higher expense ratios, which in turn may limit the assets they can attract. Therefore, we hypothesize that third-party funds generally prefer not to revenue share, but are more likely to do so when the plan has a more powerful recordkeeper.

To investigate this hypothesis, we begin with the following regression analysis:

$$RevenueShare_{p,f,t} = \beta Pressure_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}, \tag{6}$$

where $RevenueShare_{p,f,t}$ is either an indicator variable that takes the value of one when the fund revenue shares with the recordkeeper or it is the actual rebate fund f pays to plan p's recordkeeper. $Pressure_{p,f,t}$ is the explanatory variable of interest related to the recordkeeper's potential negotiation power over the fund's management company.

We use several measures as our key explanatory variable ('$Pressure$') in these analyses. First, to measure the recordkeeper's influence on the management company, we calculate the percent of the total 401(k) assets of the management company included in plans administered by the recordkeeper. Second, we also use standard measures of network centrality, which are described in detail in, for instance, Hochberg et al. (2007).

To capture additional aspects of the negotiation power of the recordkeeper, we develop two measures. First, we create a measure of reciprocity between the recordkeeper and each third-party management company on the menu. To do so, we identify reciprocal relationships that arise when two management companies work together in two or more plans in which they take turns being the recordkeeper. Our reciprocity measure is a simple indicator variable that identifies such a relationship. Second, for each third-party fund we check whether the recordkeeper offers funds with the same investment mandate in its own proprietary lineup. Specifically, we count the number of peer proprietary funds offered. Finally, $\mathbf{Controls}_{p,f,t}$, the vector of control variables, includes the variables used in our previous fund-plan-year level analyses (see, Equation 1).

Table 11 tabulates our results. For brevity, we only report coefficient estimates for the explanatory variables of interest. In Panel A, we use our revenue share indicator variable, while in Panel B we use the rebate the fund pays to the recordkeeper. The specification follows that of our previous tables that use plan-fund-year observations. For example, in columns 2,

5, and 8 in both panels we include fund fixed effects. In these models, the estimation asks whether the very same fund pays a higher rebate in plans where the recordkeeper is more influential or more central.

Columns 1-3 report our coefficient estimates using our recordkeeper influence measure. The coefficients indicate that funds are more likely to revenue share and pay a higher rebate in plans where the recordkeeper is more influential. The results also show that revenue sharing is less likely and the rebate is lower when the recordkeeper and the fund's management company share a reciprocal relationship. Interestingly, the opposite is true when the recordkeeper has similar funds in its own fund lineup and thus could offer its own funds.

Our network is characterized by its nodes (i.e., fund families acting as recordkeepers) and edges (i.e., connections between recordkeepers and third-party funds). Following Hochberg et al. (2007), the network centrality measures are defined as follows: (a) *Degree* is the number of unique ties by a recordkeeper and (b) *Betweenness* is the proportion of all paths linking actors j and k which pass through a recordkeeper.

Columns 4-6 and 7-9, report the results using the network measures 'degree' and 'betweenness,' respectively. The coefficient estimates are consistent with our influence results, suggesting that centrality is positively related to revenue sharing payments. In particular, more central recordkeepers, as captured by the measures of 'degree' and 'betweenness,' collect higher revenue share, and this holds within fund. In summary, the results indicate that compensation arrangements are significantly related to the market power of the recordkeeper.

8 Conclusion

Despite the increasing role of 401(k) plans, little is known about how provider incentives influence the characteristics of the investment choices offered in the plans. This is surprising

as small differences in fees or inefficiencies in the selection of investment options can have a significant impact on retirement savings outcomes.

Our paper focuses on the compensation of recordkeepers, and in particular, the effects of revenue sharing arrangements. We show that revenue sharing affects the menu design. High revenue-sharing funds are favored by plans: they are more likely to be added as an investment option and are also more likely to be retained. We also document that participants in revenue sharing plans face significantly higher fees. Our results are consistent with the notion that these less transparent indirect payments allow recordkeepers to extract additional rents from plan participants, and this further varies based on plan size and the relative market power of the recordkeeper in the network of providers.

References

Agnew, J., P. Balduzzi, and A. Sunden (2003). Portfolio choice and trading in a large 401(k) plan. *American Economic Review 93*, 193–215.

Andonov, A. and M. Q. Mao (2022). Financial sophistication and conflicts of interest in 401(k) pension plans. *Working Paper*.

Angus, J., W. O. Brown, J. K. Smith, and R. L. Smith (2007). What's in your 403(b)? academic retirement plans and the costs of underdiversification. *Financial Management*, 1–38.

Badoer, D. C., C. P. Costello, and C. M. James (2020). I can see clearly now: The impact of disclosure requirements on 401(k) fees. *Journal of Financial Economics 136*, 471–489.

Benartzi, S. and R. H. Thaler (2001). Naive diversification strategies in defined contribution saving plans. *American Economic Review 91*(1), 79–98.

Bergstresser, D., J. Chalmers, and P. Tufano (2009). Assessing the costs and benefits of brokers in the mutual fund industry. *Review of Financial Studies 22*(10), 4129–4156.

Boyson, N. M. (2022). The worst of both worlds? Dual-registered investment advisors. Working Paper.

Brown, J. R., N. Liang, and S. Weisbenner (2006). 401(k) matching contributions in company stock: Costs and benefits for firms and workers. *Journal of Public Economics 90*, 1315–1346.

Brown, J. R., N. Liang, and S. Weisbenner (2007). Individual account investment options and portfolio choice: Behavioral lessons from 401(k) plans. *Journal of Public Economics 91*, 1992–2013.

Carroll, G. D., J. Choi, D. Laibson, B. C. Madrian, and A. Metrick (2009). Optimal defaults and active decisions. *Quarterly Journal of Economics 124*, 1693–1674.

Chalmers, J. and J. Reuter (2020). Is conflicted investment advice better than no advice? *Journal of Financial Economics 138*(2), 366–387.

Choi, J., D. Laibson, and B. C. Madrian (2009). Mental accounting in portfolio choice: Evidence from a flypaper effect. *American Economic Review 99*, 2085–2096.

Choi, J., D. Laibson, and B. C. Madrian (2010). Why does the law of one price fail? An experiment on index mutual funds. *Review of Financial Studies 23*, 1405–1432.

Choi, J. J., D. Laibson, B. C. Madrian, and A. Metrick (2002). Defined contribution pensions: Plan rules, participant decisions, and the path of least resistance. In J. M. Poterba (Ed.), *Tax Policy and the Economy*, pp. 67–113. Cambridge, MA: MIT Press.

Choi, J. J., D. Laibson, B. C. Madrian, and A. Metrick (2004). For better or for worse. Default effects and 401(k) savings behavior. In D. A. Wise (Ed.), *Perspectives on the Economics of Aging*, pp. 81–121. Chicago, IL: University of Chicago Press.

Christoffersen, S., R. Evans, and D. K. Musto (2013). What do consumers' fund flows maximize? Evidence from their brokers' incentives. *Journal of Finance 68*(1), 201–235.

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

Cookson, G., T. Jenkinson, H. Jones, and J. V. Martinez (2021). Best buys and own brands: Investment platforms recommendations of mutual funds. *Review of Financial Studies 34*, 227–263.

Davis, G. F. and E. H. Kim (2007). Business ties and proxy voting by mutual funds. *Journal of Financial Economics 85*(2), 552–570.

Del Guercio, D. and J. Reuter (2014). Mutual fund performance and the incentive to generate alpha. *Journal of Finance 69*(4), 1673–1704.

Doellman, T. W. and S. H. Sardarli (2016). An investigation of administrative fees in defined contribution plans. *Financial Analysts Journal 72*, 41–51.

Egan, M., A. MacKay, and H. Yang (2022). What drives variation in investor portfolios? Evidence from retirement plans. *Working Paper*.

Egan, M., G. Matvos, and A. Seru (2019). The market for financial adviser misconduct. *Journal of Political Economy 127*, 233–295.

Elton, E. J., M. J. Gruber, and C. R. Blake (2006). The adequacy of investment choices offered by 401(k) plans. *Journal of Public Economics 90*, 1299–1314.

Gil-Bazo, J. and P. Ruiz-Verdu (2009). The relation between price and performance in the mutual fund industry. *Journal of Finance 64*, 2153–2183.

Hamdani, A., E. Kandel, Y. Mugerman, and Y. Yafeh (2017). Incentive fees and competition in pension funds: Evidence from a regulatory experiment. *Journal of Law, Finance, and Accounting 2*(1), 49–86.

Hochberg, Y. V., A. Ljungqvist, and Y. Lu (2007). Whom you know matters: Venture capital networks and investment performance. *Journal of Finance 62*, 251–302.

Huberman, G. and W. Jiang (2006). Offering versus choice in 401(k) plans: Equity exposure and number of funds. *Journal of Finance 61*, 763–801.

Huberman, G. and P. Sengmueller (2004). Performance and employer stock in 401(k) plans. *Review of Finance 8*, 403–443.

Inderst, R. and M. Ottaviani (2012). How (not) to pay for advice: A framework for consumer protection. *Journal of Financial Economics 105*, 393–411.

Kronlund, M., V. K. Pool, C. Sialm, and I. Stefanescu (2021). Out of sight no more? The effect of fee disclosures on 401(k) investment allocations. *Journal of Financial Economics 141*, 644–668.

Madrian, B. C. and D. F. Shea (2001). The power of suggestion: Inertia in 401(k) participation and savings behavior. *Quarterly Journal of Economics 116*, 1149–1187.

Mellman, G. S. and G. T. Sanzenbacher (2018). 401 (k) lawsuits: What are the causes and consequences? *Issue in Brief*, 18–8.

Mitchell, O. S. and S. Utkus (2021). Target date funds and portfolio selection in 401(k) plans. *Journal of Pension Economics and Finance*, 1–18.

Muir, D. M. (2013). Choice architecture and the locus of fiduciary obligation in defined contribution plans. *Iowa Law Review 99*, 1–55.

Parker, J. A., A. Schoar, A. Cole, and D. Simester (2022). Household portfolios and retirement saving over the life cycle. Working Paper.

Parker, J. A., A. Schoar, and Y. Sun (2022). Retail financial innovation and stock market dynamics: The case of target date funds. Working Paper.

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

Poterba, J. M. (2003). Employer stock and 401(k) plans. *American Economic Review 93*, 398–404.

Rauh, J. (2006). Own company stock in defined contribution pension plans: A takeover defense? *Journal of Financial Economics 81*(2), 379–410.

Rossi, A. G., D. Blake, A. Timmermann, I. Tonks, and R. Wermers (2018). Network centrality and delegated investment performance. *Journal of Financial Economics 128*(1), 183–206.

Roussanov, N., H. Ruan, and Y. Wei (2021). Marketing mutual funds. *Review of Financial Studies 34*, 3045–3094.

Ruiz-Zaiko, L. and B. Williams (2007). Plan sponsors besieged by 401(k) fee lawsuits. Pensions & Benefits Management Bridgebay Financial.

Sialm, C., L. T. Starks, and H. Zhang (2015). Defined contribution pension plans: Sticky or discerning money? *Journal of Finance 70*, 805–838.

Sokolinski, S. (2021). Regulating commission-based financial advice: Evidence from a natural experiment. *Forthcoming: Journal of Financial and Quantitative Analysis*.

Stoughton, N. M., Y. Wu, and J. Zechner (2011). Intermediated investment management. *Journal of Finance 66*, 947–980.

Tang, N., O. S. Mitchell, G. R. Mottola, and S. P. Utkus (2010). The efficiency of sponsor and participant portfolio choices in 401(k) plans. *Journal of Public Economics 94*, 1073–1085.

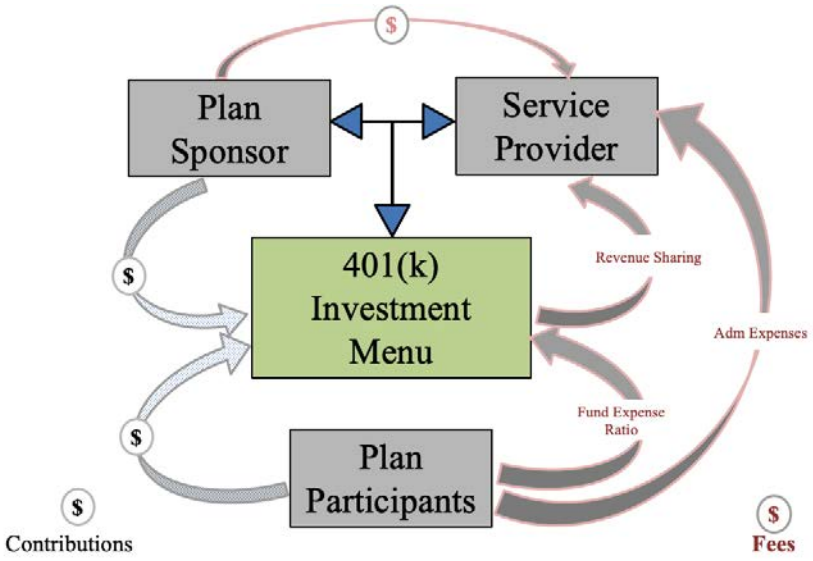
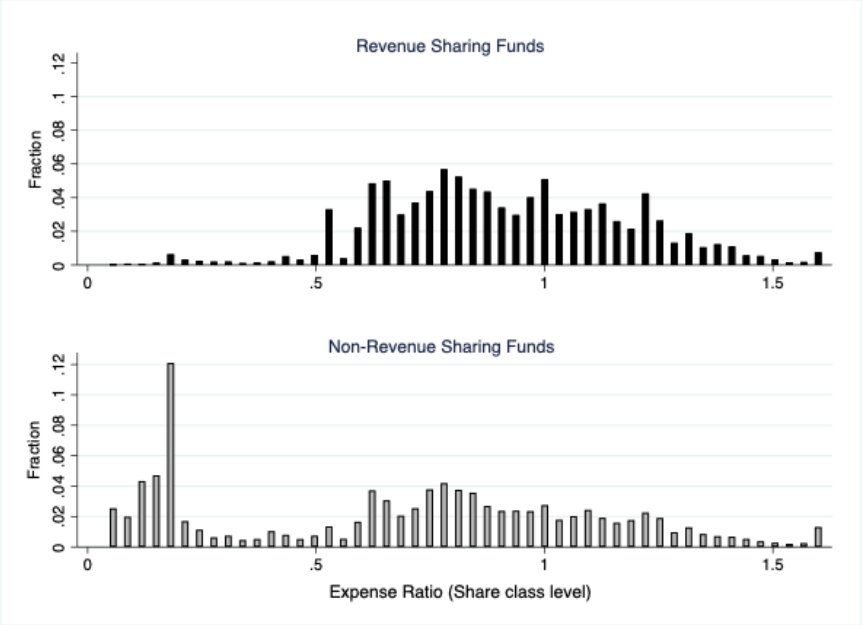


Figure 1: Flow of contributions and expenses in a 401(k) plan.
The diagram shows an example of the flow of payments from participants to mutual fund companies (expense ratios) and to the service provider (administrative expenses) as well as the flow of indirect payments from mutual fund companies to the service provider (revenue sharing).

Panel A: Share Class Level Expense ratios (All funds)



Panel B: Share Class Level Expense ratios (Domestic equity subsample)

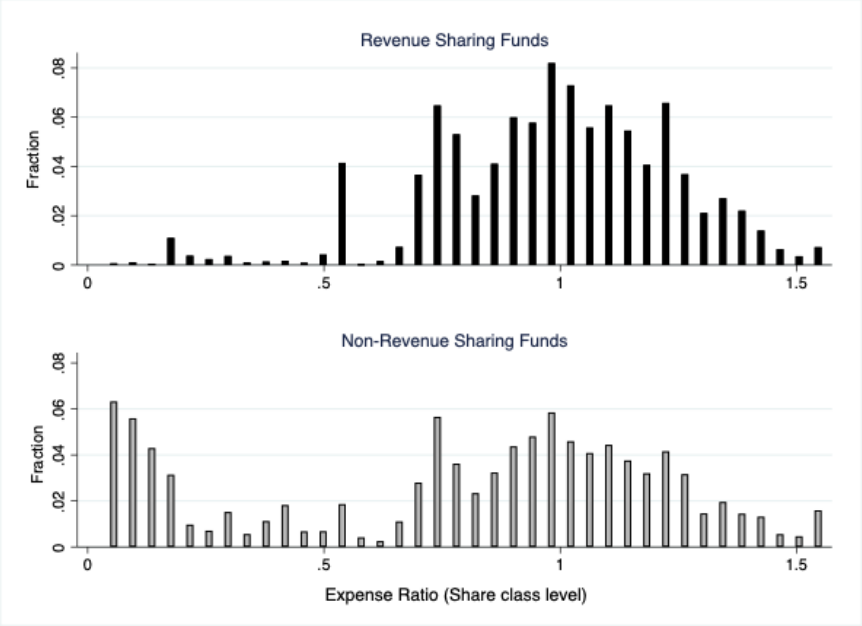


Figure 2:
The distribution of expense ratios for revenue-sharing and non-sharing funds.

Table 1: Sample Descriptive Statistics.
The table provides descriptive statistics at the plan level. Our sample is based on the largest 1,000 401(k) plans in the U.S. from 2009 to 2013. *ParticipantAll-InCosts* are the total fees paid by participants and are calculated as the sum of administrative expenses and the asset weighted average of the expense ratios of the investment options on the menu. *Revenue Sharing Ratio* is the average revenue share that unaffiliated funds pay (as a proportion of fund assets) in a revenue sharing plan across all unaffiliated funds. *Revenue Sharing Ratio (if positive)* is the average revenue share unaffiliated funds pay (as a proportion of fund assets) in a revenue sharing plan across revenue sharing unaffilated funds. *UnionizedPlan* is an indicator variable that takes the value of one if the plan is collectively bargained. *EligibleIndirectCompensation* is an indicator variable indicating whether the service providers receive eligible indirect compensation. *ServiceCodes* captures the number of different services that the recordkeeper offers to the plan and is calculated by counting the number of different service codes associated with the recordkeeper from Schedule C of Form 5500. All other variables are self-explanatory.

	Mean	Median	Min	Max	N
Revenue Sharing Plan	0.54	1	0	1	3,416
Plan Assets (in millions)	1087.96	548.12	49.21	48,151.00	3,416
Average Account Size	79,290.37	73,545.43	5,817.96	150,204.10	3,415
Plan Age	27.61	26	0	96	3,416
Number of MF options	21.6	21	1	99	3,416
Proportion of Affiliated Funds	0.4	0.4	0	1	3,416
Employer Match	0.58	0.53	0	6.96	3,310
Proportion in Employer Securities	0.09	0.03	0	0.52	3,416
Participant All-in Costs	0.62%	0.64%	0.13%	1.56%	3,334
RK Direct Compensation: Adm Expenses	0.06%	0.03%	0.00%	0.64%	3,416
Average Expense Ratio	0.56%	0.58%	0.02%	1.79%	3,334
Revenue Sharing Ratio	0.10%	0.09%	0%	0.62%	1,848
Revenue Sharing Ratio (if positive)	0.18%	0.16%	0.00%	0.76%	1,848
Unionized Plan	0.18	0	0	1	3,416
Eligible Indirect Compensation	0.83	1	0	1	3,345
Service Codes (bundled services)	2.47	1	1	12	3,416

Table 2: Revenue Sharing at Menu Option Level

The table shows revenue sharing statistics at the menu level using our sample of top 1000 401(k) plans for the 2009-2013 time period. *Percentage of Unaff. Funds that RS* is the average percentage of unaffiliated funds that revenue share in a revenue-sharing plan. *Mean RS Unaff. funds* calculates the average revenue share as a proportion of fund assets in a revenue-sharing plan. *Mean RS if RS is positive* reports the corresponding average revenue share, but the calculation only includes those funds in the plan that revenue share.

	Number of Unaff Options	Number of Unaff. options for RS Plans	Percentage of Unaff. Funds that RS	Mean RS Unaff. funds (bps)	Mean RS if RS is positive (bps)
2009	8,544	4,365	59.45%	13.1	20.6
2010	8,140	4,461	55.95%	11.5	20.7
2011	8,185	4,537	55.62%	10.0	17.3
2012	7,994	4,482	53.61%	9.2	16.2
2013	7,566	4,298	51.65%	8.1	15.1

Table 3: Univariate Description of Fund Deletions and Additions.
The table shows univariate statistics on deletion and addition rates of funds by revenue sharing in revenue sharing plans. The deletion rate is calculated as the ratio between the number of menus from which a revenue sharing fund (non-revenue sharing fund) is delisted during the year and the total number plans on which it revenue shares (does not revenue share). Addition rates are similarly calculated, where funds are classified as revenue sharing if their propensity to revenue share is above the median in the last two years. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Panel A: Deletion Rates			
Year	Revenue Sharing	Non-Revenue Sharing	Difference
2010	0.1657	0.2834	-0.1177***
2011	0.2211	0.3711	-0.1500***
2012	0.2017	0.2268	-0.0251
2013	0.2058	0.2481	-0.0423**

Panel B: Addition Rates			
Year	Revenue Sharing	Non-Revenue Sharing	Difference
2010	0.0024	0.0013	0.0011***
2011	0.0012	0.0010	0.0002
2012	0.0013	0.0008	0.0005**
2013	0.0014	0.0007	0.0007***

Table 4: Fund Deletions in Revenue Sharing Plans.

The table reports coefficient estimates for the logit model $Prob(DEL_{p,f,t} = 1) = \Lambda(\beta RevenueShare_{p,f,t-1} + \mathbf{\Gamma' Controls}_{p,f,t-1})$, where $DEL_{p,f,t}$ is an indicator variable that takes the value of one if mutual fund f is deleted from plan p in year t. In columns 1-3, $RevenueShare_{p,f,t-1}$ is an indicator variable that takes the value of one if fund f revenue shares in plan p at the end of year $t-1$. In columns 4-6 of the table, $RevenueShare_{p,f,t-1}$ is the amount of rebate that fund f pays to plan p's recordkeeper at the end of year $t-1$. $\mathbf{Controls}_{f,p,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Revenue Sharing Fund	-0.308***	-0.375***	-0.199**			
	(0.078)	(0.100)	(0.097)			
Revenue Sharing Percentage				-0.848***	-0.838**	-0.556
				(0.274)	(0.371)	(0.353)
Prior 3-year Performance	-0.020***	-0.016***	-0.024***	-0.020***	-0.015***	-0.023***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Expense Ratio	1.305***	3.698***	1.077***	1.306***	3.346***	1.107***
	(0.341)	(1.059)	(0.400)	(0.306)	(1.014)	(0.356)
Log(Option Size)	-0.093***	-0.089***	-0.158***	-0.100***	-0.090***	-0.165***
	(0.020)	(0.027)	(0.026)	(0.021)	(0.028)	(0.026)
Log(Plan Assets)	0.128***	0.120*	0.376	0.134***	0.095	0.250
	(0.044)	(0.065)	(0.616)	(0.045)	(0.072)	(0.622)
Log(Average Account Size)	-0.073	-0.174***	-1.133***	-0.072	-0.141**	-1.091**
	(0.045)	(0.061)	(0.438)	(0.046)	(0.063)	(0.461)
Perc of Affiliated Funds	-0.412***	-0.419**	2.222***	-0.423***	-0.396**	2.498***
	(0.124)	(0.170)	(0.640)	(0.127)	(0.172)	(0.663)
Employer Match	0.224***	0.188	-1.295***	0.305***	0.286**	-1.366***
	(0.080)	(0.119)	(0.323)	(0.091)	(0.130)	(0.340)
Perc in Employer Securities	-0.937***	-1.042**	-3.191	-0.972***	-1.118**	-3.622
	(0.320)	(0.469)	(2.404)	(0.330)	(0.489)	(2.506)
Unionization	-0.195***	-0.256**	0.635*	-0.162**	-0.224**	0.769**
	(0.072)	(0.105)	(0.330)	(0.074)	(0.107)	(0.332)
Plan Age	0.314***	0.407***	0.272	0.335***	0.422***	0.310
	(0.051)	(0.081)	(0.405)	(0.052)	(0.082)	(0.405)
MFoptions	0.022***	0.021***	0.072***	0.023***	0.023***	0.073***
	(0.002)	(0.003)	(0.013)	(0.002)	(0.003)	(0.013)
Bundled Services	-0.005	-0.016	0.109	-0.006	-0.017	0.146**
	(0.017)	(0.023)	(0.068)	(0.018)	(0.023)	(0.070)
Flow Volatility	2.227***	3.038***	-10.448	2.234***	3.042***	-10.560
	(0.168)	(0.290)	(7.599)	(0.174)	(0.284)	(7.729)
Plan Complexity	0.073***	0.064***	0.090	0.068***	0.065***	0.088
	(0.015)	(0.020)	(0.058)	(0.016)	(0.022)	(0.060)
Participant Loans	8.436***	8.171**	-35.052	8.992***	10.544***	-29.376
	(2.632)	(3.789)	(24.691)	(2.654)	(3.785)	(25.819)
Eligible Compensation	-0.027	-0.003	-0.321*	0.030	0.036	-0.220
	(0.083)	(0.114)	(0.167)	(0.087)	(0.119)	(0.186)
Fund FE	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES
Observations	15,108	13,096	12,990	14,689	12,689	12,452

Table 5: Fund Additions in Revenue Sharing Plans.

The table reports coefficient estimates for the logit model $Prob(ADD_{p,f,t} = 1) = \Lambda(\beta RevenueShare_{f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1})$, where $ADD_{p,f,t}$ is an indicator variable that takes the value of one if mutual fund f is added to plan p in year t. In columns 1 and 2, $RevenueShare_{f,t-1}$ is measured by the proportion of the menus on which fund f revenue shared in the past. In columns 3 and 4, we use the average rebate that fund f paid to plan recordkeepers in the past. $\mathbf{Controls}_{p,f,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. The model is estimated using the sample of revenue-sharing plans. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Probability of Revenue Sharing	0.733***	0.718***		
	(0.181)	(0.181)		
Average Revenue Sharing			2.289***	2.263***
			(0.676)	(0.675)
Prior 3-year Performance	0.013***	0.013***	0.013***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)
Expense Ratio	-1.698***	-1.666***	-1.650***	-1.624***
	(0.357)	(0.357)	(0.352)	(0.353)
Log(Plan Assets)	-0.232***	-1.855***	-0.232***	-1.846***
	(0.034)	(0.180)	(0.034)	(0.179)
Log(Average Account Size)	-0.044	0.008	-0.044	0.011
	(0.033)	(0.162)	(0.033)	(0.162)
Perc of Affiliated Funds	-1.906***	-4.471***	-1.901***	-4.475***
	(0.137)	(0.360)	(0.137)	(0.360)
No. of Funds in the Same Style	-0.294***	-0.232***	-0.297***	-0.235***
	(0.041)	(0.040)	(0.041)	(0.040)
Employer Match	-0.106	-0.634***	-0.108	-0.631***
	(0.078)	(0.204)	(0.078)	(0.204)
Perc in Employer Securities	-0.981***	-0.899	-0.987***	-0.914
	(0.227)	(1.019)	(0.227)	(1.017)
Unionization	-0.051	0.146	-0.051	0.144
	(0.049)	(0.157)	(0.049)	(0.156)
Plan Age	0.017	0.137	0.017	0.144
	(0.031)	(0.217)	(0.031)	(0.217)
MFoptions	0.045***	0.051***	0.045***	0.052***
	(0.002)	(0.005)	(0.002)	(0.005)
Bundled Services	-0.061***	0.145**	-0.062***	0.145**
	(0.016)	(0.061)	(0.016)	(0.061)
Flow Volatility	0.886***	102.026***	0.883***	101.705***
	(0.103)	(29.822)	(0.103)	(29.832)
Plan Complexity	0.028**	0.132***	0.028**	0.132***
	(0.012)	(0.036)	(0.012)	(0.036)
Participant Loans	4.936**	-2.638	4.938**	-2.816
	(2.157)	(11.175)	(2.156)	(11.168)
Eligible Compensation	0.185***	-0.229*	0.185***	-0.226*
	(0.064)	(0.134)	(0.064)	(0.134)
Plan FE	NO	YES	NO	YES
Observations	1,861,950	1,601,360	1,861,950	1,601,360

Table 6: Fund Additions - Placebo Test.

The table reports coefficient estimates for the logit model $Prob(ADD_{p,f,t} = 1) = \Lambda(\beta RevenueShare_{f,t-1} + \mathbf{\Gamma' Controls}_{p,f,t-1})$, where $ADD_{p,f,t}$ is an indicator variable that takes the value of one if mutual fund f is added to plan p in year t. In columns 1 and 2, $RevenueShare_{f,t-1}$ is measured by the proportion of the menus on which fund f revenue shared in the past. In columns 3 and 4, we use the average rebate that fund f paid to plan recordkeepers in the past. $\mathbf{Controls}_{p,f,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. The model is estimated using the sample of non-revenue sharing plans. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Probability of Revenue Sharing	0.211	0.210		
	(0.176)	(0.175)		
Average Revenue Sharing			-0.052	-0.044
			(0.664)	(0.658)
Prior 3-year Performance	0.014***	0.014***	0.014***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
Expense Ratio	-1.028***	-0.969***	-0.968***	-0.910***
	(0.282)	(0.283)	(0.281)	(0.282)
Log(Plan Assets)	-0.025	-0.097	-0.025	-0.098
	(0.030)	(0.238)	(0.030)	(0.238)
Log(Average Account Size)	-0.122***	0.025	-0.122***	0.025
	(0.038)	(0.157)	(0.038)	(0.157)
Perc of Affiliated Funds	-1.588***	-2.810***	-1.586***	-2.809***
	(0.093)	(0.474)	(0.093)	(0.474)
No. of Funds in the Same Style	-0.227***	-0.188***	-0.227***	-0.188***
	(0.038)	(0.038)	(0.038)	(0.038)
Employer Match	-0.108**	0.076	-0.108**	0.075
	(0.055)	(0.161)	(0.055)	(0.161)
Perc in Employer Securities	0.371	4.286***	0.372	4.287***
	(0.237)	(1.327)	(0.237)	(1.328)
Unionization	-0.455***	0.293	-0.455***	0.293
	(0.078)	(0.215)	(0.078)	(0.215)
Plan Age	0.040	-0.114	0.040	-0.112
	(0.042)	(0.338)	(0.042)	(0.338)
MFoptions	0.038***	0.073***	0.038***	0.073***
	(0.001)	(0.012)	(0.001)	(0.012)
Bundled Services	0.052***	-0.100*	0.052***	-0.100*
	(0.017)	(0.051)	(0.017)	(0.051)
Flow Volatility	0.865***	86.926***	0.865***	87.043***
	(0.138)	(18.662)	(0.138)	(18.686)
Plan Complexity	0.116***	-0.205***	0.116***	-0.206***
	(0.016)	(0.061)	(0.016)	(0.061)
Participant Loans	3.682*	38.204***	3.681*	38.202***
	(2.038)	(10.704)	(2.038)	(10.707)
Eligible Compensation	-0.337***	-0.679***	-0.337***	-0.680***
	(0.060)	(0.137)	(0.060)	(0.136)
Plan FE	NO	YES	NO	YES
Observations	1,532,998	1,066,054	1,532,998	1,066,054

Table 7: Plan Characteristics and Revenue Sharing.

This table compares various plan characteristics in revenue sharing ('RS') and non-revenue sharing ('non-RS') Plans. The third column reports the results of a t-test that tests the whether the differences are significant. Standard errors are clustered at the plan level. Significance levels for tests of the difference in means are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Non-Revenue Sharing	Revenue Sharing	Difference
Plan Assets (in millions)	1,252.86	949.19	-303.67*
Average Account Size	77,875.97	80,479.83	2,603.86
Plan Age	28.02	27.25	-0.77
Investment Flow Volatility	0.26	0.24	-0.02
# of Third-party Options	13	11.91	-1.09*
# of Third-party Companies	7.01	7.05	0.04
# of Asset Classes on Balance Sheet	5.16	5.28	0.12
% Invested in Proprietary Funds	0.35	0.45	0.10***
Bundled Services	2.4	2.53	0.13
Employer Match	0.59	0.56	-0.03
% Invested in Employer Securities	0.09	0.08	-0.01
Unionized Plan	0.14	0.21	0.07***
Outstanding Participant Loans	0.02	0.02	0.00
Eligible Indirect Compensation	0.83	0.83	0.00

Table 8: Revenue Sharing and Plan Costs Paid by Participants.
The table reports coefficient estimates for the following OLS model: $PlanCost_{p,t} = \beta RSplan_{p,t} + \mathbf{\Gamma' Controls}_{p,t} + \epsilon_{p,t}$. In columns 1-4, $PlanCost_{p,t}$ is the asset weighted average expense ratio in plan p in year t. In columns 5-8, $PlanCost_{p,t}$ is the all-in fee of plan participants, calculated as the sum of administrative fees (expressed as a percent of plan assets) and the average expense ratio of the plan's mutual fund options. The control variables also include year dummies and plan-level average fund characteristics, such as style, age, size, and turnover. Standard errors are clustered at the plan level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively

	Value-weighted Average Expense Ratio				All-in Participant Fees			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue Sharing Plan	0.037***	0.019*			0.028***	0.018*		
	(0.009)	(0.010)			(0.010)	(0.011)		
Asset-weighted Average Rebate			0.407***	0.246***			0.359***	0.270***
			(0.053)	(0.052)			(0.058)	(0.056)
Log(Averege Option Size)	-0.006	-0.009**	-0.008	-0.011***	-0.011**	-0.008**	-0.014**	-0.011***
	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)
Log(Plan Assets)	-0.020***	-0.022	-0.015**	-0.017	-0.016**	-0.043	-0.013	-0.040
	(0.007)	(0.026)	(0.007)	(0.028)	(0.007)	(0.029)	(0.008)	(0.032)
Log(Average Account Size)	-0.047***	-0.001	-0.041***	0.005	-0.081***	-0.013	-0.078***	-0.009
	(0.008)	(0.020)	(0.008)	(0.021)	(0.010)	(0.021)	(0.010)	(0.022)
Perc of Affiliated Funds	-0.048***	0.001	-0.058***	-0.019	-0.102***	-0.015	-0.113***	-0.038
	(0.016)	(0.039)	(0.017)	(0.039)	(0.018)	(0.042)	(0.019)	(0.043)
Employer Match	0.012	0.019	0.025**	0.023	0.028**	0.023	0.042***	0.030
	(0.011)	(0.018)	(0.011)	(0.020)	(0.013)	(0.018)	(0.013)	(0.020)
Perc in Employer Securities	0.030	-0.094	0.013	-0.107	-0.012	-0.158	-0.016	-0.186
	(0.038)	(0.106)	(0.039)	(0.115)	(0.045)	(0.109)	(0.048)	(0.119)
Unionization	-0.003	0.015	-0.006	0.017	0.009	0.021	0.005	0.024
	(0.011)	(0.016)	(0.011)	(0.018)	(0.013)	(0.015)	(0.013)	(0.017)
Plan Age	-0.001	-0.052**	0.002	-0.066**	-0.005	-0.053**	-0.001	-0.067**
	(0.008)	(0.024)	(0.008)	(0.028)	(0.009)	(0.026)	(0.009)	(0.029)
MFoptions	0.001	0.000	0.000	0.001	0.000	-0.000	0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Bundled Services	-0.002	0.002	-0.000	0.001	-0.002	0.003	-0.000	0.003
	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.006)
Flow Volatility	0.054**		0.068**		0.048		0.060*	
	(0.027)		(0.027)		(0.029)		(0.031)	
Plan Complexity	0.000	-0.002	-0.000	-0.002	0.008***	-0.003	0.008***	-0.005
	(0.002)	(0.004)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
Participant Loans	-0.132	0.937	-0.241	1.155	0.157	0.772	0.020	1.182
	(0.439)	(1.028)	(0.463)	(1.097)	(0.467)	(1.086)	(0.489)	(1.144)
Eligible Compensation	0.027**	0.017	0.030**	0.019	-0.000	0.004	0.001	0.006
	(0.013)	(0.011)	(0.013)	(0.012)	(0.014)	(0.012)	(0.015)	(0.012)
Plan FE	NO	YES	NO	YES	NO	YES	NO	YES
Observations	3,195	3,155	2,946	2,892	3,195	3,155	2,946	2,892
R-squared	0.506	0.834	0.472	0.813	0.512	0.844	0.471	0.825

Table 9: Revenue Sharing and Share Class Level Expense Ratios.
The table estimates the OLS model $ExpenseRatio_{p,f,t} = \beta RevenueShare_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}$, where $ExpenseRatio_{p,f,t}$ is the expense ratio of the share class of fund f included in plan p in year t. In columns 1-3, $RevenueShare_{p,f,t-1}$ is an indicator variable that takes the value of one if fund f revenue shares in plan p at the end of year $t-1$. In columns 4-6, $RevenueShare_{p,f,t-1}$ is the amount of rebate that fund f pays to plan p's recordkeeper at the end of year $t-1$. $\mathbf{Controls}_{f,p,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Revenue Sharing Fund	0.194***	0.018**	0.177***			
	(0.024)	(0.008)	(0.020)			
Revenue Sharing Percentage				0.889***	0.388***	0.854***
				(0.055)	(0.031)	(0.052)
Prior 3-year Performance	0.000	0.000**	0.000	0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Style Expense Ratio	0.501***	0.124	0.478***	0.470***	0.098	0.442***
	(0.084)	(0.079)	(0.071)	(0.076)	(0.077)	(0.065)
Log(Option Size)	-0.012***	-0.004***	-0.010***	-0.013***	-0.006***	-0.010***
	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)
Log(Plan Assets)	-0.001	-0.008***	0.018	0.003	-0.002	0.024
	(0.005)	(0.003)	(0.018)	(0.005)	(0.002)	(0.016)
Log(Average Account Size)	-0.020***	-0.016***	-0.007	-0.009*	-0.011***	-0.024**
	(0.006)	(0.003)	(0.011)	(0.005)	(0.002)	(0.010)
Perc of Affiliated Funds	0.023	-0.023***	0.012	0.024*	-0.018***	-0.017
	(0.015)	(0.007)	(0.034)	(0.014)	(0.006)	(0.031)
Employer Match	0.003	-0.004	0.006	0.010	0.001	0.012
	(0.009)	(0.003)	(0.010)	(0.009)	(0.004)	(0.010)
Perc in Employer Securities	0.002	0.026**	-0.083	-0.007	0.021*	-0.020
	(0.032)	(0.013)	(0.087)	(0.029)	(0.012)	(0.079)
Unionization	0.004	-0.008***	-0.004	0.003	-0.008***	0.006
	(0.008)	(0.003)	(0.009)	(0.007)	(0.003)	(0.009)
Plan Age	0.001	0.001	-0.036**	0.002	-0.000	-0.044***
	(0.005)	(0.002)	(0.015)	(0.005)	(0.002)	(0.014)
MFoptions	0.002***	0.001***	0.002***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Bundled Services	0.004*	0.000	-0.008**	0.006***	0.002***	-0.011***
	(0.002)	(0.001)	(0.004)	(0.002)	(0.001)	(0.004)
Flow Volatility	-0.038**	-0.019*		-0.027	-0.021**	
	(0.019)	(0.010)		(0.017)	(0.008)	
Plan Complexity	-0.003**	-0.002***	0.000	-0.002*	-0.002***	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Participant Loans	0.354	0.122	0.904	-0.094	-0.061	1.115
	(0.302)	(0.152)	(0.777)	(0.275)	(0.130)	(0.731)
Eligible Compensation	-0.028***	0.003	-0.019**	-0.030***	-0.003	-0.036***
	(0.008)	(0.004)	(0.008)	(0.008)	(0.003)	(0.009)
Fund FE	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES
Observations	13,304	13,004	13,294	12,992	12,689	12,982
R-squared	0.674	0.936	0.746	0.710	0.945	0.774

Table 10: Future Fund Performance.
We estimate the following OLS regression: $PerfRank_{p,b,t} = \beta_0 + \beta_{RS} RS_{b,t-1} + \beta_{EXP} EXP_{p,b,t-1} + \epsilon_{p,b,t}$, where $PerfRank_{p,b,t}$ is the weighted average monthly percentile performance rank (calculated within fund style using the CRSP fund universe) of the funds in portfolio b in plan p and $RS_{b,t-1}$ is an indicator that takes the value of one if the portfolio is formed using revenue-sharing funds and zero otherwise. $EXP_{p,b,t-1}$ is the weighted average expense ratio of the funds in the portfolio. Standard errors are clustered at plan level. Robust standard errors are reported in parentheses. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	All funds		Domestic Equity Funds Only	
	(1)	(2)	(4)	(5)
Constant	56.241***	61.266***	60.488***	68.438***
	(0.377)	(0.674)	(0.626)	(0.786)
Revenue Sharing Fund	-4.280***	-0.178	-9.810***	-1.409***
	(0.428)	(0.388)	(0.671)	(0.533)
Average Exp. Ratio		-12.708***		-21.294***
		(1.119)		(1.192)
Observations	39,006	38,993	29,460	29,436
R-squared	0.013	0.034	0.051	0.116

Table 11: Influence and Network Centrality.

Panels A and B report coefficient estimates of the following OLS model: $RevenueShare_{p,f,t} = \beta Pressure_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}$. In Panel A, *RevenueShare* is an indicator that takes the value of one if the fund revenue shares at the end of the year. In Panel B, it is the rebate that the fund pays to the plan's recordkeeper. In columns 1-3, we measure *Pressure* by $RecordkeeperInfluence$, calculated as the percent of the total 401(k) assets of the fund's management company included in plans administered by the recordkeeper. In Columns 4-6, we measure *Pressure* by the network centrality measure *degree*, while in columns 7-9, we use *betweennes* (see Hochberg et al. (2007)). We add *ReciprocalRelation*, which is an indicator equal to one if fund f's management company in plan p is a recordkeeper in another plan where plan p's recordkeeper offers one of its funds as an investment option. $Log(\#SameStyle)$ is the log number of same-style funds in the recordkeeper's own proprietary lineup. Additionally, the regression includes identical control variables to those used in our other fund-plan-year analyses (see Equation 1), including year and style dummies, and fund controls. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Panel A. Using the Revenue Sharing Indicator as the Dependent Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RK Influence	0.455***	0.887***	0.043						
	(0.069)	(0.112)	(0.042)						
Degree				689.032***	691.202***	558.562***			
				(50.998)	(58.206)	(63.328)			
Betweeness							6.808***	6.735***	1.970***
							(0.618)	(0.700)	(0.398)
ReciprocalRelation	-0.133***	-0.172***	-0.155***	-0.192***	-0.228***	-0.169***	-0.179***	-0.212***	-0.162***
	(0.017)	(0.016)	(0.018)	(0.018)	(0.019)	(0.018)	(0.018)	(0.022)	(0.018)
Log(#SameStyle)	0.052***	0.046***	0.026***	0.011***	0.016***	0.017***	0.042***	0.048***	0.025***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)
Fund FE	NO	YES	NO	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Observations	25,945	25,595	25,940	26,030	25,677	26,026	26,030	25,677	26,026
R-squared	0.254	0.438	0.580	0.314	0.469	0.583	0.255	0.420	0.581

Panel B. Using the Revenue Share Paid as the Dependent Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RK Influence	0.088***	0.163***	-0.002						
	(0.011)	(0.013)	(0.010)						
Degree				132.550***	127.236***	88.330***			
				(9.432)	(10.134)	(13.929)			
Betweeness							1.422***	1.303***	0.266***
							(0.116)	(0.117)	(0.074)
ReciprocalRelation	-0.029***	-0.034***	-0.030***	-0.041***	-0.045***	-0.031***	-0.038***	-0.042***	-0.030***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Log(# SameStyle)	0.010***	0.009***	0.005***	0.002***	0.004***	0.003**	0.008***	0.009***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fund FE	NO	YES	NO	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Observations	25,945	25,595	25,940	26,030	25,677	26,026	26,030	25,677	26,026
R-squared	0.212	0.384	0.509	0.248	0.401	0.510	0.214	0.375	0.509

Internet Appendix
Mutual Fund Revenue Sharing in 401(k) Plans

Table A.1: Example of Plan Menu: Protective Life Corp. 401(k) Plan (2012)
The table shows the menu options of the 401(k) Plan of Protective Life Corp. in 2012. It also lists the current value (in $), the expense ratio (in %), and the revenue share (in %) for each of the options.

Option	Current Value	Expense Ratio	Revenue Share
Open Architecture Options:			
Columbia Mid Cap Index Fund	11,233,894	0.20	0.10
Dodge & Cox International Stock Fund	11,698,068	0.64	0.10
Dodge & Cox Stock Fund	18,436,885	0.52	0.10
Legg Mason Batterymarch Emerging Markets Fund	1,126,377	1.27	0.10
Neuberger Berman Genesis Fund	15,648,724	1.12	0.40
PIMCO Real Return Fund	4,408,954	0.47	0.02
T. Rowe Price Growth Stock Fund	15,089,112	0.70	0.15
T. Rowe Price Retirement 2015 Fund	3,263,493	0.65	0.15
T. Rowe Price Retirement 2025 Fund	5,392,003	0.73	0.15
T. Rowe Price Retirement 2035 Fund	3,267,995	0.77	0.15
T. Rowe Price Retirement 2045 Fund	2,841,702	0.78	0.15
Vanguard Total Bond Market Index Fund	6,442,237	0.22	0
Options from Recordkeeper (Fidelity):			
Spartan 500 Index Fund	14,487,232	0.05	-
Fidelity Managed Income II-1 Collective Trust Fund	24,679,252		
Other Options:			
Protective Life Corp. Common Stock	49,272,779		
Participant Loans	5,456,741		
Total	**192,745,448**		

Table A.2: Fund Deletions, Linear Probability Model.

The table reports coefficient estimates for a linear probability model $DEL_{p,f,t} = \beta RevenueShare_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}$, where $DEL_{p,f,t}$ is an indicator variable that takes the value of one if mutual fund f is deleted from plan p at time t. In columns 1-3, $RevenueShare_{p,f,t-1}$ is an indicator variable that takes the value of one if fund f revenue shares in plan p at the end of year $t-1$. In columns 4-6 of the table, $RevenueShare_{p,f,t-1}$ is the amount of rebate that fund f pays to plan p's recordkeeper at the end of year $t-1$. $\mathbf{Controls}_{f,p,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Revenue Sharing Fund	-0.037***	-0.033***	-0.023***			
	(0.008)	(0.009)	(0.008)			
Revenue Sharing Percentage				-0.115***	-0.085**	-0.058*
				(0.029)	(0.034)	(0.030)
Prior 3-year Performance	-0.002***	-0.001***	-0.002***	-0.002***	-0.001***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Expense Ratio	0.137***	0.314***	0.108***	0.136***	0.288***	0.110***
	(0.031)	(0.105)	(0.032)	(0.027)	(0.104)	(0.028)
Log(Option Size)	-0.013***	-0.010***	-0.016***	-0.013***	-0.010***	-0.017***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
Log(Plan Assets)	0.020***	0.016***	0.015	0.020***	0.014***	0.009
	(0.004)	(0.004)	(0.043)	(0.004)	(0.005)	(0.043)
Log(Average Account Size)	-0.011***	-0.013***	-0.055**	-0.012***	-0.012***	-0.053*
	(0.004)	(0.004)	(0.026)	(0.004)	(0.004)	(0.027)
Perc of Affiliated Funds	-0.052***	-0.032***	0.080*	-0.052***	-0.032***	0.080
	(0.012)	(0.011)	(0.048)	(0.012)	(0.011)	(0.049)
Employer Match	0.020***	0.014*	-0.082***	0.028***	0.020**	-0.082***
	(0.007)	(0.007)	(0.020)	(0.008)	(0.008)	(0.021)
Perc in Employer Securities	-0.087***	-0.076***	-0.255	-0.096***	-0.081***	-0.281*
	(0.026)	(0.026)	(0.156)	(0.026)	(0.026)	(0.155)
Unionization	-0.017***	-0.016***	0.052**	-0.014**	-0.013**	0.051**
	(0.006)	(0.006)	(0.021)	(0.006)	(0.006)	(0.020)
Plan Age	0.027***	0.022***	0.017	0.029***	0.024***	0.019
	(0.004)	(0.004)	(0.027)	(0.004)	(0.004)	(0.027)
MFoptions	0.003***	0.002***	0.008***	0.003***	0.003***	0.008***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Bundled Services	0.000	-0.001	0.005	0.000	-0.001	0.010
	(0.001)	(0.001)	(0.007)	(0.002)	(0.001)	(0.007)
Flow Volatility	0.247***	0.239***		0.246***	0.238***	
	(0.023)	(0.024)		(0.024)	(0.024)	
Plan Complexity	0.007***	0.005***	0.008*	0.007***	0.005***	0.008*
	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.004)
Participant Loans	0.863***	0.563**	-1.907	0.931***	0.691***	-1.648
	(0.252)	(0.251)	(1.452)	(0.258)	(0.250)	(1.479)
Eligible Compensation	0.003	0.005	-0.029**	0.009	0.009	-0.019
	(0.008)	(0.008)	(0.014)	(0.008)	(0.008)	(0.016)
Fund FE	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES
Observations	15,108	14,766	15,104	14,689	14,345	14,683
R-squared	0.112	0.247	0.251	0.114	0.247	0.254

Table A.3: Fund Deletions, Linear Probability Model, Other Specifications.
The table reports coefficient estimates for a linear probability model $DEL_{p,f,t} = \beta RevenueShare_{p,f,t-1} + \mathbf{\Gamma'Controls}_{p,f,t-1} + \epsilon_{p,f,t}$, where $DEL_{p,f,t}$ is an indicator variable that takes the value of one if mutual fund f is deleted from plan p at time t. In columns 1-3, $RevenueShare_{p,f,t-1}$ is an indicator variable that takes the value of one if fund f revenue shares in plan p at the end of year $t-1$. In columns 4-6 of the table, $RevenueShare_{p,f,t-1}$ is the amount of rebate that fund f pays to plan p's recordkeeper at the end of year $t-1$. $\mathbf{Controls}_{f,p,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue Sharing Fund	-0.029***	-0.027***	-0.017*	-0.039***				
	(0.009)	(0.010)	(0.009)	(0.010)				
Revenue Sharing Percentage					-0.077**	-0.064*	-0.028	-0.094***
					(0.030)	(0.036)	(0.033)	(0.032)
Prior 3-year Performance	-0.002***	-0.001***	-0.001***		-0.002***	-0.001***	-0.001***	
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
Expense Ratio	0.129***	0.311***	0.202**		0.127***	0.291***	0.192*	
	(0.031)	(0.105)	(0.099)		(0.027)	(0.105)	(0.099)	
Log(Option Size)	-0.013***	-0.010***	-0.017***	-0.005**	-0.013***	-0.009***	-0.017***	-0.005*
	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Log(Plan Assets)	0.021***	0.017***	0.000	0.013***	0.021***	0.015***	-0.002	0.012***
	(0.004)	(0.004)	(0.040)	(0.004)	(0.004)	(0.005)	(0.040)	(0.004)
Log(Average Account Size)	-0.007*	-0.010**	-0.049**	-0.015***	-0.008*	-0.009**	-0.045*	-0.013***
	(0.004)	(0.004)	(0.024)	(0.004)	(0.005)	(0.005)	(0.024)	(0.004)
Perc of Affiliated Funds	-0.029**	-0.024*	0.065	-0.040***	-0.028**	-0.020	0.061	-0.038***
	(0.014)	(0.014)	(0.045)	(0.011)	(0.014)	(0.014)	(0.048)	(0.011)
Employer Match	0.018**	0.012	-0.070***	0.010	0.027***	0.019**	-0.069***	0.018**
	(0.008)	(0.008)	(0.018)	(0.007)	(0.009)	(0.009)	(0.018)	(0.008)
Perc in Employer Securities	-0.100***	-0.092***	-0.400***	-0.078***	-0.107***	-0.096***	-0.429***	-0.082***
	(0.026)	(0.026)	(0.146)	(0.025)	(0.027)	(0.027)	(0.146)	(0.026)
Unionization	-0.013**	-0.013**	0.062***	-0.018***	-0.011*	-0.012*	0.055***	-0.015***
	(0.006)	(0.006)	(0.019)	(0.006)	(0.006)	(0.006)	(0.018)	(0.006)
Plan Age	0.027***	0.022***	0.006	0.022***	0.029***	0.024***	0.011	0.023***
	(0.004)	(0.004)	(0.027)	(0.004)	(0.004)	(0.004)	(0.027)	(0.004)
MFoptions	0.003***	0.003***	0.007***	0.002***	0.004***	0.003***	0.007***	0.003***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Bundled Services	-0.014***	-0.014***	0.012*	-0.001	-0.015***	-0.015***	0.017**	-0.001
	(0.003)	(0.003)	(0.007)	(0.001)	(0.003)	(0.003)	(0.007)	(0.001)
Flow Volatility	0.231***	0.235***		0.229***	0.230***	0.234***		0.231***
	(0.023)	(0.025)		(0.023)	(0.023)	(0.025)		(0.024)
Plan Complexity	0.007***	0.005***	0.011***	0.003**	0.007***	0.005***	0.011***	0.003**
	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Participant Loans	1.096***	0.582**	-3.033**	0.705***	1.082***	0.643**	-2.940**	0.777***
	(0.270)	(0.279)	(1.320)	(0.237)	(0.275)	(0.280)	(1.352)	(0.237)
Eligible Compensation	0.048***	0.033***	-0.029**	0.004	0.055***	0.039***	-0.021	0.007
	(0.011)	(0.011)	(0.013)	(0.007)	(0.012)	(0.011)	(0.014)	(0.008)
RK FE	YES	YES	NO	NO	YES	YES	NO	NO
Fund FE	NO	YES	YES	NO	NO	YES	YES	NO
Plan FE	NO	NO	YES	NO	NO	NO	YES	NO
Fund-year FE	NO	NO	NO	YES	NO	NO	NO	YES
Observations	15,108	14,766	14,763	13,436	14,689	14,345	14,341	13,038
R-squared	0.125	0.255	0.367	0.357	0.127	0.256	0.368	0.357

Table A.4: Fund Deletions, Plans Below- and Above-Median Total Assets.
The table re-estimates the baseline logit model described in Table 4 for the subsample of plans with below- and above-median total assets, respectively. The empirical specifications and controls are identical to those in Table 4. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Panel A: Using the Revenue Sharing Indicator						
	(1)		(2)		(3)	
	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE
Revenue Sharing Fund	-0.465***	-0.177*	-0.720***	-0.311**	-0.329**	-0.050
	(0.114)	(0.098)	(0.151)	(0.146)	(0.142)	(0.128)
Prior 3-year Performance	-0.019***	-0.022***	-0.012**	-0.020***	-0.023***	-0.025***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)
Expense Ratio	1.299***	1.359***	2.918	4.432***	1.068**	1.191***
	(0.393)	(0.342)	(1.808)	(1.381)	(0.509)	(0.391)
Log(Option Size)	-0.134***	-0.067***	-0.131***	-0.072	-0.204***	-0.138***
	(0.029)	(0.024)	(0.042)	(0.046)	(0.036)	(0.034)
Log(Plan Assets)	0.381***	0.218***	0.348**	0.301**	1.491*	-0.893
	(0.103)	(0.076)	(0.154)	(0.133)	(0.805)	(1.261)
Log(Average Account Size)	-0.081	-0.209***	-0.209*	-0.348***	-0.371	-3.143***
	(0.070)	(0.068)	(0.116)	(0.100)	(0.534)	(0.794)
Perc of Affiliated Funds	-0.424**	-0.448**	-0.338	-0.493*	2.784***	0.295
	(0.182)	(0.176)	(0.278)	(0.287)	(0.791)	(1.265)
Employer Match	-0.051	0.167	0.110	-0.059	-1.050**	-1.583***
	(0.151)	(0.104)	(0.273)	(0.153)	(0.414)	(0.590)
Perc in Employer Securities	-1.705***	-0.249	-2.561***	-0.139	-3.541	-7.957*
	(0.440)	(0.410)	(0.696)	(0.693)	(2.890)	(4.193)
Unionization	-0.351***	-0.057	-0.449**	-0.108	-0.595	1.551***
	(0.120)	(0.099)	(0.174)	(0.159)	(0.595)	(0.410)
Plan Age	0.431***	0.196***	0.517***	0.430***	-0.269	0.480
	(0.073)	(0.070)	(0.130)	(0.128)	(0.611)	(0.599)
MFoptions	0.036***	0.021***	0.033***	0.027***	0.046***	0.123***
	(0.004)	(0.002)	(0.008)	(0.005)	(0.009)	(0.030)
Bundled Services	-0.006	0.044*	0.005	0.035	0.052	0.224**
	(0.028)	(0.023)	(0.039)	(0.036)	(0.109)	(0.110)
Flow Volatility	2.001***	2.603***	3.226***	3.424***	-4.764	-95.845
	(0.263)	(0.206)	(0.490)	(0.382)	(4.803)	(88.627)
Plan Complexity	0.017	0.065***	-0.041	0.063**	-0.339***	0.304***
	(0.026)	(0.019)	(0.035)	(0.029)	(0.110)	(0.082)
Participant Loans	18.798***	-5.663	22.325***	-9.835*	-29.568	-96.344*
	(3.686)	(4.191)	(5.591)	(5.881)	(28.041)	(55.129)
Eligible Compensation	0.207	-0.348***	0.303	-0.405**	-0.270	0.037
	(0.150)	(0.118)	(0.215)	(0.199)	(0.271)	(0.233)
Fund FE	NO	NO	YES	YES	NO	NO
Plan FE	NO	NO	NO	NO	YES	YES
Observations	7,255	7,853	5,733	6,078	6,147	6,672

Panel B: Using the Revenue Sharing Percentage						
	(1)		(2)		(3)	
	SMALL	LARGE	SMALL	LARGE	SMALL	LARGE
Revenue Sharing percentage	-0.875***	-0.794**	-1.350**	-0.762	-0.511	-0.249
	(0.331)	(0.402)	(0.534)	(0.652)	(0.446)	(0.506)
Prior 3-year Performance	-0.019***	-0.021***	-0.010**	-0.019***	-0.023***	-0.025***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)
Expense Ratio	1.233***	1.396***	2.856	3.703***	1.068**	1.204***
	(0.348)	(0.316)	(1.854)	(1.252)	(0.462)	(0.351)
Log(Option Size)	-0.146***	-0.068***	-0.131***	-0.075	-0.214***	-0.144***
	(0.029)	(0.025)	(0.043)	(0.050)	(0.036)	(0.034)
Log(Plan Assets)	0.337***	0.212***	0.200	0.357**	1.598*	-1.237
	(0.107)	(0.078)	(0.164)	(0.142)	(0.833)	(1.271)
Log(Average Account Size)	-0.082	-0.188***	-0.203*	-0.283***	-0.156	-3.061***
	(0.072)	(0.068)	(0.112)	(0.106)	(0.546)	(0.793)
Perc of Affiliated Funds	-0.511***	-0.400**	-0.506*	-0.302	3.562***	-1.420
	(0.190)	(0.179)	(0.288)	(0.293)	(0.808)	(1.520)
Employer Match	0.002	0.318***	0.251	0.140	-1.033**	-1.701***
	(0.152)	(0.119)	(0.265)	(0.190)	(0.419)	(0.606)
Perc in Employer Securities	-1.859***	-0.321	-2.898***	-0.405	-4.059	-7.857*
	(0.459)	(0.416)	(0.739)	(0.710)	(2.951)	(4.209)
Unionization	-0.279**	-0.044	-0.393**	-0.102	-0.155	1.516***
	(0.117)	(0.106)	(0.176)	(0.166)	(0.644)	(0.410)
Plan Age	0.455***	0.222***	0.535***	0.448***	-0.164	0.378
	(0.075)	(0.071)	(0.131)	(0.127)	(0.638)	(0.586)
MFoptions	0.037***	0.022***	0.034***	0.029***	0.044***	0.132***
	(0.004)	(0.002)	(0.007)	(0.005)	(0.009)	(0.033)
Bundled Services	0.005	0.037	0.022	0.028	0.045	0.297***
	(0.030)	(0.024)	(0.041)	(0.039)	(0.112)	(0.114)
Flow Volatility	1.969***	2.663***	3.357***	3.442***	-4.180	-135.855
	(0.272)	(0.213)	(0.520)	(0.360)	(4.909)	(90.751)
Plan Complexity	0.009	0.059***	-0.038	0.067**	-0.395***	0.287***
	(0.027)	(0.020)	(0.038)	(0.031)	(0.116)	(0.080)
Participant Loans	19.099***	-4.484	21.427***	-5.899	-23.692	-76.171
	(3.609)	(4.504)	(5.510)	(6.235)	(29.109)	(56.599)
Eligible Compensation	0.326**	-0.342***	0.517**	-0.414**	0.031	0.036
	(0.157)	(0.120)	(0.224)	(0.200)	(0.309)	(0.237)
Fund FE	NO	NO	YES	YES	NO	NO
Plan FE	NO	NO	NO	NO	YES	YES
Observations	7,074	7,615	5,546	5,879	5,889	6,397

Table A.5: Fund Additions, Plans Below- and Above-Median Total Assets.
The table re-estimates the baseline logit model described in Table 5 for the subsample of plans with below- and above-median total assets, respectively. The empirical specifications and controls are identical to those in Table 5. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Panel A: Using the Probability of Revenue Sharing				
	(1)		(2)	
	SMALL	LARGE	SMALL	LARGE
Probability of Revenue Sharing	0.981***	0.423*	0.994***	0.412*
	(0.190)	(0.226)	(0.192)	(0.227)
Prior 3-year Performance	0.015***	0.011***	0.015***	0.011***
	(0.003)	(0.004)	(0.003)	(0.004)
Expense Ratio	-1.160***	-2.317***	-1.134***	-2.337***
	(0.349)	(0.392)	(0.347)	(0.399)
Log(Average Account Size)	-0.015	-0.183***	-0.223	0.011
	(0.046)	(0.055)	(0.191)	(0.344)
Perc of Affiliated Funds	-2.297***	-1.433***	-4.660***	-7.398***
	(0.183)	(0.144)	(0.471)	(0.936)
No. of Funds in the Same Style	-0.330***	-0.244***	-0.232***	-0.205***
	(0.051)	(0.042)	(0.048)	(0.042)
Employer Match	-0.264**	-0.125	-1.170***	-0.013
	(0.113)	(0.091)	(0.265)	(0.182)
Perc in Employer Securities	-0.954***	-0.921***	-4.867***	-1.079
	(0.306)	(0.290)	(1.482)	(1.813)
Unionization	-0.157*	0.078	-0.445*	0.311
	(0.085)	(0.083)	(0.231)	(0.236)
Plan Age	0.024	0.006	0.249	1.303***
	(0.043)	(0.056)	(0.293)	(0.286)
MFoptions	0.053***	0.037***	0.068***	0.053***
	(0.002)	(0.002)	(0.007)	(0.008)
Bundled Services	-0.092***	-0.052***	0.168**	0.107
	(0.022)	(0.019)	(0.081)	(0.094)
Flow Volatility	1.226***	0.348	7.207**	4.664**
	(0.152)	(0.228)	(3.499)	(2.274)
Plan Complexity	0.034*	-0.003	0.031	0.171***
	(0.018)	(0.015)	(0.067)	(0.058)
Participant Loans	10.082***	-5.951	-23.971	-94.894***
	(2.566)	(3.831)	(15.057)	(30.993)
Eligible Compensation	0.249***	0.059	0.025	0.096
	(0.092)	(0.091)	(0.174)	(0.211)
Plan FE	NO	NO	YES	YES
Observations	899,597	962,353	788,592	762,519

Panel B: Using the Revenue Sharing Percentage				
	(1)		(2)	
	SMALL	LARGE	SMALL	LARGE
Average Revenue Sharing	2.986***	1.057	2.994***	1.048
	(0.661)	(0.937)	(0.667)	(0.942)
Prior 3-year Performance	0.015***	0.011***	0.015***	0.011***
	(0.003)	(0.004)	(0.003)	(0.004)
Expense Ratio	-1.121***	-2.255***	-1.095***	-2.280***
	(0.342)	(0.386)	(0.341)	(0.395)
Log(Average Account Size)	-0.016	-0.183***	-0.222	-0.004
	(0.046)	(0.055)	(0.192)	(0.344)
Perc of Affiliated Funds	-2.290***	-1.431***	-4.657***	-7.354***
	(0.182)	(0.144)	(0.471)	(0.930)
No. of Funds in the Same Style	-0.334***	-0.245***	-0.237***	-0.207***
	(0.051)	(0.042)	(0.048)	(0.042)
Employer Match	-0.263**	-0.126	-1.167***	-0.023
	(0.113)	(0.091)	(0.265)	(0.183)
Perc in Employer Securities	-0.964***	-0.924***	-4.839***	-0.994
	(0.306)	(0.290)	(1.483)	(1.824)
Unionization	-0.155*	0.077	-0.446*	0.353
	(0.085)	(0.083)	(0.231)	(0.236)
Plan Age	0.024	0.006	0.251	1.326***
	(0.043)	(0.056)	(0.293)	(0.289)
MFoptions	0.053***	0.037***	0.068***	0.053***
	(0.002)	(0.002)	(0.007)	(0.008)
Bundled Services	-0.094***	-0.052***	0.167**	0.112
	(0.022)	(0.019)	(0.081)	(0.094)
Flow Volatility	1.223***	0.347	7.223**	4.414*
	(0.153)	(0.228)	(3.499)	(2.276)
Plan Complexity	0.034*	-0.003	0.031	0.169***
	(0.018)	(0.015)	(0.067)	(0.058)
Participant Loans	10.052***	-5.928	-23.796	-75.358**
	(2.563)	(3.830)	(15.048)	(30.978)
Eligible Compensation	0.249***	0.060	0.031	0.086
	(0.092)	(0.090)	(0.174)	(0.211)
Plan FE	NO	NO	YES	YES
Observations	899,597	962,353	788,592	762,519

Table A.6: Fund Deletions with Affiliated Funds.

The table re-estimates the baseline logit model described in Table 4 using an augmented sample that includes affiliated funds. Since revenue sharing is not available for affiliated funds, '*Revenue Sharing Fund*' and '*Revenue Sharing Percentage*' are set to zero and the regression includes an indicator variable for affiliated funds. The empirical specifications and controls are otherwise identical to those in Table 4. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Revenue Sharing Fund	-0.393***	-0.438***	-0.398***			
	(0.084)	(0.087)	(0.107)			
Revenue Sharing Percentage				-1.199***	-1.052***	-1.293***
				(0.296)	(0.323)	(0.359)
Affiliated Fund	0.091	-0.784***	0.189	0.152	-0.715***	0.261*
	(0.113)	(0.106)	(0.142)	(0.116)	(0.104)	(0.152)
Prior 3-year Performance	-0.017***	-0.008***	-0.019***	-0.016***	-0.007***	-0.018***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Expense Ratio	1.771***	1.131*	1.770***	1.787***	0.979	1.826***
	(0.297)	(0.612)	(0.354)	(0.277)	(0.609)	(0.327)
Log(Option Size)	-0.064***	-0.070***	-0.116***	-0.067***	-0.071***	-0.119***
	(0.018)	(0.016)	(0.025)	(0.018)	(0.016)	(0.024)
Log(Plan Assets)	0.011	0.072**	1.184***	0.011	0.061	1.122***
	(0.033)	(0.036)	(0.406)	(0.034)	(0.037)	(0.408)
Log(Average Account Size)	-0.076*	0.044	-0.819***	-0.080**	0.052	-0.799***
	(0.040)	(0.049)	(0.277)	(0.040)	(0.049)	(0.285)
Perc of Affiliated Funds	-0.444***	-0.263*	4.031***	-0.434***	-0.230	4.377***
	(0.117)	(0.142)	(0.450)	(0.119)	(0.144)	(0.444)
Employer Match	0.053	0.026	-0.433**	0.091	0.057	-0.448**
	(0.052)	(0.062)	(0.193)	(0.057)	(0.065)	(0.196)
Perc in Employer Securities	-0.415**	-0.454**	-2.600*	-0.430**	-0.448**	-3.011**
	(0.188)	(0.214)	(1.395)	(0.194)	(0.221)	(1.411)
Unionization	-0.100**	-0.210***	0.945***	-0.086**	-0.195***	1.041***
	(0.040)	(0.050)	(0.173)	(0.041)	(0.050)	(0.166)
Plan Age	0.195***	0.125***	0.926***	0.203***	0.129***	0.923***
	(0.030)	(0.040)	(0.347)	(0.030)	(0.040)	(0.347)
MFoptions	0.020***	0.020***	0.045***	0.021***	0.021***	0.046***
	(0.001)	(0.002)	(0.006)	(0.001)	(0.002)	(0.006)
Bundled Services	-0.124***	0.017	-0.068	-0.127***	0.017	-0.047
	(0.023)	(0.017)	(0.053)	(0.023)	(0.018)	(0.054)
Flow Volatility	1.563***	1.929***		1.537***	1.916***	
	(0.114)	(0.169)		(0.114)	(0.169)	
Plan Complexity	0.059***	0.055***	0.132***	0.057***	0.055***	0.137***
	(0.010)	(0.011)	(0.044)	(0.010)	(0.012)	(0.044)
Participant Loans	2.908*	1.210	-39.281**	3.200*	2.075	-40.118**
	(1.709)	(2.060)	(17.349)	(1.732)	(2.069)	(17.741)
Eligible Compensation	-0.078	0.010	0.091	-0.037	0.050	0.229
	(0.072)	(0.095)	(0.143)	(0.073)	(0.098)	(0.155)
Fund FE	NO	YES	NO	NO	YES	NO
Plan FE	NO	NO	YES	NO	NO	YES
Observations	28,517	26,319	26,640	28,098	25,909	26,174

Table A.7: Fund Additions with Affiliated Funds.

The table re-estimates the baseline logit model described in Table 5 using an augmented sample that includes affiliated funds. As in Table A.6, '*Probability of Revenue Sharing*' and '*Average Revenue Sharing*' are set to zero and the regression includes an indicator variable for affiliated funds. The empirical specifications and controls are otherwise identical to those in Table 5. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Probability of Revenue Sharing	0.946***	0.883***		
	(0.185)	(0.187)		
Average Revenue Sharing			3.223***	2.945***
			(0.718)	(0.710)
Affiliated Fund	1.667***	1.601***	1.610***	1.544***
	(0.129)	(0.129)	(0.128)	(0.125)
Prior 3-year Performance	0.014***	0.014***	0.014***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
Expense Ratio	-2.102***	-2.012***	-2.066***	-1.978***
	(0.366)	(0.349)	(0.362)	(0.346)
Log(Plan Assets)	-0.259***	-1.594***	-0.258***	-1.584***
	(0.033)	(0.168)	(0.033)	(0.168)
Log(Average Account Size)	-0.050*	0.001	-0.049*	0.004
	(0.029)	(0.142)	(0.028)	(0.142)
Perc of Affiliated Funds	-1.131***	-3.339***	-1.123***	-3.342***
	(0.088)	(0.286)	(0.088)	(0.286)
No. of Funds in the Same Style	-0.254***	-0.198***	-0.257***	-0.202***
	(0.034)	(0.035)	(0.034)	(0.035)
Employer Match	-0.119*	-0.610***	-0.121*	-0.606***
	(0.068)	(0.167)	(0.068)	(0.166)
Perc in Employer Securities	-0.627***	-1.327	-0.635***	-1.338
	(0.191)	(0.940)	(0.191)	(0.939)
Unionization	-0.082*	-0.096	-0.082*	-0.097
	(0.044)	(0.122)	(0.044)	(0.122)
Plan Age	0.064**	-0.160	0.064**	-0.154
	(0.027)	(0.165)	(0.027)	(0.165)
MFoptions	0.043***	0.056***	0.043***	0.056***
	(0.001)	(0.005)	(0.001)	(0.005)
Bundled Services	0.032**	0.188***	0.031*	0.187***
	(0.016)	(0.047)	(0.016)	(0.047)
Flow Volatility	1.000***	84.133***	0.995***	83.845***
	(0.099)	(29.910)	(0.099)	(29.918)
Plan Complexity	0.027***	0.116***	0.027***	0.116***
	(0.010)	(0.032)	(0.010)	(0.032)
Participant Loans	-0.465	-5.863	-0.468	-5.965
	(1.784)	(9.893)	(1.783)	(9.896)
Eligible Compensation	0.133*	-0.156	0.134*	-0.154
	(0.070)	(0.128)	(0.070)	(0.128)
Plan FE	NO	YES	NO	YES
Observations	2,007,689	1,820,591	2,007,689	1,820,591

Table A.8: Fund Deletions, Revenue Sharing and 12b1 Fees.

The table re-estimates the baseline logit model described in Table 4 by adding 12b1 fees as an additional control. The emprical specifications and controls are identical to those in Table 4. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Revenue Sharing Fund	-0.368***			-0.383***			-0.265***		
	(0.078)			(0.103)			(0.100)		
Revenue Sharing Percentage		-1.081***			-0.977**			-0.755**	
		(0.274)			(0.381)			(0.368)	
12b1 Fee	1.611***	1.598***	1.413**	-3.739	-3.410	-3.015	2.254***	2.165***	2.140***
	(0.560)	(0.531)	(0.554)	(2.998)	(2.989)	(2.941)	(0.657)	(0.632)	(0.655)
Prior 3-year Performance	-0.019***	-0.019***	-0.019***	-0.016***	-0.015***	-0.015***	-0.023***	-0.022***	-0.022***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Expense Ratio	1.361***	1.362***	1.161***	3.660***	3.268***	3.871***	1.171***	1.195***	1.038***
	(0.305)	(0.276)	(0.306)	(1.075)	(1.024)	(1.030)	(0.347)	(0.314)	(0.347)
Log(Option Size)	-0.088***	-0.095***	-0.102***	-0.092***	-0.092***	-0.093***	-0.157***	-0.164***	-0.170***
	(0.020)	(0.020)	(0.019)	(0.027)	(0.028)	(0.027)	(0.027)	(0.027)	(0.027)
Log(Plan Assets)	0.119***	0.127***	0.128***	0.115*	0.088	0.105	0.222	0.086	0.338
	(0.044)	(0.046)	(0.045)	(0.065)	(0.073)	(0.070)	(0.633)	(0.640)	(0.619)
Log(Average Account Size)	-0.091**	-0.093**	-0.086*	-0.205***	-0.177***	-0.193***	-1.088**	-1.037**	-1.124**
	(0.045)	(0.046)	(0.046)	(0.060)	(0.062)	(0.061)	(0.444)	(0.469)	(0.440)
Perc of Affiliated Funds	-0.382***	-0.392***	-0.412***	-0.364**	-0.328*	-0.370**	2.163***	2.454***	0.869
	(0.126)	(0.128)	(0.123)	(0.174)	(0.176)	(0.169)	(0.628)	(0.648)	(0.607)
Employer Match	0.194**	0.278***	0.249***	0.146	0.240*	0.194	-1.296***	-1.368***	-1.366***
	(0.082)	(0.093)	(0.081)	(0.121)	(0.132)	(0.123)	(0.329)	(0.346)	(0.328)
Perc in Employer Securities	-0.869***	-0.898***	-0.769**	-0.957**	-1.010**	-0.730*	-3.995	-4.490*	-5.838**
	(0.323)	(0.332)	(0.312)	(0.465)	(0.483)	(0.441)	(2.516)	(2.636)	(2.613)
Unionization	-0.197***	-0.157**	-0.171**	-0.250**	-0.219**	-0.227**	0.648**	0.782**	0.668**
	(0.074)	(0.076)	(0.073)	(0.107)	(0.109)	(0.104)	(0.321)	(0.324)	(0.300)
Plan Age	0.327***	0.349***	0.371***	0.408***	0.433***	0.448***	0.168	0.213	0.010
	(0.051)	(0.052)	(0.052)	(0.082)	(0.084)	(0.083)	(0.411)	(0.411)	(0.402)
MFoptions	0.022***	0.023***	0.021***	0.021***	0.023***	0.020***	0.082***	0.083***	0.077***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.014)	(0.014)	(0.012)
Bundled Services	0.001	-0.001	0.012	-0.011	-0.013	0.008	0.118*	0.159**	0.137*
	(0.017)	(0.018)	(0.018)	(0.023)	(0.023)	(0.023)	(0.071)	(0.073)	(0.070)
Flow Volatility	2.252***	2.259***	2.348***	3.035***	3.053***	3.275***	-13.144*	-13.071	-13.584*
	(0.175)	(0.181)	(0.175)	(0.299)	(0.292)	(0.301)	(7.756)	(7.952)	(7.782)
Plan Complexity	0.073***	0.067***	0.082***	0.070***	0.071***	0.078***	0.090	0.089	0.130**
	(0.015)	(0.016)	(0.015)	(0.021)	(0.022)	(0.021)	(0.060)	(0.061)	(0.058)
Participant Loans	7.901***	8.450***	7.508***	7.204*	9.411**	6.525*	-43.706*	-37.953	-62.746**
	(2.679)	(2.704)	(2.622)	(3.818)	(3.808)	(3.740)	(25.784)	(27.203)	(26.627)
Eligible Compensation	-0.049	0.010	-0.020	-0.004	0.030	0.029	-0.349**	-0.240	-0.395**
	(0.085)	(0.089)	(0.082)	(0.117)	(0.122)	(0.113)	(0.171)	(0.189)	(0.168)
Fund FE	NO	NO	NO	YES	YES	YES	NO	NO	NO
Plan FE	NO	NO	NO	NO	NO	NO	YES	YES	YES
Observations	14,401	13,990	14,690	12,473	12,071	12,772	12,241	11,712	12,550

Table A.9: Fund Additions, Revenue Sharing and 12b1 fees.

The table re-estimates the baseline logit model described in Table 5 by adding 12b1 fees as an additional control. The empirical specifications and controls are identical to those in Table 5. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Probability of Revenue Sharing	0.697***			0.703***		
	(0.183)			(0.184)		
Average Revenue Sharing		2.240***			2.239***	
		(0.671)			(0.673)	
12b1 Fee	-1.323***	-1.360***	-1.365***	-1.326***	-1.363***	-1.368***
	(0.394)	(0.391)	(0.394)	(0.394)	(0.390)	(0.393)
Prior 3-year Performance	0.013***	0.013***	0.013***	0.013***	0.013***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Expense Ratio	-1.555***	-1.505***	-1.314***	-1.548***	-1.498***	-1.308***
	(0.361)	(0.355)	(0.343)	(0.363)	(0.358)	(0.346)
Log(Plan Assets)	-0.231***	-0.231***	-0.231***	-1.972***	-1.968***	-1.967***
	(0.035)	(0.035)	(0.035)	(0.271)	(0.271)	(0.271)
Log(Average Account Size)	-0.043	-0.043	-0.043	0.136	0.136	0.136
	(0.033)	(0.033)	(0.033)	(0.162)	(0.162)	(0.162)
Perc of Affiliated Funds	-1.892***	-1.887***	-1.884***	-4.840***	-4.838***	-4.837***
	(0.140)	(0.140)	(0.140)	(0.392)	(0.391)	(0.392)
No. of Funds in the Same Style	-0.295***	-0.298***	-0.298***	-0.228***	-0.231***	-0.231***
	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
Employer Match	-0.105	-0.106	-0.106	-0.475**	-0.474**	-0.474**
	(0.079)	(0.079)	(0.079)	(0.201)	(0.201)	(0.201)
Perc in Employer Securities	-0.973***	-0.979***	-0.979***	-1.961*	-1.952*	-1.954*
	(0.231)	(0.231)	(0.232)	(1.166)	(1.166)	(1.166)
Unionization	-0.058	-0.059	-0.059	0.155	0.153	0.152
	(0.050)	(0.050)	(0.050)	(0.169)	(0.169)	(0.169)
Plan Age	0.017	0.017	0.017	0.676***	0.674***	0.675***
	(0.031)	(0.031)	(0.031)	(0.234)	(0.234)	(0.233)
MFoptions	0.045***	0.045***	0.045***	0.057***	0.057***	0.057***
	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
Bundled Services	-0.071***	-0.072***	-0.072***	0.109	0.109	0.109
	(0.015)	(0.015)	(0.015)	(0.067)	(0.067)	(0.067)
Flow Volatility	0.875***	0.872***	0.872***	91.526***	91.348***	91.256***
	(0.105)	(0.105)	(0.105)	(29.594)	(29.603)	(29.609)
Plan Complexity	0.026**	0.026**	0.026**	0.152***	0.152***	0.152***
	(0.012)	(0.012)	(0.012)	(0.039)	(0.039)	(0.039)
Participant Loans	5.149**	5.153**	5.133**	-25.140*	-25.092*	-25.082*
	(2.182)	(2.181)	(2.182)	(14.447)	(14.442)	(14.446)
Eligible Compensation	0.175***	0.176***	0.175***	-0.144	-0.142	-0.141
	(0.064)	(0.064)	(0.064)	(0.137)	(0.137)	(0.137)
Plan FE	NO	NO	NO	YES	YES	YES
Observations	1,843,120	1,843,120	1,843,120	1,578,656	1,578,656	1,578,656

Table A.10: Revenue Sharing and Plan Costs Paid by Participants, Other Specifications.

The table reports coefficient estimates for the following OLS model: $PlanCost_{p,t} = \beta RSplan_{p,t} + \mathbf{\Gamma' Controls}_{p,t} + \epsilon_{p,t}$. In columns 1,2,5, and 6, $PlanCost_{p,t}$ is the asset weighted average expense ratio in plan p in year t. In columns 3,4,7, and 8, $PlanCost_{p,t}$ is the all-in fee of plan participants, calculated as the sum of administrative fees (expressed as a percent of plan assets) and the average expense ratio of the plan's mutual fund options. The control variables also include year dummies and plan-level average fund characteristics, such as style, age, size, and turnover. Standard errors are clustered at the plan level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively

	Avg Expense Ratio		All-in Fees		Avg Expense Ratio		All-in Fees	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue Sharing Plan	0.042***	0.019**	0.038***	0.019**				
	(0.010)	(0.009)	(0.011)	(0.009)				
Asset-weighted Average Rebate					0.421***	0.232***	0.375***	0.259***
					(0.050)	(0.050)	(0.056)	(0.052)
Log(Averege Option Size)	-0.007*	-0.009**	-0.013***	-0.008**	-0.008*	-0.011***	-0.014***	-0.011***
	(0.004)	(0.003)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)
Log(Plan Assets)	-0.012**	-0.029	-0.010	-0.051*	-0.008	-0.029	-0.008	-0.053*
	(0.006)	(0.026)	(0.007)	(0.029)	(0.006)	(0.028)	(0.008)	(0.032)
Log(Average Account Size)	-0.031***	-0.002	-0.064***	-0.014	-0.026***	0.007	-0.061***	-0.005
	(0.008)	(0.020)	(0.010)	(0.020)	(0.008)	(0.021)	(0.010)	(0.021)
Perc of Affiliated Funds	0.085***	0.070	0.029	0.060	0.054**	0.034	0.002	0.020
	(0.024)	(0.053)	(0.026)	(0.054)	(0.024)	(0.053)	(0.026)	(0.054)
Employer Match	0.004	0.014	0.022	0.017	0.016	0.015	0.036**	0.020
	(0.012)	(0.018)	(0.014)	(0.018)	(0.012)	(0.020)	(0.015)	(0.020)
Perc in Employer Securities	-0.021	-0.084	-0.046	-0.147	-0.040	-0.099	-0.053	-0.174
	(0.036)	(0.103)	(0.044)	(0.106)	(0.037)	(0.111)	(0.048)	(0.113)
Unionization	0.007	0.005	0.020*	0.013	0.005	0.006	0.018	0.014
	(0.010)	(0.016)	(0.012)	(0.016)	(0.010)	(0.017)	(0.012)	(0.016)
Plan Age	0.001	-0.050**	-0.001	-0.049**	0.003	-0.063**	0.001	-0.062**
	(0.007)	(0.023)	(0.008)	(0.025)	(0.007)	(0.027)	(0.008)	(0.028)
MFoptions	0.001**	0.000	0.001*	-0.000	0.001**	0.000	0.001	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Bundled Services	-0.000	0.000	0.002	0.001	-0.001	-0.001	0.001	-0.001
	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.006)
Flow Volatility	0.052**		0.047*		0.070***		0.064**	
	(0.024)		(0.026)		(0.024)		(0.027)	
Plan Complexity	-0.002	-0.002	0.007**	-0.003	-0.001	-0.001	0.007**	-0.004
	(0.002)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)	(0.004)
Participant Loans	-0.110	0.733	0.243	0.643	-0.260	0.971	0.054	1.083
	(0.380)	(1.025)	(0.420)	(1.092)	(0.396)	(1.097)	(0.436)	(1.148)
Eligible Compensation	0.010	0.020	-0.020	0.009	0.013	0.026**	-0.018	0.015
	(0.013)	(0.012)	(0.015)	(0.013)	(0.014)	(0.013)	(0.017)	(0.013)
RK FE	YES	YES	YES	YES	YES	YES	YES	YES
Plan FE	NO	YES	NO	YES	NO	YES	NO	YES
Observations	3,191	3,152	3,191	3,152	2,941	2,889	2,941	2,889
R-squared	0.573	0.839	0.577	0.849	0.537	0.820	0.535	0.832

Table A.11: Revenue Sharing and Administrative Costs Paid by Participants.
The table reports coefficient estimates for the following OLS model: $PlanCost_{p,t} = \beta RSplan_{p,t} + \mathbf{\Gamma' Controls}_{p,t} + \epsilon_{p,t}$. $PlanCost_{p,t}$ is the administrative direct cost in plan p in year t. The control variables also include year dummies and plan-level average fund characteristics, such as style, age, size, and turnover. Standard errors are clustered at the plan level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue Sharing Plan	-0.010**	-0.001	-0.005	-0.001				
	(0.005)	(0.003)	(0.005)	(0.003)				
Asset-weighted Average Rebate					-0.048*	0.024	-0.045*	0.027*
					(0.025)	(0.016)	(0.027)	(0.014)
Log(Averege Option Size)	-0.005**	0.000	-0.006***	0.000	-0.005**	0.001	-0.006***	0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Log(Plan Assets)	0.004	-0.021	0.002	-0.022	0.002	-0.023	0.000	-0.024
	(0.004)	(0.014)	(0.004)	(0.014)	(0.004)	(0.016)	(0.004)	(0.016)
Log(Average Account Size)	-0.034***	-0.013	-0.033***	-0.012	-0.037***	-0.014	-0.035***	-0.012
	(0.005)	(0.009)	(0.006)	(0.008)	(0.006)	(0.009)	(0.006)	(0.009)
Perc of Affiliated Funds	-0.054***	-0.016	-0.056***	-0.010	-0.055***	-0.020	-0.052***	-0.013
	(0.008)	(0.013)	(0.010)	(0.015)	(0.009)	(0.014)	(0.010)	(0.017)
Employer Match	0.016**	0.005	0.018***	0.003	0.017**	0.007	0.020**	0.005
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
Perc in Employer Securities	-0.042*	-0.064*	-0.025	-0.062*	-0.028	-0.079**	-0.013	-0.075**
	(0.024)	(0.033)	(0.025)	(0.033)	(0.026)	(0.037)	(0.027)	(0.038)
Unionization	0.012**	0.006	0.013**	0.008*	0.011*	0.007	0.013**	0.009*
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)
Plan Age	-0.003	-0.001	-0.002	0.001	-0.003	-0.001	-0.002	0.001
	(0.004)	(0.011)	(0.004)	(0.011)	(0.004)	(0.012)	(0.004)	(0.012)
MFoptions	-0.000	-0.001**	-0.000	-0.001*	-0.000	-0.001*	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Bundled Services	0.000	0.001	0.002*	0.001	-0.000	0.001	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Flow Volatility	-0.007		-0.005		-0.008		-0.006	
	(0.012)		(0.011)		(0.013)		(0.012)	
Plan Complexity	0.008***	-0.002	0.009***	-0.002	0.009***	-0.002	0.009***	-0.002
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Participant Loans	0.289	-0.165	0.353*	-0.090	0.261	0.028	0.315	0.112
	(0.204)	(0.518)	(0.188)	(0.523)	(0.219)	(0.533)	(0.206)	(0.537)
Eligible Compensation	-0.028***	-0.012**	-0.030***	-0.010*	-0.029***	-0.013**	-0.030***	-0.011*
	(0.007)	(0.005)	(0.009)	(0.006)	(0.008)	(0.006)	(0.010)	(0.007)
Plan FE	NO	YES	NO	YES	NO	YES	NO	YES
RK FE	NO	NO	YES	YES	NO	NO	YES	YES
Observations	3,195	3,155	3,191	3,152	2,946	2,892	2,941	2,889
R-squared	0.320	0.857	0.395	0.862	0.322	0.856	0.391	0.861

Table A.12: Revenue Sharing and Share Class Level Expense Ratios, Other Specifications.

The table estimates regression models that relate fund f's minimum expense ratios across share classes it charges in plan p to the revenue sharing rebate it pays in the same plan. In columns 1-4, $RevenueShare_{p,f,t-1}$ is an indicator variable that takes the value of one if fund f revenue shares in plan p at the end of year $t-1$. In columns 5-8 of the table, $RevenueShare_{p,f,t-1}$ is the amount of rebate that fund f pays to plan p's recordkeeper at the end of year $t-1$. $\mathbf{Controls}_{f,p,t-1}$ is the vector of control variables. In addition to those listed in the table, these controls also include year and style dummies and fund characteristics, such as age, size, and turnover. Standard errors are clustered at the fund level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue Sharing Fund	0.208***	0.029***	0.026***	0.022**				
	(0.024)	(0.008)	(0.007)	(0.009)				
Revenue Sharing Percentage					0.935***	0.424***	0.394***	0.415***
					(0.056)	(0.031)	(0.026)	(0.034)
Prior 3-year Performance	0.000	0.000**	0.000**		0.000	0.000**	0.000*	
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
Style Expense Ratio	0.490***	0.154**	0.169**		0.461***	0.135*	0.147**	
	(0.082)	(0.075)	(0.073)		(0.073)	(0.072)	(0.068)	
Log(Option Size)	-0.011***	-0.004***	-0.002**	-0.004***	-0.010***	-0.005***	-0.004***	-0.006***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)
Log(Plan Assets)	-0.004	-0.009***	0.002	-0.007***	0.000	-0.004*	0.009	-0.001
	(0.005)	(0.003)	(0.013)	(0.003)	(0.005)	(0.002)	(0.012)	(0.002)
Log(Average Account Size)	-0.018***	-0.015***	-0.000	-0.015***	-0.009*	-0.012***	-0.010	-0.010***
	(0.006)	(0.004)	(0.008)	(0.003)	(0.005)	(0.003)	(0.007)	(0.002)
Perc of Affiliated Funds	0.011	-0.035***	0.003	-0.019**	0.004	-0.039***	-0.007	-0.014**
	(0.018)	(0.009)	(0.016)	(0.008)	(0.016)	(0.009)	(0.014)	(0.006)
Employer Match	0.007	-0.003	-0.003	-0.004	0.017*	0.003	0.000	-0.002
	(0.009)	(0.004)	(0.005)	(0.003)	(0.010)	(0.004)	(0.005)	(0.004)
Perc in Employer Securities	0.005	0.030**	-0.015	0.024*	0.004	0.026**	-0.001	0.018
	(0.032)	(0.014)	(0.049)	(0.013)	(0.029)	(0.012)	(0.044)	(0.012)
Unionization	0.006	-0.006*	-0.013***	-0.007**	0.006	-0.005*	-0.007	-0.007***
	(0.008)	(0.003)	(0.005)	(0.003)	(0.007)	(0.003)	(0.005)	(0.003)
Plan Age	0.005	0.002	-0.006	0.003	0.005	0.001	-0.014**	0.000
	(0.005)	(0.003)	(0.008)	(0.003)	(0.004)	(0.002)	(0.007)	(0.002)
MFoptions	0.002***	0.001***	0.001***	0.001***	0.002***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Bundled Services	0.000	0.001	-0.001	0.001	-0.001	0.002	-0.002	0.003***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.002)	(0.001)
Flow Volatility	-0.025	-0.017*		-0.022**	-0.009	-0.017**		-0.023***
	(0.019)	(0.009)		(0.010)	(0.017)	(0.008)		(0.008)
Plan Complexity	-0.002	-0.002***	-0.000	-0.002***	-0.001	-0.002**	-0.001	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Participant Loans	0.466	0.150	-0.171	0.207	0.063	-0.025	-0.109	0.046
	(0.306)	(0.145)	(0.436)	(0.154)	(0.290)	(0.130)	(0.410)	(0.126)
Eligible Compensation	-0.036***	-0.006	0.001	0.003	-0.029***	-0.012**	-0.013**	-0.002
	(0.010)	(0.005)	(0.005)	(0.004)	(0.010)	(0.005)	(0.005)	(0.003)
RK FE	YES	YES	NO	NO	YES	YES	NO	NO
Fund FE	NO	YES	YES	NO	NO	YES	YES	NO
Plan FE	NO	NO	YES	NO	NO	NO	YES	NO
Fund-Year FE	NO	NO	NO	YES	NO	NO	NO	YES
Observations	13,304	13,004	12,994	11,628	12,992	12,689	12,679	11,331
R-squared	0.689	0.937	0.947	0.942	0.724	0.947	0.955	0.952