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# Financial Sophistication and Conflicts of Interest

## Evidence from the Investment Menus Offered in 401(k) Plans

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# Financial Sophistication and Conflicts of Interest: Evidence from the Investment Menus Offered in 401(k) Plans\*

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## Abstract

We analyze the investment menus offered within 401(k) pension plans to the employees of the largest finance and nonfinance firms. Finance firm employees allocate less to sponsor stock and options affiliated with the trustee as compared to employees of other firms. In addition, the selection of mutual funds by pension plans sponsored by a finance firm with an independent trustee is more sensitive to past performance and less biased towards funds affiliated with the trustee. These findings suggest that financial literacy among the plan participants and sponsoring company can mitigate inefficiencies in 401(k) menus. However, financial literacy alone is not sufficient to eliminate inefficient options from the menu, because the higher performance sensitivity and reduced favoritism appear only among pension plans of finance firms governed by an independent external trustee.

**JEL classification:** G11, G23.

**Keywords:** financial literacy, 401(k), pension plans, sponsor, trustee, mutual funds.

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# 1 Introduction

U.S. defined contribution (DC) 401(k) pension plans have gained substantial popularity and became the dominant form of saving and investing individual's wealth for retirement, especially in the private sector. Already in 2000, almost 90 percent of private retirement contributions went to DC plans in which individuals decide on the contribute rate and asset allocation (Poterba, Venti, and Wise, 2008).<sup>1</sup> Similar retirement systems have been established in many other countries, like Australia, Chile, and Sweden. The organization of DC pension funds leaves greater responsibility on the plan participants and the financial expertise of plan participant becomes one of the key determinants of future wealth and retirement outcomes.

The role of financial literacy in DC retirement savings has been studied mainly by looking at the accumulated wealth, enrollments and contribution rates over time. Lusardi and Mitchell (2007) show that financial literacy is important for retirement planning and wealth accumulation. Agnew (2006) finds that employees with a higher salary are more likely to participate in 401(k) retirement plans, invest less in the employer's stock and are less likely to adopt a 1/n allocation heuristic. On the other hand, financial service providers in DC plans, who are bounded to discharge their duties solely in the interest of the participants, face incentives to design the investment menu in a way to benefit their affiliated companies (Cohen and Schmidt, 2009; Pool, Sialm, and Stefanescu, 2016). In this paper, we study whether financial literacy can help mitigate agency issues and conflicts of interest between financial service providers and individuals.

In a DC plan, the plan sponsor usually hires a financial firm to serve as a trustee and together they determine the menu of available investment options. Plan participants have to decide how to contribute and allocate their retirement savings across the available options, which are mainly

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<sup>1</sup>The 401(k) assets have grown from \$2.2 trillion which represented 16% of the US retirement market in 2008 to \$5.6 trillion and 19% of the market in 2018. About 67% of the assets were held in mutual funds as the end of September 2018. (www.ici.org)

mutual funds. Though the asset allocation outcome is jointly determined by the quality of the options offered and the choice by the participants, plan participants are often unable to overcome the inefficiencies in the menu design fully and make suboptimal asset allocation decisions (Benartzi and Thaler, 2007). Therefore, conflicts of interest can arise when the objectives of plan sponsors and trustees are not in line with their fiduciary duty, and they can design suboptimal investment menus at the cost of plan participants (Elton, Gruber, and Blake, 2006; Cohen and Schmidt, 2009; Pool, Sialm, and Stefanescu, 2016).

We hypothesize that individuals with greater financial literacy are better aware of and able to overcome potential inefficiencies in the menu design, which leads to better investment decisions. To explore the association at the firm level, we assume that financial company employees are financially more literate than those working in other industries. Financial companies, on average, have a larger proportion of employees with required qualifications in financial skills than nonfinancial companies. Those having jobs that are not finance related at a financial company can have better indirect exposure to financial knowledge in the working environment. The greater financial literacy from participants in turn pressures the plan sponsors and trustees to overcome potential conflicts of interest and design more efficient investment menus. While controlling for available options on the menu, we predict that investment allocations by employees in the financial sector are more efficient than those working in other sectors.

In addition to financial sophistication, we examine also the relation between the sponsor and the trustee who jointly design the investment menu. Within finance firms we distinguish between those that hire an external trustee for their pension plan and those that serve also as the trustee of their pension plan. In the case when firms use in-house trustees, there is no independent external party involved in the menu design and the conflicts of interest become that between the sponsor and the employees. We predict that finance firms with an in-house trustee, compared to those with an

external trustee, have more incentives to attract investments in sponsor stock and affiliated funds.

Our sample includes the investment menus offered of 144 401(k) pension plans established by large companies (sponsors) during the 2010–2016 period. In 2016, these plans held together around \$800 billion assets under management. We find that employees with a higher financial literacy reduce their exposure to assets susceptible to agency conflicts. However, employees with higher level of financial literacy gain less exposure to investment options subject to agency conflicts only when the investment menu is designed by an independent external trustee and not when the plan sponsor serves also as the trustee.

First, we examine the inclusion of employer stock on the investment menu. Offering an employer stock with 401(k) plans could be beneficial for the sponsoring firm as a mean to put more stocks into friendly employee ownership and deter takeovers (Rauh, 2006). However, higher allocation to employer stock exposes employees to more idiosyncratic risk and an employees' human capital is positively correlated with the employer's performance (Benartzi, Thaler, Utkus, and Sunstein, 2007). Nevertheless, employees perceive the inclusion of company stock on the menu as an implicit investment advice and invest significant proportion of their assets in employer's stock (Brown, Liang, and Weisbenner, 2006).<sup>2</sup> Cohen (2008) estimates that employees experience around 20% loss in retirement income or a loss of 1.75% per year in returns due to the higher allocation to company stock.

We find that employees of finance firms allocate a lower amount of their retirement income to sponsor equity relative to those of firms operating in other industries. However, employees of finance firms reduce their exposure to employer's equity only when the sponsor and trustee are separate entities. Employees of finance firms with in-house trustee maintain a higher allocation to employer's equity.

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<sup>2</sup>Brown, Liang, and Weisbenner (2006) study the determinants of matching contributions in company stock by the employer. They suggest that the restricted match may benefit employees who follow naive investment strategies.

Next, we look at the proportion of trustee-affiliated funds on the menu. A trustee has incentives to favor own mutual funds when designing the menu because that enables it to increase the assets under management and the manager's compensation. If a trustee can maintain its own funds on the menu over time, it can avoid outflows induced by menu changes and rely on stable inflows from participants (Sialm, Starks, and Zhang, 2015). The favoritism negatively affects participants' retirement income because they continue investing in the poorly performing affiliated funds and experience negative abnormal returns (Pool, Sialm, and Stefanescu, 2016).

We find that the menu offered to employees of finance firms with external trustees contains 15% less options affiliated with the trustee compared to the menu offered to those of nonfinance firms. The lower representation of affiliated options on the menu offered to employees of finance firms with external trustees translates into 13% lower monetary allocation to affiliated options. This result suggests that independent trustees hired by financially sophisticated sponsors are more pressured to include unaffiliated options because the plan participants seem to be aware of the potential agency problems

Third, we examine the determinants of changes in the list of options included on the investment menu. We analyze the subsample of mutual funds as they represent 80% of the investment options. We limit attention to only mutual fund options because we can obtain information on their past performance, i.e. before these options are added or deleted from the menu, and performance is the main determinant of menu changes (Sialm, Starks, and Zhang, 2015; Pool, Sialm, and Stefanescu, 2016). Persistence in fund performance implies that it can be optimal to add past winners and drop past losers (Carhart, 1997). The menu sensitivity to performance also helps incentivize fund managers to generate value. The within-sponsor changes of the menu over time allow us to better identify and compare different strategies by the menu designer and the participants among the three groups of firms in concern.

We find that when a mutual fund's performance percentile ranking within the funds of the same style increases from the lowest to the highest, the probability to be removed from the 401(k) menu is reduced by about 6.9%. We also observe that the performance sensitivity depends on the sponsoring firm type and its relation with trustee. The sensitivity of fund deletion to performance almost doubles for finance sponsors with independent external trustees as compared to nonfinance sponsors. However, pension plans of finance firms trusted by the sponsoring company itself do not display such a higher sensitivity to fund performance.

In line with Pool, Sialm, and Stefanescu (2016), we also find that mutual funds affiliated with the trustee have a lower probability to be removed from the investment menu. Finance firms with independent trustees manage to eliminate the favoritism towards trustee funds, but finance firms with in-house trustees do not correct the favoritism bias towards (own) trustee funds.

When analyzing mutual fund addition to the investment menu, we find that better performing mutual funds are more likely to be added on the menu. The relation between additions and performance is the highest for finance firms with independent trustees. Besides, the favoritism towards trustee funds depends on the governance structure. Finance firms with internal trustees tend to add more mutual funds on the menu which are mainly funds offered by their own family.

We then explore whether updating the investment menu by fund past performance is *ex post* effective. We find that on average funds in the sample exhibit persistent performance. In addition, the funds dropped from the menu underperform those staying on the menu in the subsequent year only for finance firms with independent external trustees. The evidence points to a relatively more efficient menu updating rule by finance firms with external trustees than the other groups.

Last, we analyze the mutual fund flows. Our results are consistent with a dominate role of menu changes in determining capital allocations of plan participants over time. The positive flows-to-performance sensitivity is mainly driven by additions of outperforming funds and deletions of

underperforming funds by the menu designers. Flows for funds on the menu of finance firms with independent trustees exhibit twice as large sensitivities as those of other firms. In addition, they exhibit less bias towards trustee-affiliated funds. The evidence highlights the value relevance of the pension plan menu design. Menu inefficiencies lead to inefficient investment allocations by plan participants. The finding implies that plan sponsor's financial sophistication helps mitigate conflict of interests between the service providers and participants.

Our study is related to the literature on the efficiency of asset allocations. Individuals display heuristics and biases that negatively affect investment performance, like inertia in asset allocation, overweighting employer stock, poor market timing, naive diversification, and susceptibility to framing effects (Agnew, Balduzzi, and Sundén, 2003; Benartzi and Thaler, 2007; Madrian and Shea, 2001).<sup>3</sup> Prior literature has suggested that these mistakes can be eliminated by educating the plan participants and increasing their financial literacy (Lusardi and Mitchell, 2014). We offer evidence on the comparison of allocations among participants from different employers and find that employees in the finance industry are more likely to overcome inefficiencies in 401(k) pension plans. However, financial literacy alone is not sufficient and the improvement of menu design depends also on whether an external trustee is involved. This result implies that the problems of DC pension funds are also on the institutional side and educational programs targeting only the financial literacy of plan participants will not necessarily improve the functioning of DC retirement systems. This is consistent with the conclusions put forth by Choi, Laibson, and Madrian (2005) that the effect from empowering and educating employees to trade out of employer stock may be limited.

We also contribute to the literature underlining potential agency issues from the financial service providers. In the context of investment by pension funds, it is subject to the conflicting interests among sponsors, mutual fund family trustees and employees. Pool, Sialm, and Stefanescu (2016)

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<sup>3</sup>Tang, Mitchell, Mottola, and Utkus (2010) show that pension plan participants fail to exploit diversification opportunities offered in the plan.



document that mutual fund families acting as trustees in 401(k) plans display favoritism toward their own affiliated funds. Cohen and Schmidt (2009) find that trustee families overweight their client firm’s stock. They suggest that agency problems may drive the incentives of mutual fund managers to attract big clients rather than simply fulfilling their fiduciary duty. However, plan participants are often unable to overcome the inefficiencies in the menu design and make suboptimal asset allocation decisions (Benartzi and Thaler, 2007). We find that plan participants who are more financially literate are probably more aware of the agency conflicts associated with the trustee and manage to reduce their exposure to susceptible options.

## 2 Data

Our data come from two primary sources. First, we obtain data on the investment menus offered in 401(k) pension plans from the Department of Labor’s Form 5500. Form 5500 must be filed annually by pension plan sponsors (i.e., employers) under Title I and Title IV of ERISA and under the Internal Revenue Code. We limit attention to defined contribution 401(k) pension plans and use the 2013 Department of Labor Form 5500 dataset to rank 401(k) pension plans by their total net assets separately for finance sponsors and other sponsors. We then hand collect the “Attachment to Form 5500, Schedule H, Line 4(i) – Schedule of Assets (Held at End of Year)” from the Form 5500 filed annually by the largest finance and other sponsors during the period 2010–2016.<sup>4</sup> Specifically, the attachment reports the complete investment menu offered by the pension plan and the allocation into each option on the menu. From the Form 5500, we identify also the trustee for each pension plan. The trustee holds a fiduciary responsibility to act in the best interest of plan participants and together with plan sponsors designs the investment menu that will be offered to the employees.

The investment options offered on the menu can be managed by the trustee’s company or other

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<sup>4</sup>Beginning January 2010, Form 5500 must be filed through an all-electronic system called EFAST2. The improved data collection methods likely leads to better quality files.

financial companies. We classify an option as a *Trustee Option* if the fund is owned and managed by the trustee or its subsidiaries.<sup>5</sup> We split the options on the investment menu into ten categories: mutual funds affiliated with the trustee, unaffiliated mutual funds, cash funds affiliated with the trustee, unaffiliated cash funds, participant loans, sponsor equity, insurance products, brokerage account, master trust, and other assets.

Second, mutual funds represent the majority of the options offered on 401(k) investment menus and we collect additional information about these options.<sup>6</sup> We match mutual fund options with CRSP U.S. Mutual Fund database based on fund name and share class. If share class information is missing in the Form 5500, we match options to mutual funds using the institutional share class. From CRSP database, we obtain information about the mutual fund size, performance, turnover, and expense ratio. Based on CRSP information, we classify mutual funds into five investment styles: balanced, bond, domestic equity, international equity, or other. We calculate fund performance using the percentile ranking of the cumulative performance in the past three years within each style category.

Table 1 shows that our sample covers the 401(k) menus of 141 unique firms and 144 unique plans during the period 2010–2016 which results in 970 plan-year observations. On a pension plan-year-option level, our sample contains 27,716 observations. These pension plans are administered by 28 unique trustees. Based on the firm industry and relation between sponsor and trustee, we split firms into three groups. The first group, *Finance Outsource*, includes finance firms that hire another firm to serve as a trustee of their pension plan. In our sample, 51 plans are from finance sponsoring companies which hire an external trustees. The second group, *Finance In-House*, captures finance firms that serve also as a trustee of their own pension plan. This groups is smaller and includes

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<sup>5</sup>For example, Bank of New York Mellon serves as a trustee of multiple 401(k) pension plans; Options managed by Dreyfus will be classified as affiliated because Dreyfus became a subsidiary of Bank of New York Mellon when Mellon Financial and The Bank of New York merged in 2007.

<sup>6</sup>In the Form 5500, sponsors can label mutual fund options either as registered investment companies or as collective investment funds. We classify both types as mutual funds in our analysis.

21 plans. The third group, *Other Outsource*, includes pension plans of firms operating in other industries than finance. In our sample, nonfinance companies always hire an external trustee to manage their 401(k) pension plans so there are no in-house trustees in this group. This group contains 73 plans.<sup>7</sup>

Our sample selection is based on size, so pension plans in our sample are relatively large in terms of assets under management and number of options on the menu. For instance, pension plans of other nonfinance firms have around \$4.08 billion assets under management. Finance sponsor are smaller on average than other sponsors, because we want to have a balanced sample of both categories, but finance sponsors offer relatively more options to their employees. On average, finance firms with outsourced trustee have 30 options on the menu, while finance firm with in-house trustee have 31 options on the menu. On average, pension plans sponsored by nonfinance firms have 24 options on the menu.

Mutual funds dominate the list of options on the investment menu. Figure 1 shows that mutual funds account for around 80% of the number of options on the menu for all three groups of sponsors. However, the relative inclusion of mutual funds affiliated with the trustee differs across sponsor types. Trustee funds represent around 17% of the options on the menu of pension plans sponsored by finance firms administered by an external trustee, while trustee funds represent around 34% of the options on the menu of pension plans trusteeed by a sponsoring finance firm and 29% of the options on the menu of pension plans sponsored by other nonfinance firms. The higher representation on the menu translates into higher asset allocation. Funds affiliated with the trustee account for 32% and 28% of the assets of pension plans sponsored by *Finance In-House* and *Other Outsource* firms respectively, and only for 19% of the assets of pension plans sponsored by *Finance Outsource* sponsors. The lower representation of funds unaffiliated with the trustee translates into around 10

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<sup>7</sup>Some plans have changed their trustees during the period. One finance firm is categorized into the first group for some years and the second group for other years.

percentage points lower allocations for Finance In-House and Other Outsourced firms. In addition, unaffiliated mutual funds receive less than proportional flows.

Figure 2 shows that the lower allocation to unaffiliated mutual funds is primarily compensated by a higher allocation to sponsor equity. Most of the 401(k) pension plans offer an option to invest in sponsor equity, but the participants in plans sponsored by finance firms and administered by external trustees invest less in company stock.

Table 1 summarizes the other remaining options on the investment menu. Almost all pension plans include at least one cash (money market) fund on the menu and these funds can be affiliated or unaffiliated with the trustee. 401(k) pension plans typically allow participants to borrow from the pension fund and participant loans represent the value of these outstanding loans. Insurance products, like annuity contracts, are also offered by the majority of pension plans. Some pension plans include a brokerage account which enables participants to directly buy and sell securities in the exchange instead of selecting mutual funds or insurance products offered on the menu. Some firms in our sample have a master trust in addition to the other investment options on the menu. Sponsors who structure part of their investment options as a master trust are not required to disclose the composition of such entities on the Form 5500 (Rauh, 2006).

### **3 Investment Menu Design**

In this section, we analyze the investment menu design on a pension plan-year level. 401(k) menus offered to employees are jointly determined by the plan sponsor and the trustee. We analyze the incentives of plan sponsors and trustees, and focus on two menu items that can potentially create conflicting incentives for them.

First, the inclusion of employer stock on the investment menu could be beneficial for the sponsoring firm as a mean to put more stocks into friendly employee ownership and deter takeovers (Rauh, 2006).

However, higher allocation to employer stock can be used as a proxy of under-diversification because it exposes employees to more idiosyncratic risk. To the extent that an employee's human capital is closely bounded with future prospect of the employer, the diversification benefits would accrue when the employee allocates her financial investment to assets that are less correlated with the financial performance of the employer (Benartzi, Thaler, Utkus, and Sunstein, 2007). Nevertheless, employees perceive the inclusion of company stock on the menu as an implicit investment advice and invest a significant proportion of their assets in employer's stock (Brown, Liang, and Weisbenner, 2006). Cohen (2008) estimates that employees experience around 20% loss in retirement income or a loss of 1.75% per year in returns due to the higher allocation to company stock.

Second, we look at the proportion of trustee funds on the menu. A trustee has incentives to favor affiliated mutual funds when designing the menu because that enables it to increase the assets under management and managerial compensation. If a trustee can maintain its own funds on the menu over time, it can rely on stable flows from participants and avoid outflows induced by menu changes (Sialm, Starks, and Zhang, 2015). The favoritism negatively affects participants' retirement income because they continue investing in the poorly performing affiliated funds and experience negative abnormal returns (Pool, Sialm, and Stefanescu, 2016).

In 401(k) plans, the monetary allocation to any option on the menu is jointly affected by menu designers and plan participants. Even though the offered menu may be subject to inefficiencies, they might be overcome by participants who see through the potential distortions and reduce monetary allocation to these inefficient options. We conduct tests on both dimensions reflecting the design of the pension menu and the active allocation by participants.

In Table 2, we use the allocation to sponsor equity to gauge the exposure to agency conflicts. Columns (1) and (2) report the marginal effects of the logit regression relating whether sponsor equity is offered on the menu to a set of pension fund characteristics. Finance firms with external

trustees seem to be less likely to offer sponsor equity on the menu than nonfinance firms, but the difference is statistically insignificant. Larger plans are significantly more likely to include sponsor equity.

In column (3) and (4), we examine the determinants of the percentage allocation in sponsor equity using the same sample. If sponsor equity is not included as an option, the allocation would be mechanically zero. To separate the implication of menu design from that of employees' choice, we redo the tests by restricting the sample to those pension plans with sponsor equity included as an option. Column (5) and (6) report the estimates using this restricted subsample. Consistent across all four columns, employees of finance firms with independent trustees allocate significantly less to sponsor equity compared with employees from nonfinance firms. The magnitude ranges from 6.7% to 7.7%. The evidence suggests that finance firm employees tend to caution against overly concentrating their risk exposure to the employer. By actively shifting investments away from sponsor equity, they benefit more from portfolio diversification. However, the difference in allocation of assets to sponsor equity between employees of finance firms with an in-house trustee and those of nonfinance firms is relatively small. This result suggests that financial sophistication alone is not sufficient to overcome inefficiencies in the menu design and part of the lower allocation to sponsor equity may be driven by the separation of sponsor and trustee.

In Table 3, we analyze the allocation to trustee-affiliated options as a proxy for inefficiencies caused by agency problems of the trustee. In columns (1) and (2), the dependent variables is the number of trustee-affiliated options as a percentage of the total number of options on the menu. In columns (3) and (4), the dependent variable is the percentage allocation to trustee-affiliated options. The results show that the investment menus offered to employees of finance firms with external trustees contain 15 percentage points less options affiliated with the trustee than the menus offered to employees of nonfinance firms. The employees of finance firms with external trustees also allocate

a lower amount to trustee-affiliated options by around 13%. The positive and significant coefficients of number of options are consistent with the favoritism from the trustee towards options from own family in general. The evidence thus implies that finance firm participants seem to be aware of the potential agency problem by the trustee and independent trustees of finance firms are more pressured to include unaffiliated options.

Overall, we observe that financial sophistication and governance of 401(k) pension plans influence the allocation decisions. Employees of finance firms allocate a lower amount of their retirement income to sponsor equity and trustee funds relative to employees of firms operating in other industries. However, employees of finance firms reduce their exposure to assets susceptible to agency problems only when the sponsor and trustee are separate entities. These results suggest that employee financial literacy alone may not be sufficient to overcome inefficiencies in 401(k) pension plans.

## 4 Investment Menu Changes

The within-sponsor changes of the menu over time allow us further identify and compare strategies by the menu designer and the participants among different types of firms in concern. In this section, we focus on the subsample of the options on the 401(k) menu which are mutual funds as they represent 80% of the investment options. Fund performance has been documented as the main determinant of the deletions from and additions to a menu (Elton, Gruber, and Blake, 2007; Sialm, Starks, and Zhang, 2015; Pool, Sialm, and Stefanescu, 2016). A dynamically managed menu that tends to retain winner funds and drop loser funds can help enhance investment performance when fund performance is persistent. Besides, the menu's updating rule based on sensitivity to performance can incentivize fund managers to generate alpha. Therefore, we attribute a higher performance sensitivity to a greater menu efficiency. In addition, a more efficient menu should be associated with a lower favoritism towards trustee-affiliated funds by a menu designer who decides on adding or

dropping options.

The analysis is on a pension plan-year-option level and we examine both deletions and additions of mutual funds to the investment menu. We include new variables on a mutual fund level to capture fund characteristics and past performance. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. We also control for the logarithm of fund size, turnover, and expense ratio. Our regression includes year fixed effects and fund investment style fixed effects to absorb any affect due to time and style specific unobservables. Specifically, we model the probability of fund  $i$ 's deletion or addition by the pension fund  $p$  in year  $t$  using the following:

$$\begin{aligned} Prob(Deletion_{i,p,t}/Addition_{i,p,t} = 1) = & \Lambda(a + b^T F_{i,p,t-1} + c^T F_{i,p,t-1} P_{i,p,t-1} + d^T F_{i,p,t} TO_{i,p,t-1} \\ & + e^T Z_{i,p,t-1} + \epsilon_{i,p,t}) \end{aligned} \quad (1)$$

where  $F$  is an indicator vector for the type of the sponsor,  $P$  is the relative performance of the fund,  $TO$  is the indicator that takes the value of 1 is the fund is affiliated with the trustee and 0 otherwise,  $Z$  include controls of pension plan and mutual fund characteristics.

For mutual fund deletion analysis, we include a control for the relative importance of each option in the pension plan defined as the percentage value of the option relative to the pension plan assets. This information is not available for candidate funds to be added to the menu. We expect that options with a relatively higher percentage allocation are less likely to be removed from the menu because participants direct more retirement savings to these options.

We create an indicator variable for target date funds based on the option (fund) name. If a pension plan decides to include target date funds on the menu, that means including a series of related mutual funds from the same fund family, but with different target years which reflect the expected year of retirement and the corresponding portfolio allocation. The 2006 Pension Protection



Act classified target date funds as one of the qualified default investment alternative and many sponsors have added more target date funds to the menu as a default investment option (Mitchell and Utkus, 2012). The fact that target date funds bundle together multiple options and are frequently classified as a default option means that they are less likely to be removed from the menu. Target date funds are also more likely to be added over time because new funds are necessary to match the expected retirement year of new younger employees. Therefore, we expect that the target indicator variable will be negatively related to the probability of deletion, but positively to the probability of addition to the menu.

Table 4 summarizes average mutual fund characteristics by group and whether the fund is added to, dropped from or staying on the investment menu. It shows that consistent across all three groups, DC pension plans tend to replace mutual funds on the menu with those having better past performance and lower expense ratio. In addition, funds that are dropped have on average worse past performance and higher expense ratio than those staying on the menu. For finance firms with external trustees, the difference in performance percentile is 6.7% between the funds dropped and those staying on the menu. The difference is 5.5% for finance firms trusted by the sponsoring company and only 2.7% for other nonfinance firms. On the other hand, for finance firms with external trustees, the percentage of affiliated funds in those that are dropped is about the same as that in those which stay on the menu. Both finance firms trusted by the sponsoring company and nonfinance firms have a large percentage of affiliated funds on the menu to begin with. The percentage of affiliated funds in those that are dropped is relatively smaller. The univariate analysis suggests the presence of cross-sectional variations in how 401(k) pension plans update the investment menus based on fund characteristics. In particular, finance firms with external trustees exhibit higher performance sensitivity and less favoritism towards trustees than the other two groups. In the following, we analyze mutual fund deletions, fund additions, and fund flows in multivariate settings.

## 4.1 Mutual Fund Deletions

In Table 5, we analyze the decision to remove a mutual fund from the menu. We use logit regressions to estimate the determinants of the probability of a mutual fund included on the menu at year  $t$  to be dropped at year  $t+1$  and report marginal effects at the means of the independent variable. Column (1) shows that underperforming funds are more likely to be deleted in the following year from the investment menu. When the mutual fund performance percentile ranking increases by 10 percentage points, the probability to be removed from the 401(k) menu is reduced by 0.69%. This result is in line with the finding of Sialm, Starks, and Zhang (2015) that DC pension plans have a relatively high flow-to-performance sensitivity driven by deletions of underperforming funds from the menu. In line with Pool, Sialm, and Stefanescu (2016), we also find that *Trustee Option* is negatively related to the deletion probability. Controlling for performance, mutual funds affiliated with the trustee have 1.8% lower probability to be removed from the investment menu.

In columns (2), (3) and (4), we extend the analysis by adding two interaction terms. First, we add an interaction term between firm type and performance which intends to capture whether the sensitivity of the deletion probability to performance varies across finance versus other firms. Second, we add an interaction term between firm type and trustee options to capture whether the intensity of favoring trustee-affiliated mutual funds varies across the three groups of sponsors. We find that the interaction term between *Finance Outsource* and *Performance* is significant and negative. Based on Column (2), the fund deletion sensitivity to performance is almost twice as large for finance sponsors with independent external trustees as compared to nonfinance sponsors. However, pension plans of finance firms trusted by the sponsoring company do not display a significantly higher sensitivity. Similarly, we find that trustee-affiliated funds are more likely to be dropped for finance sponsors with external trustees than nonfinance sponsors. The interaction term between *Finance Outsource* and *Trustee Option* is positive and outweighs the negative baseline of effect of *Trustee*

*Option* on deletion probability. We find that finance firms with independent trustees manage to eliminate the favoritism towards trustee funds, but finance firms with in-house trustee do not correct such favoritism bias towards (own) trustee funds.

In columns (5) to (8), we add additional mutual fund level controls and the inferences remain largely unchanged. We find that the relative percentage of pension fund assets allocated to the mutual fund option and the total mutual fund size are negatively associated with the probability of deletion. In line with our expectations, target date funds are also less likely to be removed from the menu, while mutual funds with a higher expense ratio are more likely to be removed. These findings are consistent with the fiduciary duty of both the sponsoring company and its trustee to keep relatively large, popular and cost-efficient funds on the menu.

In Appendix Table A.2, we estimate a robustness test of the deletion results by estimating the regressions models separately for the three sponsor types instead of including interaction terms. The results confirm that finance firms with independent external trustees are more sensitive to performance when deciding on whether to delete a fund from the menu and they also do not favor funds affiliated with the trustee.

Overall, the results from analyzing the mutual fund deletions from the pension menu suggest that a higher level of financial literacy among the plan participants and the sponsoring company leads to a higher tendency to drop potentially inefficient underperforming funds and eliminates the favoritism towards trustee funds susceptible to agency issues. However, financial literacy alone is not sufficient to eliminate inefficient options from the menu, because the higher performance sensitivity and reduced favoritism appear only among pension plans of finance firms governed by an independent external trustee.

## 4.2 Mutual Fund Additions

In this section, we examine the decision to add a mutual fund to the investment menu. We restrict the universe of candidate funds to those which have been offered by at least one other pension plan in the sample. This allows us to focus on the cross-sectional differences across these large pension plans in the decision to select a fund. The specification is similar to that for the deletion decision except that now the dependent variable is one if a mutual fund which is not on the pension fund menu in year  $t$  is added in year  $t+1$  and zero otherwise. When presenting the results for mutual fund additions, we do not show marginal effects because there are large differences in baseline probabilities and the odds ratios provide more meaningful comparisons (Pool, Sialm, and Stefanescu, 2016).

Table 6 shows the results. The coefficients of past fund performance are highly significant in all columns, indicating that better performing funds are more likely to be added on the menu. The coefficients of the indicator for trustee-affiliated option flip signs from those in the mutual fund deletions tests, confirming a strong favoritism by the trustee towards funds from its own family. We find that the interaction term between *Finance Outsource* and *Performance* is insignificant and positive, while that between *Finance In-House* and *Performance* is significantly negative. It implies that finance firms with external trustees (those with internal trustees) exhibit the highest (lowest) sensitivity to performance when deciding on which funds to add on the menu. The interaction terms between firm type and *Trustee Option* suggest that the tendency to add trustee-affiliated options is the highest for finance firms with internal trustees than the other two groups. The coefficients of the control variables are consistent with the expectation that menu designers tend to add relatively large and cost-efficient funds.

In Appendix Table A.3, we estimate a robustness test of the addition results by estimating the regressions models separately for the three sponsor types instead of including interaction terms. The results confirm that finance firms serving as a trustee of their own pension plans exhibit insignificant

sensitivity to fund performance and are more likely to add own mutual funds to the investment menu.

### 4.3 Mutual Fund Performance

We argue that the deletion of underperforming funds and the addition of outperforming funds can incentivize mutual fund managers to generate value and therefore can proxy for menu efficiency. It is, however, difficult to gather direct supporting evidence. To investigate the actual effectiveness of such menu updating rule, we examine whether the *ex post* year  $t$ 's performance is in line with the past performance as well as the decision by the menu designer to drop or keep the fund in year  $t - 1$ . Table 7 relates relative performance of the fund in year  $t$  to whether it is dropped from or stays on the menu, its past performance and whether it is affiliated with the trustee. The results suggest that funds on the pension menu exhibit persistent performance, consistent with Carhart (1997) that fund performance rankings tend to be persistent. In addition, on average, dropped funds are found to underperform those staying on the menu in the subsequent year. Interestingly, it holds only for finance firms with an independent trustee. In contrast, the dropped funds perform slightly better than the ones kept on the menu subsequently for finance firms with in-house trustees. Together with the results on fund deletion and addition, the finding implies that the sensitivity of menu change to fund past performance can be valuable. It also supports the prediction that finance firms with independent trustees design more efficient menus than others.

In sum, combing both results as to the mutual fund deletions and additions on the investment menu, we find that finance firms using external trustees tend to adopt menu updating policies which are more sensitive to past performance and potentially more in line with their fiduciary duty than other firms. Nonfinance firms tend to keep trustee-affiliated options, while finance firms using in-house trustees tend to keep and add options from own family. The findings imply financial

literacy helps to mitigate inefficient investment allocations due to agency issues, but only when it is accompanied by an independent external trustee governing the pension plan.

#### 4.4 Mutual Fund Flows

In this section, we explore mutual fund flows to funds on the investment menu. Fund flows reveal value implications of menu design on the actual allocation of pension contributions by plan participants. Similar to the previous sections, we focus on how flows are sensitive to fund performance and affected by its relation with the trustee:

$$Flows = a + b^T F_{i,p,t-1} + c^T F_{i,p,t-1} P_{i,p,t-1} + d^T F_{i,p,t} T O_{i,p,t-1} + e^T Z_{i,p,t-1} + \epsilon_{i,p,t} \quad (2)$$

We measure fund flows using

$$\frac{V_t - V_{t-1}(1 + r_t)}{V_t + V_{t-1}(1 + r_t)} \quad (3)$$

where  $V_t$  is the total value of the mutual fund and  $r_t$  is the fund return. The measure is well defined for options dropped from, added to, as well as those staying on the menu. It is equal to one and negative one for newly-added funds and just-dropped funds respectively. It takes intermediate values between minus one and one for funds staying on the menu. There can be a mechanical relation between fund flows and the growth of the 401(k) plan. Therefore, we add the control of the growth of the plan size in the regression. In addition, we differentiate the flows due to menu changes of fund deletions and additions and those due to actions by plan participants. To do this, we also conduct the tests using the subsample where the dependent variable is taking intermediate values between minus one and one.

Table 8 shows the results for the sample including all flows in the first four columns and that for

participating flows in the next four columns where only funds carried over from year  $t-1$  to  $t$  are included. For the all-flows sample, we find a significantly positive flow-to-performance sensitivity. On average, the flows are increased by 8.2% when the past performance of a fund moves from the lowest to the highest percentile. The fund flow-to-performance sensitivity for finance firms with external trustees is twice as large as that for other firms. On average, we do not find significantly more flows to trustee-affiliated funds. Such flows are lower for finance firms with external trustees than nonfinance firms, though statistically insignificant. Consistent with our expectation, flows are positively associated with the growth of pension plan assets and higher for target date and low cost funds. For the participant-flows sample, the coefficients of fund performance and its interactions become insignificant. It implies that the positive flow to performance sensitivity for pension options is mainly driven by the menu designers who add outperforming and drop underperforming funds regularly. Plan participants and even those from finance firms do not exhibit performance chasing behavior. The signs of other coefficients are similar to the all-flows sample.

Overall, the tests on mutual fund flows suggest that plan sponsors and trustees play a crucial role in investment allocations to mutual funds by plan participants. The inefficiencies in menu design caused by favoritism towards underperforming funds and trustee-affiliated funds lead to inefficient capital allocation ultimately. Consistent with the findings on menu changes, the findings on fund flows show that mutual funds on the menu of finance firms with external trustees, compared to those on the menu of the other two groups, face more incentives to outperform and overcome the favoritism towards affiliated funds.

## 5 Conclusion

We compare investment menus and allocations in 401(k) defined contribution plans between finance and nonfinance firms. Finance firms are found to be associated with more efficient investments by

their pension plan participants than nonfinance firms. Finance firm employees allocate relatively less to sponsor stock and trustee-affiliated options. In addition, they are offered with and invest in the mutual funds, the selection of which is more sensitive to past performance and less biased towards those affiliated with the trustee. The findings highlight the role of financial literacy in DC investments. However, such efficiency gain due to financial literacy largely disappears when the finance firm also serves as the trustee for its own pension plan.

Our results suggest that financial literacy alone is not sufficient and the improvement of pension investments also depends on the institutional side. Designing a well functioning DC retirement system requires understanding the incentives and conflicts of interest among the sponsor, the service providers as well as the participants.



## References

- Agnew, J., P. Balduzzi, and A. Sundén (2003). Portfolio choice and trading in a large 401(k) plan. *American Economic Review* 93(1), 193–215.
- Agnew, J. R. (2006). Do behavioral biases vary across individuals? evidence from individual level 401 (k) data. *Journal of Financial and Quantitative Analysis* 41(4), 939–962.
- Benartzi, S. and R. H. Thaler (2007). Heuristics and biases in retirement savings behavior. *Journal of Economic Perspectives* 21(3), 81–104.
- Benartzi, S., R. H. Thaler, S. P. Utkus, and C. R. Sunstein (2007). The law and economics of company stock in 401(k) plans. *Journal of Law and Economics* 50(1), 45–79.
- 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(6-7), 1315–1346.
- Carhart, M. M. (1997). On persistence in mutual fund performance. *Journal of Finance* 52(1), 57–82.
- Choi, J. J., D. Laibson, and B. C. Madrian (2005). Are empowerment and education enough? Underdiversification in 401(k) plans. *Brookings Papers on Economic Activity* 2005(2), 151–198.
- Cohen, L. (2008). Loyalty-based portfolio choice. *Review of Financial Studies* 22(3), 1213–1245.
- Cohen, L. and B. Schmidt (2009). Attracting flows by attracting big clients. *Journal of Finance* 64(5), 2125–2151.
- 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(6-7), 1299–1314.
- Elton, E. J., M. J. Gruber, and C. R. Blake (2007). Participant reaction and the performance of funds offered by 401(k) plans. *Journal of Financial Intermediation* 16(2), 249–271.
- Lusardi, A. and O. S. Mitchell (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics* 54(1), 205–224.
- Lusardi, A. and O. S. Mitchell (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature* 52(1), 5–44.
- 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(4), 1149–1187.
- Mitchell, O. S. and S. Utkus (2012). Target-date funds in 401(k) retirement plans. Working Paper: NBER.
- 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(4), 1779–1812.
- Poterba, J. M., S. F. Venti, and D. A. Wise (2008). New estimates of the future path of 401 (k) assets. *Tax Policy and the Economy* 22(1), 43–80.
- Rauh, J. D. (2006). Own company stock in defined contribution pension plans: A takeover defense? *Journal of Financial Economics* 81(2), 379–410.

Sialm, C., L. T. Starks, and H. Zhang (2015). Defined contribution pension plans: Sticky or discerning money? *Journal of Finance* 70(2).

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(11-12), 1073–1085.

Figure 1: Firm Type and Investments in Mutual Funds

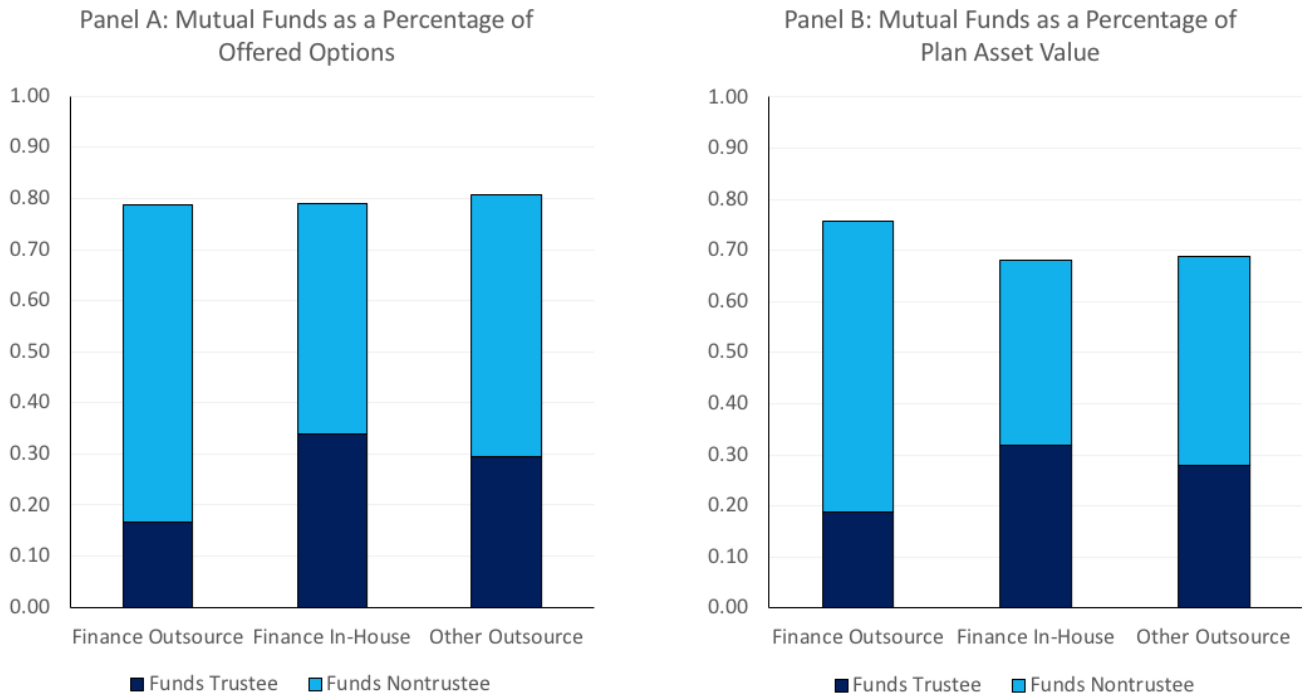


Figure 2: Firm Type and Percentage Allocation to Sponsor Equity

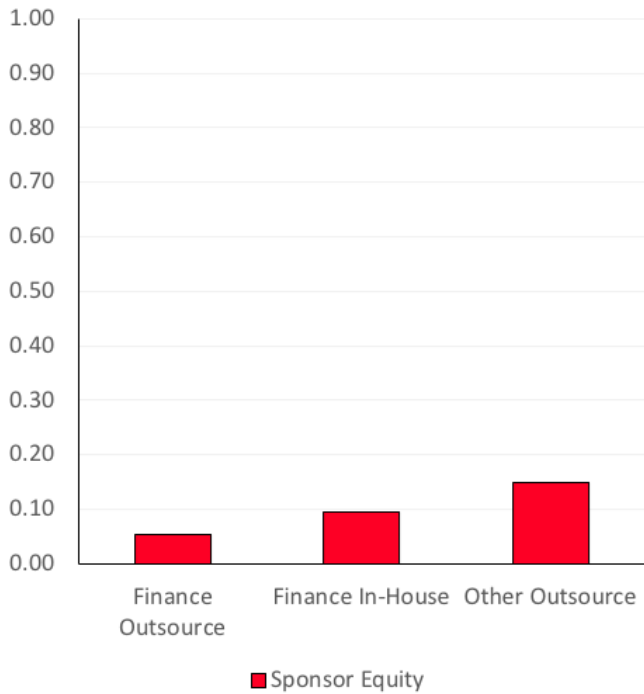


Table 1: **Summary Statistics**

We collect data on the investment menus offered in the 401(k) retirement plans of 141 firms. We split the firms into three groups: finance firms that hire another firm to serve as a trustee of their pension plan, finance firms that serve also as a trustee of their plan, and other nonfinance firms that have another firm serving as a trustee. *Plan Size* presents the average assets under management (\$ mil.) and *Number of Options* presents the average number of options on the investment menu on a plan-year level. We split the options on the investment menu into ten categories: mutual funds affiliated with the trustee, unaffiliated mutual funds, cash funds affiliated with the trustee, unaffiliated cash funds, participant loans, sponsor equity, insurance products, brokerage account, master trust, and other assets. For every category, we present the total number of plan-year-option observations, the average value in (\$ mil.), the median value in (\$ mil.), and the standard deviation of the value.

	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD
	<b>Finance Firms Outsource Trustee</b>				<b>Finance Firms In-House Trustee</b>				<b>Other Firms Outsource Trustee</b>			
#Plans	51				21				73			
#Plan-year	342				139				489			
#Plan-year-option	10,082				5,646				11,988			
Plan Size	342	2,888.269	2,221.740	2,148.045	139	5,973.165	2,905.628	7,399.781	489	6,094.311	4,080.303	6,626.270
Number of Options	342	29.480	30.000	10.763	139	40.619	31.000	34.866	489	24.515	24.000	8.523
Funds Trustee	1,610	122.958	43.347	271.619	2,920	67.869	23.235	122.127	3,751	195.852	89.127	345.746
Funds Nontrustee	6,593	81.755	37.806	161.878	1,986	163.181	51.105	347.079	6,199	197.958	85.396	431.075
Cash Trustee	197	41.996	6.295	123.901	100	397.647	67.154	914.453	186	97.438	13.256	177.409
Cash Nontrustee	341	100.953	45.781	146.926	129	104.323	4.739	256.173	276	167.874	38.450	291.987
Participant Loans	335	50.393	33.826	43.844	135	122.488	47.691	206.482	480	90.437	57.906	87.283
Sponsor Equity	210	251.318	162.557	307.949	93	1,272.294	520.096	2,376.211	390	1,368.133	553.164	2,384.761
Insurance Products	383	150.139	56.894	261.218	122	513.213	214.248	791.380	146	955.874	376.592	2,095.262
Brokerage Account	111	122.369	55.581	249.459	42	137.281	59.111	183.435	169	206.044	150.132	256.340
Master Trust	10	989.325	1,006.639	221.550	6	2369.484	2,367.047	574.413	65	983.917	497.558	1,266.292
Other Assets	292	196.850	43.975	439.419	113	330.432	9.179	727.876	326	425.050	123.794	802.082

Table 2: **Allocation to Sponsor Equity**

In this table we analyze the allocation to sponsor equity. Observations are at the pension plan-year level. Columns (1) and (2) presents results of logit regressions in which the dependent variable equals one if a company offers employer stock as an option on the 401(k) investment menu. We present the marginal effects (elasticities) at the means of the independent variables. If the independent variable is an indicator, the marginal effects present the elasticities for a discrete change from 0 to 1. In the other columns, we examine the allocation to sponsor equity. In columns (5) and (6), we limit attention to the pension plan offering employer stock as an option on the menu. *Finance Outsource* is an indicator variable for finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* is an indicator variable for finance firms that also serve as a trustee of their plan. The omitted category is other nonfinance firms. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. We include year fixed effects and double-cluster standard errors by pension plan and year. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Offering on Menu		Percentage Allocation			
	(1)	(2)	(3)	(4)	(5)	(6)
Finance Outsource	-0.071 [0.092]	-0.068 [0.099]	-0.056*** [0.020]	-0.063*** [0.024]	-0.067** [0.031]	-0.077** [0.037]
Finance In-House		0.012 [0.122]		-0.024 [0.028]		-0.038 [0.036]
Plan Size	0.116** [0.050]	0.117** [0.050]	0.038*** [0.013]	0.037*** [0.013]	0.027 [0.018]	0.025 [0.018]
Number of Options	-0.005** [0.002]	-0.005** [0.002]	-0.002*** [0.000]	-0.001*** [0.000]	-0.003* [0.002]	-0.003 [0.002]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	970	970	970	970	592	592
R <sup>2</sup>			0.129	0.131	0.126	0.132

Table 3: **Options Affiliated with the Trustee**

In this table we analyze the allocation to investment options affiliated with the trustee. Observations are at the pension plan-year level. In columns (1) and (2), the dependent variables measures the percentage of affiliated options from all options on the investment menu. In columns (3) and (4), we examine the percentage allocation to affiliated options. *Finance Outsource* is an indicator variable for finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* is an indicator variable for finance firms that also serve as a trustee of their plan. The omitted category is other nonfinance firms. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. We include year fixed effects and double-cluster standard errors by pension plan and year. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Percentage Offered		Percentage Allocation	
	(1)	(2)	(3)	(4)
Finance Outsource	-0.145*** [0.048]	-0.151*** [0.052]	-0.133*** [0.051]	-0.135** [0.055]
Finance In-House		-0.024 [0.072]		-0.009 [0.073]
Plan Size	-0.006 [0.025]	-0.007 [0.024]	-0.028 [0.025]	-0.029 [0.025]
Number of Options	0.005*** [0.001]	0.005*** [0.001]	0.005*** [0.001]	0.005*** [0.001]
Year FE	Yes	Yes	Yes	Yes
Observations	970	970	970	970
R <sup>2</sup>	0.108	0.108	0.102	0.102

Table 4: **Mutual Fund Characteristics**

This table summarizes average characteristics of mutual funds added to, dropped from and staying on the 401(k) investment menu for the each group of firms. *Finance Outsource* indicates the group of finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* indicates the group of finance firms that also serve as a trustee of their plan. *Nonfinance* indicates the group of nonfinance firms. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. *Target Date Fund* is an indicator variable for target date mutual funds. *Mutual Fund Size* is the natural logarithm of the mutual fund assets. *Turnover* and *Expense Ratio* are in percentage points.

<b>Mutual Fund Characteristics by Group</b>			
	<b>Finance Outsource</b>	<b>Finance In-House</b>	<b>Nonfinance</b>
Observations	5,889	3,143	6,678
<b>Panel A: Additions</b>			
Performance	0.606	0.543	0.596
Trustee Option	0.158	0.395	0.259
Target Date Fund	0.205	0.243	0.218
Mutual Fund Size	0.487	0.303	0.912
Turnover	0.713	0.576	0.532
Expense Ratio	0.564	0.463	0.446
<b>Panel B: Deletions</b>			
Performance	0.495	0.519	0.542
Trustee Option	0.179	0.430	0.306
Target Date Fund	0.179	0.217	0.203
Mutual Fund Size	0.028	-0.054	1.116
Turnover	0.744	0.708	0.495
Expense Ratio	0.651	0.604	0.545
<b>Panel C: No Change</b>			
Performance	0.562	0.574	0.569
Trustee Option	0.178	0.607	0.352
Target Date Fund	0.313	0.160	0.276
Mutual Fund Size	0.963	0.431	1.446
Turnover	0.539	0.634	0.503
Expense Ratio	0.509	0.584	0.407



Table 5: Mutual Fund Deletions from Investment Menu

We focus on the subsample of mutual fund investment options and analyze the decision to remove an option from the menu. Observations are at the pension plan-year-option level. We present results of logit regressions in which the dependent variable equals one if a mutual fund offered as an option in year  $t$  is deleted from the menu in year  $t+1$ . We present the marginal effects (elasticities) at the means of the independent variables. If the independent variable is an indicator, the marginal effects present the elasticities for a discrete change from 0 to 1. *Finance Outsource* is an indicator variable for finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* is an indicator variable for finance firms that also serve as a trustee of their plan. The omitted category is other nonfinance firms. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. We include also interaction terms between firm type and performance. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. We include also interaction terms between firm type and trustee option. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Logit Regressions: Mutual Fund Deletions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Finance Outsource	-0.016**	0.014	-0.019***	0.010	-0.010*	0.029**	-0.014**	0.025*
	[0.006]	[0.014]	[0.007]	[0.014]	[0.006]	[0.014]	[0.006]	[0.014]
Finance In-House	-0.009	0.010	-0.006	0.012	-0.021***	-0.009	-0.019**	-0.007
	[0.009]	[0.018]	[0.010]	[0.019]	[0.008]	[0.015]	[0.009]	[0.016]
Performance	-0.069***	-0.042*	-0.069***	-0.042**	-0.067***	-0.036**	-0.067***	-0.036**
	[0.018]	[0.021]	[0.018]	[0.021]	[0.012]	[0.016]	[0.012]	[0.016]
Finance Outsource × Performance		-0.057**		-0.058**		-0.069***		-0.070***
		[0.023]		[0.023]		[0.021]		[0.021]
Finance In-House × Performance		-0.035		-0.033		-0.024		-0.023
		[0.029]		[0.029]		[0.026]		[0.026]
Trustee Option	-0.018**	-0.018**	-0.022**	-0.021**	-0.016**	-0.016**	-0.021**	-0.022**
	[0.008]	[0.008]	[0.010]	[0.010]	[0.007]	[0.007]	[0.009]	[0.009]
Finance Outsource × Trustee Option			0.019	0.020			0.025	0.028
			[0.016]	[0.016]			[0.019]	[0.019]
Finance In-House × Trustee Option			-0.009	-0.009			-0.007	-0.005
			[0.016]	[0.016]			[0.017]	[0.017]
Plan Size	-0.005	-0.005	-0.005	-0.005	-0.002	-0.002	-0.002	-0.002
	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]
Number of Options	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
%Allocation to Option					-0.431***	-0.432***	-0.422***	-0.422***
					[0.140]	[0.139]	[0.139]	[0.139]
Target Date Fund					-0.078***	-0.078***	-0.078***	-0.078***
					[0.007]	[0.007]	[0.007]	[0.007]
Mutual Fund Size					-0.009***	-0.009***	-0.009***	-0.009***
					[0.002]	[0.002]	[0.002]	[0.002]
Turnover					0.004	0.003	0.004	0.003
					[0.003]	[0.003]	[0.003]	[0.003]
Expense Ratio					0.026***	0.026***	0.026***	0.026***
					[0.010]	[0.010]	[0.010]	[0.010]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12647	12647	12647	12647	10945	10945	10945	10945

Table 6: Mutual Fund Additions to Investment Menu

We focus on the subsample of mutual fund investment options and analyze the decision to add an option to the menu. Observations are at the pension plan-year-option level. We present coefficient estimates of logit regressions in which the dependent variable equals one if a mutual fund that was not offered on the investment menu in year  $t-1$  is added as an option in year  $t$ . *Finance Outsource* is an indicator variable for finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* is an indicator variable for finance firms that also serve as a trustee of their plan. The omitted category is other nonfinance firms. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. We include also interaction terms between firm type and performance. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. We include also interaction terms between firm type and trustee option. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Logit Regressions: Mutual Fund Additions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Finance Outsource	0.162** [0.076]	0.043 [0.158]	0.105 [0.081]	-0.015 [0.157]	0.134 [0.083]	0.035 [0.196]	0.101 [0.090]	0.004 [0.195]
Finance In-House	0.307*** [0.107]	0.732*** [0.182]	-0.144 [0.124]	0.246 [0.192]	0.340*** [0.118]	0.877*** [0.213]	-0.050 [0.133]	0.427* [0.233]
Performance	0.351** [0.142]	0.410** [0.197]	0.357** [0.141]	0.402** [0.196]	0.768*** [0.167]	0.878*** [0.223]	0.760*** [0.167]	0.843*** [0.220]
Finance Outsource × Performance		0.198 [0.244]		0.197 [0.243]		0.157 [0.289]		0.153 [0.288]
Finance In-House × Performance		-0.747** [0.297]		-0.679** [0.293]		-0.890*** [0.319]		-0.778** [0.324]
Trustee Option	1.796*** [0.089]	1.796*** [0.089]	1.382*** [0.135]	1.382*** [0.135]	1.527*** [0.099]	1.528*** [0.099]	1.165*** [0.133]	1.168*** [0.133]
Finance Outsource × Trustee Option			0.122 [0.193]	0.125 [0.193]			-0.012 [0.213]	-0.007 [0.212]
Finance In-House × Trustee Option			2.554*** [0.201]	2.546*** [0.201]			2.483*** [0.211]	2.472*** [0.211]
Plan Size	-0.169*** [0.038]	-0.170*** [0.038]	-0.204*** [0.039]	-0.205*** [0.039]	-0.229*** [0.042]	-0.229*** [0.042]	-0.259*** [0.044]	-0.261*** [0.044]
Number of Options	0.011*** [0.002]	0.011*** [0.002]	0.008*** [0.001]	0.008*** [0.001]	0.010*** [0.002]	0.010*** [0.002]	0.007*** [0.002]	0.007*** [0.002]
Target Date Fund					0.969*** [0.172]	0.969*** [0.172]	0.969*** [0.173]	0.959*** [0.173]
Mutual Fund Size					0.166*** [0.034]	0.166*** [0.034]	0.170*** [0.034]	0.170*** [0.034]
Turnover					0.003 [0.047]	0.004 [0.047]	0.007 [0.045]	0.007 [0.045]
Expense Ratio					-0.825*** [0.164]	-0.827*** [0.164]	-0.797*** [0.163]	-0.799*** [0.163]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1044850	1044850	1044850	1044850	941526	941526	941526	941526

Table 7: Performance of Mutual Funds

We focus on the subsample of mutual fund investment options from the menu and analyze fund performance. We use all firms in columns (1) and (2), finance firms that hire another firm to serve as a trustee of their pension plan in columns (3) and (4), finance firms that serve also as a trustee of their plan in columns (5) and (6), and other nonfinance firms in columns (7) and (8). The dependent variable is the percentile ranking of the mutual fund based on the returns in year  $t + 1$  relative to funds of the same style in the CRSP fund universe. *Deletion* equals one if a fund is on the menu in year  $t$  but not in year  $t + 1$  and zero if a fund is on the menu in both years. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Future Performance							
	All Firms		Finance Outsource		Finance In-House		Other Firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Deletion	-0.014*	-0.011	-0.034**	-0.025*	0.039**	0.029	-0.019	-0.014
	[0.008]	[0.009]	[0.013]	[0.014]	[0.016]	[0.019]	[0.012]	[0.013]
Performance	0.197***	0.095***	0.171***	0.078***	0.180***	0.109***	0.224***	0.096***
	[0.017]	[0.021]	[0.020]	[0.028]	[0.021]	[0.025]	[0.022]	[0.028]
Trustee Option	0.014***	0.017***	0.017**	0.012	0.006	0.014	0.017**	0.012
	[0.006]	[0.006]	[0.007]	[0.008]	[0.009]	[0.010]	[0.008]	[0.008]
%Allocation to Option		0.531***		0.506***		0.500***		0.560***
		[0.082]		[0.143]		[0.139]		[0.087]
Target Date Fund		-0.104***		-0.107***		-0.097***		-0.103***
		[0.019]		[0.021]		[0.021]		[0.022]
Mutual Fund Size		0.002		0.001		-0.004		0.006**
		[0.002]		[0.003]		[0.003]		[0.002]
Turnover		-0.005		-0.005		-0.011		-0.004
		[0.003]		[0.004]		[0.007]		[0.005]
Expense Ratio		-0.029**		-0.042***		-0.030*		-0.023
		[0.012]		[0.014]		[0.017]		[0.016]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14633	12579	5521	4685	2936	2622	6176	5272

Table 8: Mutual Fund Flows

We focus on the subsample of mutual fund investment options and analyze flows to an option on the menu. Observations are at the pension plan-year-option level. The dependent variable is  $\frac{V_t - V_{t-1}(1+r_t)}{V_t + V_{t-1}(1+r_t)}$  where  $V_t$  is the total value of the option and  $r_t$  is the fund return. It is equal to one for just-added options and negative one for just-dropped options. OLS coefficient estimates are presented. The first three columns include all funds on the menu. The next three columns include only old funds which are not dropped in year  $t$ . *Finance Outsource* is an indicator variable for finance firms that hire another firm to serve as a trustee of their pension plan. *Finance In-House* is an indicator variable for finance firms that also serve as a trustee of their plan. The omitted category is other nonfinance firms. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. We include also interaction terms between firm type and performance. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. We include also interaction terms between firm type and trustee option. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. *Plan Growth* is the growth of the pension plan assets. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

	Mutual Fund Flows							
		All Flows			Participant Flows			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Finance Outsource	0.018** [0.009]	-0.024 [0.019]	0.023** [0.010]	-0.018 [0.019]	0.005 [0.004]	0.005 [0.009]	0.005 [0.005]	0.005 [0.009]
Finance In-House	0.017 [0.012]	0.024 [0.022]	0.011 [0.014]	0.019 [0.023]	-0.011* [0.006]	-0.002 [0.012]	-0.014* [0.007]	-0.004 [0.013]
Performance	0.082*** [0.018]	0.059** [0.025]	0.082*** [0.018]	0.059** [0.025]	0.013 [0.008]	0.017 [0.012]	0.013 [0.008]	0.017 [0.012]
Finance Outsource × Performance		0.071** [0.029]		0.073** [0.029]		-0.000 [0.014]		-0.000 [0.014]
Finance In-House × Performance		-0.012 [0.032]		-0.014 [0.032]		-0.016 [0.017]		-0.017 [0.017]
Trustee Option	0.009 [0.009]	0.009 [0.009]	0.012 [0.011]	0.013 [0.011]	-0.006 [0.004]	-0.006 [0.004]	-0.008 [0.005]	-0.008 [0.005]
Finance Outsource × Trustee Option			-0.025 [0.018]	-0.026 [0.018]			0.000 [0.009]	0.000 [0.009]
Finance In-House × Trustee Option			0.018 [0.020]	0.018 [0.020]			0.008 [0.010]	0.008 [0.010]
Plan Size	-0.004 [0.005]	-0.005 [0.005]	-0.004 [0.005]	-0.004 [0.005]	-0.005** [0.003]	-0.005** [0.003]	-0.005** [0.003]	-0.005** [0.003]
Number of Options	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 [0.000]
Plan Growth	0.167*** [0.046]	0.167*** [0.046]	0.166*** [0.046]	0.166*** [0.046]	0.317*** [0.025]	0.318*** [0.025]	0.317*** [0.025]	0.317*** [0.025]
%Allocation to Option	-0.219 [0.134]	-0.222* [0.134]	-0.226* [0.134]	-0.229* [0.134]	-0.685*** [0.095]	-0.687*** [0.095]	-0.686*** [0.095]	-0.688*** [0.095]
Target Date Fund	0.157*** [0.020]	0.158*** [0.020]	0.157*** [0.020]	0.159*** [0.020]	0.055*** [0.010]	0.055*** [0.010]	0.055*** [0.010]	0.055*** [0.010]
Mutual Fund Size	0.005* [0.003]	0.005* [0.003]	0.005* [0.003]	0.005* [0.003]	-0.003** [0.001]	-0.003** [0.001]	-0.003* [0.001]	-0.003* [0.001]
Turnover	-0.004 [0.005]	-0.003 [0.005]	-0.004 [0.005]	-0.003 [0.005]	-0.001 [0.003]	-0.001 [0.003]	-0.001 [0.003]	-0.001 [0.003]
Expense Ratio	-0.079*** [0.016]	-0.079*** [0.016]	-0.080*** [0.016]	-0.080*** [0.016]	-0.041*** [0.009]	-0.041*** [0.009]	-0.042*** [0.009]	-0.042*** [0.009]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10625	10625	10625	10625	9584	9584	9584	9584

**Online Appendix:**

**Financial Sophistication and Conflicts of Interest:  
Evidence from the Investment Menus Offered in 401(k) Plans**

Table A.1: **Summary Statistics: Mutual Funds**

This table summarizes observations corresponding to the matched and unmatched funds when merging the funds from pension plan menus to the CRSP Mutual Fund database. Both the number and the percentage are reported for the three groups: finance firms that hire another firm to serve as a trustee of their pension plan, finance firms that serve also as a trustee of their plan, and other nonfinance firms that have another firm serving as a trustee.

	<b>Matching with CRSP Mutual Fund Database</b>					
	Finance Outsource		Finance In-House		Other Firms	
	N	%	N	%	N	%
Unmatched	1005	12%	912	19%	1366	14%
Matched	7198	88%	3994	81%	8584	86%
Total	8203	100%	4906	100%	9950	100%

Table A.2: Mutual Fund Deletions from Investment Menu

We focus on the subsample of mutual fund investment options and analyze the decision to remove an option from the menu. We split the firms into three groups: in columns (1) and (2) finance firms that hire another firm to serve as a trustee of their pension plan, in columns (3) and (4) finance firms that serve also as a trustee of their plan, and in columns (5) and (6) other nonfinance firms that have another firm serving as a trustee. Observations are at the pension plan-year-option level. We present results of logit regressions in which the dependent variable equals one if a mutual fund offered as an option in year  $t$  is deleted from the menu in year  $t+1$ . We present the marginal effects (elasticities) at the means of the independent variables. If the independent variable is an indicator, the marginal effects present the elasticities for a discrete change from 0 to 1. *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

Logit Regressions: Mutual Fund Deletions						
	Finance Outsource		Finance In-House		Other Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
Performance	-0.090*** [0.024]	-0.095*** [0.019]	-0.052*** [0.015]	-0.039*** [0.015]	-0.068*** [0.024]	-0.063*** [0.017]
Trustee Option	-0.000 [0.012]	0.007 [0.014]	0.001 [0.009]	-0.003 [0.008]	-0.026*** [0.010]	-0.025*** [0.009]
Plan Size	-0.018** [0.007]	-0.010 [0.006]	0.006 [0.004]	0.011** [0.005]	-0.007 [0.005]	-0.009* [0.005]
Number of Options	-0.001 [0.000]	-0.001** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]	0.005*** [0.001]	0.004*** [0.000]
%Allocation to Option		-0.298* [0.175]		0.188 [0.124]		-0.274* [0.157]
Target Date Fund		-0.085*** [0.010]		-0.026*** [0.009]		-0.089*** [0.009]
Mutual Fund Size		-0.014*** [0.003]		-0.007*** [0.002]		-0.006*** [0.002]
Turnover		0.007 [0.005]		0.011*** [0.003]		-0.011** [0.005]
Expense Ratio		0.026* [0.015]		-0.007 [0.013]		0.038*** [0.013]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4713	4042	2538	2267	5396	4636

Table A.3: **Mutual Fund Additions to Investment Menu**

We focus on the subsample of mutual fund investment options and analyze the decision to add an option to the menu. We split the firms into three groups: in columns (1) and (2) finance firms that hire another firm to serve as a trustee of their pension plan, in columns (3) and (4) finance firms that serve also as a trustee of their plan, and in columns (5) and (6) other nonfinance firms that have another firm serving as a trustee. Observations are at the pension plan-year-option level. We present coefficient estimates of logit regressions in which the dependent variable equals one if a mutual fund that was not offered on the investment menu in year  $t-1$  is added as an option in year  $t$ . *Performance* measures the percentile ranking of the mutual fund based on the returns in the previous three years relative to funds of the same style in the CRSP fund universe. *Trustee Option* is an indicator variable for mutual funds affiliated with the pension plan trustee. *Plan Size* is the natural logarithm of the pension plan assets and *Number of Options* is the number of options on the investment menu. *%Allocation to Option* is the percentage value of the option relative to the pension plan assets. *Target Date Fund* is an indicator variable for target date mutual funds. The remaining variables are mutual fund-level variables: *Mutual Fund Size* estimated as the natural logarithm of the mutual fund assets, *Turnover* in percent, and *Expense Ratio* in percentage points. We include year fixed effects, investment style fixed effects, and cluster standard errors by mutual fund. We report standard errors in brackets. \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively.

<b>Logit Regressions: Mutual Fund Additions</b>						
	Finance Outsource		Finance In-House		Other Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
Performance	0.561*** [0.194]	0.888*** [0.247]	-0.180 [0.255]	0.336 [0.364]	0.413** [0.195]	0.819*** [0.233]
Trustee Option	1.547*** [0.155]	1.198*** [0.181]	3.866*** [0.148]	3.636*** [0.182]	1.352*** [0.137]	1.036*** [0.134]
Plan Size	-0.240*** [0.056]	-0.320*** [0.061]	-0.085 [0.075]	-0.105 [0.089]	-0.219*** [0.061]	-0.278*** [0.068]
Number of Options	-0.003 [0.005]	0.008* [0.005]	0.007*** [0.001]	0.004** [0.002]	0.017*** [0.006]	0.022*** [0.006]
Target Date Fund		0.992*** [0.259]		1.151*** [0.331]		0.822*** [0.207]
Mutual Fund Size		0.137*** [0.042]		0.116** [0.056]		0.226*** [0.045]
Turnover		0.017 [0.049]		-0.026 [0.069]		0.004 [0.068]
Expense Ratio		-0.453** [0.219]		-0.835*** [0.241]		-1.123*** [0.225]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365834	329682	148964	134195	530052	477649