

# Does the source of money determine retirement investment choices?

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## Abstract

Using a unique dataset of actual investment choices of Oregon State University employees, we investigate how investment choices differ among (1) the optional retirement plan (ORP) funded by the employer and (2) the investments in 403(b) accounts funded by employees themselves using voluntary salary reduction. We find that the level of risk associated with voluntary, salary reduction investments in 403(b) accounts is lower than the risk these same employees are currently taking in their employer funded 401(a) accounts. We also investigate whether the choice of the provider has a significant impact on the asset allocation chosen by the employees and find that participant investment choices in Fidelity are riskier than the choices made by those in TIAA-CREF. © 2017 Academy of Financial Services. All rights reserved.

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## 1. Introduction

According to Starr (2010), 403(b) plans, on which the non-profit and public sectors rely, have not been studied as thoroughly as 401(k) plans. In this article we explore the choices and asset allocation decisions within the public sector and focus on the defined contribution investment choices available to university employees. We consider employee decisions for two types of accounts: (1) the optional retirement plan (ORP), which is an alternative to the

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traditional defined benefit pension, and (2) voluntary investments in 403(b) accounts. Unlike many of the studies that analyze the 401(k) space, the employees in our sample are highly educated and, in aggregate, wealthier than the national average. These individuals have been shown to take an active role in their retirement planning.<sup>1</sup> Our goal in this study is to explore the investment decisions public employees choose to make and whether those investment choices differ based on the source of money being invested and the provider chosen.

Although 403(b) accounts are studied less frequently than 401(k) accounts, there are a number of studies that explore how university employees make investment and savings decisions. Unlike the previous studies that focus on the characteristics of the employees and the impact of those characteristics on the saving decision, our goal is to investigate the differences between investment behaviors based on the source of the money being invested. We examine whether individuals treat “free money” differently from “earned” money in terms of risk and vendor choice. Angus, Brown, Kihom Smith, and Smith (2008) explore the investment options universities offer their employees through TIAA-CREF. They conclude that the limited investment options result in reducing the risk-taking of the employees but also decreasing the diversification and as a result, reducing growth.

Given university employees’ increased reliance on defined contribution accounts and the responsibility that the employees must take for their retirement choices, this study is significant in a number of ways. First, we examine whether university employees treat their “free money” differently from their “earned money.” In other words, we analyze how the investment choices in the optional pension plan funded by the employer (the state) differ from the investment choices funded by employees themselves in the voluntary salary reduction 403(b) accounts. Because of the design of the state’s retirement system, our sample presents a natural experiment in which we can observe and compare employees’ distinct investment choices associated with employee contributions versus employer contributions.

Second, we explore whether the choice of the provider has a significant impact on the asset allocation chosen by the employees. Before making the individual investment decisions, university employees choose between Fidelity and TIAA-CREF.<sup>2</sup> Although the funds available are roughly equivalent between the two providers, the default investment elections and costs are not identical. Additionally, TIAA-CREF contains options not offered by Fidelity (mainly annuities) that have historically been associated with the concept of investment safety.

## **2. Literature review**

### *2.1. Investment choices and portfolio selection*

Retirement asset allocation is a decision that could potentially cost employees hundreds of thousands of dollars over their lifetime. However, how good are individuals at making this decision? So far, the data points to a number of flaws in individual decision making regarding retirement planning. For example, Benartzi (2001) shows that for well-performing stocks about 40% of discretionary contributions in 401(k) accounts are funneled into an individuals’ own company stock. Based on survey findings, Choi, Laibson, Madrian, and Metrick (2005)

find that people do not make 401(k) investment allocation decisions based on their risk-reward profiles, the management costs of the investments, or even their own unique circumstances. On the contrary, they make their selection by looking at the past performance (especially when it comes to company stock), and in many cases they opt for the default investment option rather than a deliberate choice. As a result, the authors call for a restriction of the options available in a 401(k) account to contain highly diversified mutual funds.

## *2.2. Concerns with self-directed retirement investment*

There are a number of reasons that could partially contribute to the observed suboptimal retirement participation and allocation. First, the options available to employees have increased dramatically in the last 15–20 years. The increased choices also contribute to a change in investment behavior. Choi et al. (2005) show that employees will distribute their investment allocations based on the choices offered by the employer. For example, the more equity funds that are available, the higher the percentage of employee contributions flows into equity funds.

Second, the trend towards automatic enrollment comes with the burden on the employer to choose the default investment selection. Madrian and Shea (2001) argue that in the short term, a significant percentage of employees do not change the default asset allocation. The employer choice for the default investment option then becomes imperative in the retirement well-being of the employees. Beshears, Choi, Laibson, Madrian, and Milkman (2015) find that those who default to non-enrollment in their 401(k) plan have a counterintuitive negative reaction to information about peer retirement savings, while those who opted into a contribution tend to increase savings in response to information about their peer's savings rates. Third, there is a strong reliance on past performance affecting investment allocation. Although modern portfolio theory argues that expected returns should drive the investment decision, in reality, participants often look at the immediate past performance to decide future asset allocation. Mitchell and Utkus (2003) point to a number of reasons that drive the strong influence of past performance on the investment decision. For example, defined contribution providers make such information easily available, which leads to availability bias. Additionally, past performance is easily accessible in the media while expected returns are difficult to find and assess.

## *2.3. Factors that affect investment decisions*

Despite evidence that points to suboptimal investment allocation, not everyone makes suboptimal decisions at the same rate. Agnew (2006) shows that although many follow naïve diversification rules when allocating their retirement account, participants making more than \$100,000 per year hold less company stock, are less likely to follow behavioral biases such as the framing heuristic, and are more likely to participate in a 401(k) compared with lower paid employees. Agnew, Andreson, Gerlach, and Szykman (2008) suggest that partially because of the differential in risk aversion and financial literacy, gender has an impact on investment allocation. As a result, their study finds that women are more likely to choose an annuity compared with men.

#### 2.4. Current 403(b) research

Most of the current research in the 403(b) space focuses on the characteristics of university employees that are more prone to contribute to retirement funds. Duflo and Saez (2002) study the impact of group influence on the choice of mutual fund vendor. The authors show that the peer group influences both the participation in a retirement account and also the provider or vendor that is chosen. Deaves, Veit, Bhandari, and Cheney (2007) explore the characteristics of college employees associated with the propensity to plan, utilizing a survey. The authors report that the depth of participation (pension contributions as a percentage of salary) is positively correlated to a planning mindset. They also find that demographic characteristics such as gender, marital status, age, and salary were significantly correlated as well. The propensity to plan is reported to be positively correlated with risk tolerance. The authors argue that this might be “because planners are more financially sophisticated and understanding of the fact that some risk-taking is appropriate in a pre-retirement portfolio.”

Kim and Hanna (2015) find that those with both defined benefit and defined contribution plans are unrealistic about their future retirement income, and their objective inadequacy increases with age. They also find that those without plans are less realistic than those with retirement savings. Households willing to take on above-average investment risk are overly optimistic about retirement adequacy. Those with higher education and financial experience are more likely to have realistic estimates of retirement income, but the use of a financial planner does not have the same benefit.

Studies examining investment choices indicate that while rationally the investment allocation for retirement should be driven by the investment horizon and, thus, tilted towards equity for young employees, the reality is different. Similar to findings by Choi et al. (2004), the hypothetical allocation experiment organized by Benartzi and Thaler (2001) showed that University of California employees make the asset allocation choice based on the funds available in the plan menu. An earlier TIAA-CREF study finds that participants also do not adjust their asset allocation with age, which may result in an overly risky portfolio.

At the plan design level, Angus et al. (2008) argue that the set-up of 403(b) plans may also have a negative impact on the participants' decisions. The authors study the efficiency of TIAA-CREF, the largest provider of education institutions' 403(b) plans, to show that participants could be about 40% better off in terms of wealth when investment choices are not restricted only to TIAA-CREF retirement annuities.

A small portion of U.S. employees have a generous employer contribution that does not call for employee participation. Our sample gives us the unique opportunity to study a plan in which the employer contributes to a separate employee retirement plan and that contribution is significant. This separate plan can be invested differently than the same employee's 403(b) account. A house money effect has been documented by a number of studies, such as Thaler and Johnson (1990). The employer contribution may be viewed as the house money. Employees may be more willing to take risk with the employer money than their own salary reduction contribution to the 403(b) account when there is an easy way to separate the two accounts and invest them independently of each other. Our study focuses on the differences

in investment decisions between the two types of accounts and the sources of funds: the “free money” and the “earned money.”

We examine investment choices of university employees within the context of Lopes’ (1987) SP/A theory. A psychological framework that examines decision making under uncertainty, the framework attempts to balance the feeling of security (S) with aspirational levels (A), or in our case, the goal of potential retirement. The theory predicts that investors will try to match their savings motives, such as a desire to retire, with their aspirational level. Thus, the investment behavior of households will relate to their goal of a successful retirement.

As such, we expect to see employees maximizing their retirement accounts when the employer is contributing while minimizing the risk taken with their voluntary, salary reduction investments.

### 3. Methodology

#### 3.1. *The framework of the retirement system*

Oregon State University is part of the Oregon public universities’ retirement system. Upon hire, academic and administrative unclassified employees choose between PERS, a defined benefits plan and ORP,<sup>3</sup> an optional retirement 401(a) plan that can be chosen in lieu of PERS. This is a onetime irrevocable decision. The employees are split into four tiers based on date of hire. Employer contribution rules are driven by the tier. This paper is focused on the ORP population only.

There are two accounts associated with the ORP: the employer’s and the employee’s. Both accounts are funded by the employer. The employer account vests 100% after five years of service and the employee account is vested immediately. For Tier I–III employees, the employee account consists of a 6% automatic contribution by the employer into the employee account. This is not an elective employee salary reduction. In other words, regardless of employee participation, the employer contributes 6% on the behalf of the employee and that amount is vested immediately. This is what we refer to as “free money.” For Tier IV employees (hired after July 1, 2014), the employee account is called *Employer Match Account* and consists of 1% to 4%, based on employee contribution into the TDI 403(b) account. Unlike Tiers I–III, there is no free, immediately vested money available to employees unless the employee also contributes to the 403(b). Once selected into the ORP, the employees have a choice between Fidelity and TIAA-CREF for their provider.<sup>4</sup>

In addition to the ORP (or PERS), the participants may also elect one of the two voluntary retirement plans, the 403(b) or the 457. The default investment options are a money market account for TIAA-CREF and the age-appropriate, target date fund for Fidelity.

#### 3.2. *Data description*

We obtain investment account data from Oregon State University as of December 2015. The data includes the type of account: either TDI, voluntary 403(b), or the 401(a), ORP. The

Exhibit 1: Risk tier classification

Risk tier	Description
I	Money market account <sup>a</sup>
II	Bond fund
III	Balanced fund (lifecycle or target date fund)
IV	Domestic equity fund
V	International equity fund
VI	Real estate (sector) fund or the self-directed brokerage account <sup>b</sup>

<sup>a</sup>Traditional (minimum guarantee) annuities are assigned a 1 and variable annuities are assigned to the risk tier that corresponds to the annuity's underlying asset class.

<sup>b</sup>The self-directed brokerage account is only available for Fidelity.

data provides investment fund and percentage allocation by employee. The data are de-identified, but includes the date of hire, allowing us to identify the hiring tiers, and the current age of the employee. We supplement the data by looking at the individual funds and adding the asset class, expense ratio, and, where available, Sharpe ratio, beta, and standard deviation of each fund in the portfolio.

Our main goal is to compare the risk taken with one's own money versus the employer money. We use a number of measures of risk. First, we measure risk using beta and standard deviation. Then, given data limitations of beta and standard deviation within our sample, we also measure risk using an identifier called risk tier, which we build based on the perceived risk of the asset class. Specifically, we assign a risk tier from 1 to 6, where 1 is equivalent to the least risky investment, the money market fund, and 6 is associated with the riskiest investment. Tier VI includes the sector specific fund for TIAA-CREF and the self-directed brokerage account for Fidelity, as detailed in Exhibit 1. We develop risk classifications based on the weighted average of the standard deviations for the funds in the given category. We understand that these risk tier classifications are not perfectly linear but feel it is a close estimation given the data limitations.<sup>5</sup>

Given the limited investment information obtained from the retirement plan providers, in addition to the data obtained from the two providers, we also conduct a survey of Tier III and IV employees regarding their allocation, perceptions about retirement accounts, and interest and comfort with making investment choices. The full survey is available upon request. Our goal is to better understand how and why participants make their investment choices. The survey was emailed to all university employees; 312 participants finished the survey. We draw on some of the answers to compare self-reported data to the actual data received from the vendors.

### 3.3. Analysis

For the multivariate analysis, we use ordinary least squares regressions and apply the Newey-West correction for heteroscedasticity in the residuals of each linear regression model. Our model is:

$$\text{Risk} = \alpha + \beta_1 \text{FidelityDummy} + \beta_2 \text{TIAA 403(b)} + \beta_3 \text{Age} + \beta_4 \text{Tier} + e_i \quad (1)$$

The dependent variable, Risk, is measured as the weighted-average portfolio risk tier as specified in exhibit 1. The independent variables in the baseline models are as follows:

*Fidelity dummy* equal to 1 if the participant is enrolled in a Fidelity fund and 0 otherwise, *TDI 403(b) dummy* equal to 1 if the participant is enrolled in the 403(b) plan and 0 otherwise,

*Age* equal to the current age of the participant as provided by the plan sponsor (Fidelity or TIAA-CREF), and *Tier* equal to the current tier of the employees based on the date of hire.

## 4. Results

### 4.1. Summary statistics

The sample consists of 3,436 Fidelity observations and 5,851 TIAA-CREF observations. Of these, 1,689 are Fidelity ORP 401(a), 3,734 are TIAA-CREF ORP 403(b), and an additional 1,747 and 2,117 observations are from the 403(b) accounts, respectively. A total of 1,175 (or 56.93%) unique participants belong to Fidelity and 889 (43.07%) to TIAA-CREF. Table 1 provides the breakdown by hiring tier. The average age of participants in the full sample is 49.11 years old, with those with Fidelity at 50.36 and those with TIAA-CREF at 48.37 years.

At the vendor level, 56.93% participants are enrolled in Fidelity plans versus 43.04% in TIAA-CREF. The majority of participants in our sample are Tier III employees hired between 2003 and 2013. The recent hires (Tier IV) appear to prefer TIAA-CREF. At the plan level, 54.96% of observations are in the ORP plan (employer contribution) and 45.04% are in the voluntary 403(b) plan. This is an intriguing number given the voluntary nature of the 403(b). Given recent changes in employer contribution for Tier IV employees, we expect to see more employees participating in their 403(b) plan. We find that out of 116 participants in Tier IV, 60 chose both the 401(a) and the 403(b) plans, 23 participants chose only the 401(a) plan, and 33 participants chose only the 403(b) plan. Although it appears that only 19% chose not to participate in both plans and thus did not maximize their employer

Table 1 Sample description

	All vendors	Fidelity	TIAA	ORP 401(a)	TDI 403(b)
Tier I	407 (19.72%)	291 (24.77%)	116 (13.05%)	139 (10.37%)	309 (28.14%)
Tier II	438 (21.22%)	249 (21.19%)	189 (21.26%)	307 (22.91%)	198 (18.03%)
Tier III	1,102 (53.37%)	588 (50.04%)	514 (57.82%)	811 (60.52%)	497 (45.26%)
Tier IV	116 (5.62%)	47 (4.00%)	69 (7.76%)	83 (6.19%)	93 (8.47%)
Total	2,064 (100%)	1,175 (100%)	889 (100%)	1,340 (100%)	1,098 (100%)

Results reported are number of observations in the sample and portion of sample in parentheses. ORP = optional retirement plan.

Table 2 Investments choices by vendor

	Full sample mean ( <i>N</i> )	Fidelity sample mean ( <i>N</i> )	TIAA-CREF sample mean ( <i>N</i> )
Number of funds	3.90 (2,064)	2.69 (1,175)	5.49 (889)
Gross expense	0.43% (9,286)	0.48% (3,435)	0.40% (5,851)
Beta	.9831 (5,407)	0.9297 (2,997)	1.0495 (2,410)
SD	10.72 (5,627)	10.08 (3,217)	11.59 (2,410)
Sharpe ratio	0.9359 (5,627)	0.9246 (3,217)	0.9510 (2,410)
Risk tier	3.7 (9,287)	3.6 (3,436)	3.8 (5,851)

Results reported are the mean value for each variable with number of observations in parentheses. ORP = optional retirement plan.

contribution, it is important to mention the data availability constraints that may underrepresent the true number of dual plan enrollments.<sup>6</sup>

Next, we examine employee investment choices. Given that the two vendors have different default investments (target data fund for Fidelity and money market account for TIAA-CREF), we present the data separately by vendor. Table 2 displays these results.

On average, participants distribute their investments across 3.90 funds. The number of funds in TIAA-CREF accounts is significantly higher, at 5.49, versus the number of funds in Fidelity accounts at 2.69. To gain insight into the differences we look at the distribution by provider. We find that 198 of the 889 TIAA-CREF participants (22.27%) allocate their retirement funds to 10 or more funds (maximum is 25). By comparison, only 27 Fidelity participants (2.29%) allocated their funds to 10 or more funds (maximum is 17).

The difference in the number of chosen funds is significant, especially given that the way the funds are presented to participants on the enrollment form is similar between the two providers. All elections are done online and each participant assigns a percentage of the account to different funds. To understand this difference better, we looked at the survey that several participants completed. An interesting find was that participants who are less knowledgeable and confident in their investment skills tend to choose TIAA-CREF over Fidelity. Some participants explained that they associated TIAA-CREF with a “safer option” and “less risk.” This is an interesting marginal finding that shows the difference in employee perception about the choices available.

While the gross expenses vary from 0.05% to 1.23% for Fidelity and from 0.06% to 0.87% for TIAA-CREF (excluding traditional annuity), the mean expense ratios are statistically significantly different at 0.48% and 0.40%, respectively. Standard deviation, beta, and risk tier are all significantly different between the groups. Mean standard deviations are 10.08 and 11.59, betas are 0.93 and 1.05, and average risk tier investments are 3.58 and 3.82, respectively, for Fidelity and TIAA-CREF. The average age of our sample is 49.11. Fidelity participants’ age averages 50.36 and TIAA-CREF is 48.37, a statistically significant difference of two years.

In this section we investigate whether the risk associated with TDI(a) investments differs from the risk in the ORP 403(b) investment choices. We proxy for risk using the weighted average of the risk tiers of each fund in the individual’s portfolio. Alternatively, we also explore the weighted average of the standard deviations, provided by the vendor, of each fund in the individual’s portfolio as a secondary risk measure.

Table 3 The relationship between type of account and risk

Variables	Model 1 Combined	Model 2 ORP 401(a)	Model 3 TDI 403(b)
Fidelity dummy	0.236*** (4.77)	0.182*** (2.70)	0.315*** (4.28)
TDI 403(b) dummy	−0.233*** (−4.64)		
Age	−0.00504* (−1.94)	−0.00309 (−0.87)	−0.00782** (−2.07)
Tier	−0.122*** (−3.60)	−0.153*** (−2.97)	−0.103** (−2.29)
Constant	3.874*** (20.05)	3.891*** (14.33)	3.697*** (13.25)
Observations	2,435	1,340	1,095
R <sup>2</sup>	0.023	0.014	0.024

The dependent variable is the weighted-average portfolio risk tier. The independent variables are a Fidelity dummy equal to 1 if the participant is enrolled in a Fidelity fund and 0 otherwise, a TDI 403(b) dummy equal to 1 if the participant is enrolled in the 403(b) plan and 0 otherwise, age equal to the current age of the participant as provided by the plan sponsor, and tier equal to the current tier of the employees based on the date of hire. *T*-statistics are reported in parentheses.

\*\*\*, \*\*, \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Table 3 presents the multivariate regression results based on investment choice and the type of account. We use the actual portfolio holdings in each fund to calculate the appropriate weighted average. Individuals who have missing observations for our proxies of risk are removed from the sample. If an individual has both an ORP account and a TDI account they will appear in the sample twice. Thus, the sample number of observations for the multivariate regressions is slightly larger than the number of unique individuals. There were 583 unique participants who are enrolled in the 401(a) plan and 567 in the 403(b) plan. The average age in the full sample is 49.9, with the age in the 403(b) slightly higher at 52.71 years than the 401(a) plan at 47.16 years.

In support of the theory, we find that employees treat their 401(a) accounts differently from the 403(b) accounts. The TDI 403(b) dummy is negative and statistically significant. The level of risk associated with voluntary, salary reduction investments in 403(b) accounts is lower than the risk employees are currently taking in their employer funded 401(a) accounts. The results hold irrespective of the measure of risk (using risk tier and standard deviation). These findings are consistent with the notion of a house money effect. Employees appear to be more willing to take risk with the employer money, or “free money,” than their own salary reduction contribution to the 403(b) account.

We also examine a special subpopulation consisting of the 374 individuals in the sample who have both an ORP account and a TDI account. For those people, the average risk tier for the ORP is 3.44 with a 95% confidence interval between 3.34 and 3.53. The average risk tier for the TDI account is 3.26 with a 95% confidence interval between 3.14 and 3.37. We find a statistically significant difference in risk of 0.177 between the groups. Forty-six percent of the individuals have no difference in risk tiers between ORP and TDI, 34% have a difference of less than 1 between the two types, 15% of individuals have a difference between 1 and 3, and 5% have a difference of greater than 3. We also observe that age is statistically and negatively related to risk. Older employees are more conservative in their investment choices, which is expected given their proximity to retirement.

To further test the house money effect, we add a dummy in Table 1 for the non-vested employer accounts. Our hypothesis that employees take more risk with other people’s money

Table 4 The relationship between provider and risk

Variables	Model 1 Combined (risk tier)	Model 2 Fidelity (risk tier)	Model 3 TIAA-CREF (risk tier)
Fidelity dummy	0.236*** (4.77)		
TDI 403(b) dummy	-0.233*** (-4.64)	-0.304*** (-4.16)	-0.161** (-2.33)
Age	-0.00504* (-1.94)	-0.00642 (-1.64)	-0.00347 (-1.00)
Tier	-0.122*** (-3.60)	-0.224*** (-4.42)	-0.0411 (-0.90)
Constant	3.874*** (20.05)	4.239*** (14.99)	3.804*** (14.87)
Observations	2,435	1,121	1,314
R <sup>2</sup>	0.023	0.031	0.006

The dependent variable is the weighted-average portfolio risk tier in Models 4–6. The independent variables are a Fidelity dummy equal to 1 if the participant is enrolled in a Fidelity fund and 0 otherwise, a TDI 403(b) dummy equal to 1 if the participant is enrolled in the 403(b) plan and 0 otherwise, age equal to the current age of the participant as provided by the plan sponsor, and tier equal to the current tier of the employees based on the date of hire. *T*-statistics are reported in parentheses.

\*\*\*, \*\*, \* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

(free employer money) can be further tested by treating the unvested portion of the account as money belonging to someone else. However, we do not find this to be the case. The difference in the average risk of the account pre- and post-vesting does not vary significantly. The second objective is to examine investment choices and risk associated with the two vendors.

The difference in investment choices between the two providers is shown in Table 4. The coefficient for the Fidelity dummy is positively and significantly related to the risk tier. It appears that participant investment choices in Fidelity are riskier than the choices in TIAA-CREF. When looking at the data by provider, we find that the riskiness of investment choices is consistently lower for the 403(b) self-directed account as compared with the employer funded 401(a) account.

One of the main limitations of our study is the lack of additional control variables in the multivariate analysis. Because of limited data availability, we were not able to control for additional demographic characteristics. To help to alleviate this concern and to get a better understanding of the differences in choices between the two providers, we expand our analysis and look at the characteristics of the two vendor investment choices. Table 5 presents the summary results at the vendor level. We first present a general overview of investment choices in the Fidelity account in Panel A, followed by the choices in the TIAA-CREF account in Panel B.

There were 11.97% of Fidelity participants who are enrolled in the target date fund, a balanced fund. Another 584 people, or 18.10%, have some participation in the target date fund. A very small percentage, at 0.52%, transferred their funds to Fidelity's self-service brokerage account (that allows enrollment in a large number of mutual funds). There are 1.60% of participants who have their entire investment in a money market account, an active choice made by the participant. The average age of the people in this category is 54.56. Finally, 5.52% invested their funds to a certain degree in the S&P 500 ETF, the cheapest fund on the menu at a gross expense of 0.05%, while 7.37% invested their money in one of the five funds with a gross expense ratio above 1.00%. It is important to add that the Fidelity

Table 5 Investment choice participation by provider

Panel A: Investment Choice Participation by: Fidelity	
Fidelity	<i>N</i>
Number of participants 100% invested in Target Date Fund	388 (11.97%)
Number of participants 100% invested in Brokerage Account	17 (0.52%)
Number of participants 100% invested MM account (average age 54.56)	52 (1.60%)
Number of participants invested to some degree in cheapest fund <sup>a</sup>	179 (5.52%)
Number of participants invested to some degree in most expensive funds <sup>b</sup>	239 (7.37%)

<sup>a</sup>S&P 500 ETF.  
<sup>b</sup>Baron Growth 1.23%, VI Small Cap 1.20%, JPM Mid Cap 1.141%, AMG Mid Cap 1.04% JPM.

Panel B: Investment Choice Participation by: TIAA-CREF	
TIAA-CREF	<i>N</i>
Number of participants 100% invested in Target Date Fund	64 (1.20%)
Number of participants 100% invested in Traditional Annuity	36 (0.67%)
Number of participants 100% invested in Variable Annuity	172 (3.24%)
Number of participants 100% MM account (average age )	17 in MM; 183 VAMM (3.76%)
Number of participants invested to some degree in cheapest fund <sup>a</sup>	362 (6.81%)
Number of participants invested to some degree in most expensive fund <sup>b</sup>	469 (8.83%)

<sup>a</sup>CREF Intl Eq Idx-Inst-0.06%.  
<sup>b</sup>TIAA Real Estate-0.87%.

choices include comparable Vanguard midcap and small-cap funds, both available for a gross expense of 0.08%.

Unlike Fidelity, the number of participants enrolled in TIAA-CREF's target date fund (lifecycle fund) is much lower. Only 1.20% enrolled 100% into this option and a total of 2.73% have the option as part of their portfolio. The difference is not surprising given that Fidelity's default investment option is the target date fund, while the TIAA-CREF default investment option is not. Participation in the traditional annuity option is only 0.67% for the full enrollment and 8.08% for partial enrollment. By comparison, 3.24% of employees have chosen a variable annuity option and 44.97% chose the partial variable annuity option. Cost-wise, 6.81% are enrolled in the cheapest fund, which is the CREF international equity index with a gross expense ratio of 0.06%. By comparison, 8.83% are enrolled in the TIAA real estate sector fund, which is the most expensive.

In cooperation with administrators at Oregon State University, we conducted a web-based survey of Oregon State University employees during the summer of 2015. We sent a survey link via email in June 2015 to all Oregon State University employees that made a retirement plan choice. We removed respondents that were not eligible for the 403(b) plan and removed those enrolled before Tier III started. There were 339 respondents who completed the survey. The survey asked about a variety of issues related to retirement plan saving and investment, including questions about the participant's plans for retirement, methods of preparation for retirement, expected job tenure, reasons for enrolling in specific retirement plans, knowledge of how the OSU retirement plans worked, financial literacy, confidence in financial ability, risk attitudes, and basic demographic information. The survey questions are available upon

request. This was a blind survey in that we could not merge the survey responses with the actual investment data found in the earlier part of the paper.

The average age of the participants in the sample is 42. Forty-two percent of respondents enrolled in the ORP plan, 48% enrolled in the defined benefit (pension) plan, and 10% of the respondents are not sure which plan they selected. There were 31% of the respondents who enrolled in the optional 403(b) plan, while 22% are not sure if they enrolled in an optional plan; 53% of respondents use Fidelity, 33% used TIAA-CREF, 2% use VALIC, and 12% are not sure which vendor they used for their ORP accounts. For the 403(b), 61% of respondents use Fidelity, 32% used TIAA-CREF, and 7% are not sure which vendor they chose. Participants are asked to rate the level of confidence in their investment skills on a scale from 0 to 10. The mean confidence level for the sample is 4.19. The mean confidence level for those selecting a 403(b) plan is 5.21 whereas those without the optional plan selected an average mean confidence level of 4.01.

The investment funds selected in their 403(b) accounts are a result of an active choice made by the participant for 72% of the participants, while 28% of participants simply used the default investment settings for each vendor. Using multivariate regressions, we find that the choice to enroll in the defined contribution plan (ORP) rather than the pension plan is associated with respondents who: (1) figured out how much they need for retirement, (2) are younger, (3) have a higher household income, (4) are the primary decision makers, and (5) are more confident about their investment skills. Enrollment into the optional 403(b) plan is associated with respondents who: (1) figured out how much they need for retirement, (2) have a higher household income, (3) are Tier IV employees, (4) are more financially knowledgeable, and (5) see investing as an exciting activity.

## **5. Conclusion and implications**

Using a unique dataset of actual investment choices of Oregon State University employees, we investigate how investment choices differ between (1) the ORP funded by the employer and (2) the investments in 403(b) accounts funded by employees themselves using voluntary salary reduction. We find that the level of risk associated with voluntary, salary reduction investments in 403(b) accounts is lower than the risk employees are currently taking in their employer funded 401(a) accounts. These findings are consistent with the notion of a house money effect, with the employer contribution as the house money. Employees appear to be more willing to take risk with the employer money, or “free money,” than their own salary reduction contribution to the 403(b) account.

We also examine whether the choice of the provider, Fidelity or TIAA-CREF, is related to the asset allocation choices made by the employees. We find that participant investment choices in Fidelity are riskier than the choices made by those who selected TIAA-CREF. One possible interpretation and implication is that participants who enroll into Fidelity are more sophisticated investors and are better able to assess risk. This result is further reinforced by the answers to our survey. Respondents who choose Fidelity also tend to be more confident in their investment ability and knowledgeable about the stock market.

Lastly, using a survey of 354 Oregon State University employees we explore how individuals choose their plan, the level of risk, and the plan provider. There were 28% of those in the survey who chose the default investment option by the provider. Enrollment into the optional plan is associated with respondents who are more likely to have figured out how much they need for retirement, have a higher household income, are recently hired (Tier IV) employees, are more financially knowledgeable, and see investing as an exciting activity.

The study and findings have implications for both the design and choices employers make in their retirement plans and the choices employees make when selecting investments. First, the employer's choice of a default option has a considerable impact on the investment choice made by the employee. As such, employers should select the default option that has the best potential to be an appropriate option for employees in the event of no involvement by the employee. Second, employers should add educational information around the employee and employer accounts during employee orientation when the retirement system is presented. This will assure that employees are clear on the types of investment choices available and the implication of an active or passive choice. Lastly, given the financial implication of the decision, in the event that employees do not feel comfortable with making the investment choices, employees should employ professional services rather than spreading funds equally between similar accounts or investing in high fee funds that have low fee comparable options.

## Notes

- 1 As education and income have been shown to have a strong relationship with retirement planning, we aim to eliminate that impact rather than control for it. For example, Joo and Grable (2005) show a link between higher education/higher income and the existence of workplace retirement savings.
- 2 Employees are informed about the two options at a Human Resources-led orientation but they are not advised to choose one over the other.
- 3 For a complete guide of eligibility and rules, see the state of Oregon public employees' website.
- 4 VALIC is also an option but it is a closed provider since 2007 and no VALIC data is included in this study.
- 5 One concern is that the TIAA real estate fund is less risky than equity funds. To account for this possibility we specify an alternative ranking, where real estate was assigned a 4, domestic equity a 5, and international equity a 6, with the brokerage account becoming a 7. This change does not have a significant impact on the results.
- 6 It is possible that some employees chose Fidelity for one plan and TIAA-CREF for the other. Given the lack of employee identifiers, we are unable to crosscheck the two plans and identify such participants. We treat each unique participant from either Fidelity or TIAA-CREF as non-overlapping, when in reality this may not be so. Additionally, participants could choose the 403(b) account and not be enrolled in the TDI(a). Rather, they may decide to choose the defined benefit pension alternative.

Given the data availability, we expect the real number of Tier IV employees who do not maximize their benefits to be lower.

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