

## INTERNET APPENDIX

### “Is Conflicted Investment Advice Better than No Advice?”

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- *Appendix A* explains why, in our setting, there is little difference between financial guidance, which HIGH provided, and financial advice, which it was not allowed to provide.
- *Appendix B* describes changes in the investment menus of HIGH, LOW, and NEW between October 1996 and December 2009, which are summarized in *Table A1*.
- *Appendix C* studies the choice between ORP and PERS. *Table A2* predicts demand for PERS over ORP. To address concerns about time-varying selection into ORP, *Table A3* compares the survey responses of ORP participants who join at the end of Regime 1 to those who join during Regime 2.
- *Table A4* is an alternative version of *Table 5*, estimated on a larger sample of participants.
- *Table A5* summarizes the risk and return of actual ORP portfolios and counterfactual portfolios based on TDFs, separately for each calendar year. As in *Table 6*, the sample is restricted to ORP participants who join during Regime 1 and choose either HIGH or LOW. However, the sample is further restricted to those participants for whom we can estimate  $\Pr(\text{High})$  in column 2 of *Table 3*.
- *Table A6* is an alternative version of *Table 8* that decomposes differences in the returns of actual portfolios and counterfactual portfolios based on TDFs into (i) differences in broker fees, (ii) differences in predicted returns associated with differences in factor loadings, and (iii) differences in the six-factor alphas of underlying investment options (when monthly returns are measured gross of broker fees but net of expense ratios).
- *Table A7* is an alternative version of *Table 8* that is estimated on the subsample of ORP participants from Regime 1 for whom we observe a response to the survey question: “When choosing between ORP providers assess the importance of the following factors: Access to face-to-face meetings with a financial adviser.”
- *Tables A8* is an alternative version of *Table 10* that is estimated on the same subsample of participants as *Table A6*.

- *Appendix D* studies the allocation of monthly contributions across investment menu options in HIGH and LOW. Our focus is on the sensitivity of allocations to the level of broker and non-broker fees. *Table A9* estimates Tobit regressions, in which the dependent variable equals the fraction of contributions allocated to option  $j$  by participant  $i$ .
- *Table A10* estimates Probit regressions and *Table A11* estimates linear probability models (i.e., OLS regressions), in which the dependent variable equals one when the allocation to option  $j$  by participant  $i$  is positive, and zero otherwise.

### *Appendix A. Financial advice versus financial guidance*

The Employee Retirement Income Security Act (ERISA) prohibits defined contribution pension plan providers from giving their own financial advice on the investment options within their plans.<sup>32</sup> To comply with ERISA, HIGH uses algorithms developed by Ibbotson Associates to generate financial advice for investors with managed accounts. However, OUS prohibits HIGH from directly managing the “participant-directed” accounts of ORP investors. Because of this restriction, it is more accurate to say that HIGH provides ORP participants with face-to-face access to financial guidance.

Within an investment menu of modest size (like that available through HIGH), the distinction between financial guidance and financial advice is small. ERISA defines financial advice narrowly, as a recommendation that is immediately actionable. Under this definition, the recommendation to “invest 100% of your retirement assets in Vanguard’s S&P 500 index fund” is *financial advice*. In contrast, the recommendation to “invest 100% of your retirement assets in a low-cost S&P 500 index fund” is *financial guidance* because the recommendation is personalized but not immediately actionable. This remains true even if the investment menu offers a single S&P 500 index fund. Therefore, while brokers employed by HIGH are prohibited from offering financial advice, they are allowed to offer financial guidance (and education)—a distinction that is likely lost on those seeking relationships with brokers.<sup>33</sup>

### *Appendix B. Overview of the HIGH and LOW investment menus*

ORP participants face different investment menus when they invest through HIGH, LOW, and NEW. In Table A1, we report the number of investment options in each asset class at the beginning and end of our sample period. We also report the number of investment options that are actively managed versus passively managed, the number of investment options that are advised by the provider versus outside asset management firms (e.g., HIGH provides access to the HIGH Small-Cap Value Fund and the SIT Mid-Cap Growth Fund), and the default investment option, which varies across plans but not in the time series within plans.<sup>34</sup>

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<sup>32</sup> DOL Advisory Opinion 2001-09A, also known as the The SunAmerica Opinion Letter, permits defined contribution retirement plan providers to offer financial advice only when they outsource asset allocation and investment selection decisions to independent, third party providers.

<sup>33</sup> A recommendation that is neither personalized nor actionable, such as “academics recommend investing in low-cost, diversified mutual funds”, is classified as *financial education*.

<sup>34</sup> Although we lack data on the investment menus of SMALL and SMALLER, we were able to confirm that each provider offered a money market fund as its default investment option throughout Regime 1.

During Regime 1, HIGH offers four-times as many investment options as LOW in October 1996 (40 versus 10). Even after LOW increases its investment menu in July 2007, HIGH still offers more than three-times as many investment options (61 versus 19). While HIGH's investment menu grows significantly over our sample period, access to investments advised by other firms declines significantly. For example, HIGH introduces its own Mid-Cap Growth Fund in September 1998 and drops the SIT Mid-Cap Growth Fund in May 2006. Perhaps more significantly, HIGH's investment menu is skewed toward domestic equity, offering investments with narrow investment mandates (such as Small-Cap Value or Mid-Cap Growth). This could explain why 15% of the survey respondents who choose to invest through HIGH report never meeting with their broker—they choose HIGH for access to equity funds rather than for access to broker recommendations. During Regime 2, NEW offers both a larger menu than LOW (38 options versus 19 options) and relatively more domestic equity funds (16 versus 9).

#### *Appendix C. Demand for PERS versus ORP*

As we highlight in Figure 2, all of the investors that we study actively choose ORP over PERS. Therefore, in this Appendix, we study the demand for PERS relative to ORP. The Probit specifications estimated in Table A2 are similar to those estimated in Table 3, and are similar in spirit to those estimated by Brown and Weisbenner (2007) when studying the choice between DB and DC retirement plans in the State Retirement System of Illinois. The dependent variable equals one if OUS employee  $i$  chooses PERS as his or her retirement plan (or is defaulted into PERS) and zero if he or she chooses ORP. The set of independent variables is the same as in Table 3, with three exceptions. First, we cannot include monthly salary because we only observe monthly salary for the subset of employees who choose ORP. Second, we include a dummy variable indicating if the choice between PERS and ORP occurs during ORP Regime 2 (between November 2007 and December 2009). Third, we include a dummy variable indicating if the choice between PERS and ORP occurs during PERS Regime 2 (between September 2003 and December 2009), when the employer contribution rate for new employees was reduced to match changes in the expected generosity of PERS. These dummy variables are intended to control for shifts in the perceived relative value of ORP due to plan changes. Columns 1 and 2 focus on the portion of our sample period for which we observe the date of the choice between PERS and ORP (on or after February 1999); columns 3 and 4 are restricted to the last four years of our sample period (End of Regime 1 plus Regime 2); and columns 5 and 6 are restricted to the subset of campuses and calendar years for

which we observe data on educational attainment. Many of the marginal effects in Table A2 are broadly consistent with those estimated in Table 3. In particular, demand for PERS and HIGH both decrease with educational attainment, and are both significantly lower for employees within business and economics departments and other quantitative departments. These patterns suggest that there could be less variation in financial sophistication within our sample of ORP participants than there is within the full sample of OUS employees (or the subsample that selects into PERS). Indeed, our survey of current participants reveals an unusually high level of financial literacy within our sample (Table 4 Panel E).

These patterns also raise questions about possible differential selection into ORP. Specifically, if the increased market volatility during Regime 2 increased the fraction of employees with lower levels of financial sophistication who choose PERS, the sample of ORP participants during Regime 2 could be more financially sophisticated than during Regime 1. This would complicate our empirical strategy that uses the choices of ORP participants with high predicted demand for broker recommendations who join during Regime 2 to identify counterfactual portfolios of broker clients who join during Regime 1. We address concerns about differential selection in four ways.

First, we can measure the extent to which PERS substitutes for HIGH during Regime 1 by measuring the correlation between the fraction of ORP-eligible participants who choose PERS each month and the fraction of ORP participants who choose HIGH in the same month. While this correlation is  $-0.099$ , suggesting a modest degree of substitutability between PERS and HIGH, the correlation is not statistically significant at conventional levels (p-value of  $0.313$ ).

Second, we predict demand for PERS versus ORP using data between January 2005 and December 2009. We then calculate predicted values for participants who do and do not pick PERS, during Regimes 1 and 2. The predicted values for participants who choose PERS are almost identical in the two regimes ( $72.7\%$  versus  $72.7\%$ ), as are the predicted values for participants who choose ORP ( $79.7\%$  versus  $79.0\%$ ). These similarities argue against any significant change in observables across the two regimes.

Third, we use the April 2012 survey described in Section 3.4 to test for differential selection. In total, we received 286 responses from ORP participants who joined during the End of Regime 1 and 191 from those who joined during Regime 2. In Table A3, we compare the survey responses of these two groups. We find some evidence that ORP participants joining during Regime 2 could be slightly less risk averse than ORP participants joining during Regime 1. Specifically, the fraction of Regime 2 participants who prefer the job offering a 50% chance of a 20%

wage increase and a 50% chance of a 10% wage decrease is 59.1% versus 49.3% for End of Regime 1 participants (p-value of 0.129). The only difference that is statistically significant at conventional levels is the finding that Regime 2 participants are slightly less likely to rate “Historical investment performance” as “Important” or “Very Important” (74.1% versus 82.5%; p-value of 0.043), which could reflect a modest increase in investment experience. However, we find no meaningful differences in the ability to correctly answer all four financial literacy questions (92.2% versus 92.8%; p-value of 0.747)

Finally, as discussed in Section 3.5, we identify participants with top-quartile predicted demand for HIGH using the distribution of  $\text{Pr}(\text{HIGH})$  within the full sample of ORP participants. As a result, we classify 26.5% of the ORP participants in Regime 1 as having top-quartile predicted demand for HIGH versus 20.0% of the ORP participants in Regime 2, allowing for an apples-to-apples comparison.

#### *Appendix D. Comparing the investment selection of HIGH and LOW investors*

To implement an asset allocation plan, an investor must allocate her monthly retirement contributions across an appropriate set of funds. In Table A9, we explore the influence of brokers on fund selection. We test two hypotheses. The first concerns the agency conflict that can arise when financially unsophisticated (or trusting) investors seek investment recommendations from financially sophisticated intermediaries. To test for conflicted advice, we exploit across-fund variation in broker fees in the HIGH investment menu and test whether HIGH clients are more likely to allocate their retirement dollars to investments paying higher broker fees. As discussed in the text, our research question most closely matches that of Christoffersen et al. (2013), who find that cross-sectional variation in the level of broker fees helps to explain cross-sectional variation in mutual fund flows, and Hackethal, Inderst, and Meyer (2012), who find that broker recommendations respond to sales incentives. The main motivation for testing this hypothesis is to shed light on the lower six-factor alphas earned by broker clients in Table 10. Another motivation is to increase our confidence that broker clients follow the investment recommendations of their brokers (since broker clients are unlikely to choose funds with higher broker fees on their own).

The second hypothesis concerns return chasing. Within the full universe of mutual funds, there is strong evidence that the relation between flows and performance is convex, with the best

performing mutual funds receiving a disproportionate share of the dollars.<sup>35</sup> At the same time, because studies like Carhart (1997) find little evidence that positive abnormal returns persist, investors should not necessarily make long-term asset allocation decisions on recent fund-level returns.<sup>36</sup> Therefore, we test whether return-chasing behavior differs between broker clients and self-directed investors. To the extent that brokers discourage return chasing, we expect to find less evidence of return chasing by broker clients. The implicit assumption underlying this comparison is that broker clients would have been at least as likely to engage in return chasing without a broker. An alternative test is whether broker clients' exhibit any return chasing at all since there can be no return chasing in a portfolio that allocates 100% to a single TDF.

The dependent variable in Table A9 is the fraction of participant  $i$ 's retirement contribution that is allocated to fund  $j$  in month  $t$ . Because this variable is nonnegative, estimation is via Tobit.<sup>37</sup> The sample consists of all ORP participants for whom the enrollment date is uncensored, and all of the funds available to HIGH or LOW investors in month  $t$ . To focus attention on active fund choices, we exclude those participants who invest solely in the default investment option. There are three independent variables of interest. To test for conflicted advice, we include the fee that fund  $j$  pays each year to the broker. For HIGH investments, the broker fee is a constant 55, 85 or 105 basis points; for LOW investments, it is zero. To test whether investors are sensitive to the level of fund fees more broadly, we include the annual fees charged by the fund that are not paid to the broker (i.e., the total annual fee minus the broker fee). Interacting the "Nonbroker Fee" with dummy variables indicating whether the fund is available to HIGH or LOW investors allows us to test whether brokers steer investors away from fees from which the brokers do not benefit. To test for return chasing, we include the net return on fund  $j$  over the prior twelve months interacted with dummy variables that indicate whether participant  $i$  invests through HIGH or LOW.

One set of specifications focus on initial fund choices (month 1) and another set focus on choices two years later (month 24). All of our specifications control for the fund's broad asset category, turnover, and whether it is an index fund. Because we are testing for differential sensitivities to lagged returns and fees across ORP providers, in columns 1 and 4, we include a separate

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<sup>35</sup> See, for example, Ippolito (1992), Chevalier and Ellison (1997), Sirri and Tufano (1998), and Del Guercio and Tkac (2002).

<sup>36</sup> We write "should not necessarily" because Berk and Green (2004) highlight the possible role that flow-performance plays in efficiently allocating flows across managers and Del Guercio and Reuter (2014) highlight positive feedback from flow-performance relations to the operational decisions of mutual fund families.

<sup>37</sup> Our findings are similar when we predict which funds receive positive allocations using Probit regressions (Table A10) and linear probability models (Table A11).

fixed effect for each provider each month, so that we are comparing fund returns and fees within each menu relative to the other funds within the same menu. In the other columns, we include a separate fixed effect for each provider-asset category-month combination, so that we are comparing fund returns and fees within a given menu and category. When we focus on narrow categories instead of broad categories (e.g., small-cap value funds instead of domestic equity funds), we limit the sample to HIGH equity funds. Standard errors are clustered on date.

We find strong evidence of conflicted investment advice. The coefficients on the level of broker fees are positive and statistically significant in all six columns, and the magnitudes are economically significant. Increasing broker fees by 50 basis points (i.e., the difference between the lowest and highest broker fee) is predicted to increase the allocation to investment  $j$  by as much as 35.3 percentage points. The fact that broker fees continue to explain HIGH investment choices in month 24 reflects the fact that broker fees paid by investment  $j$  do not vary in the time series. Interestingly, we also find robust evidence that HIGH investors invest less in funds that have high fees that are not retained by the broker, which suggests that brokers steer investors away from high-fee funds when those fees do not benefit the brokers. In other words, our findings are similar in spirit to Barber, Odean, and Zheng's (2005) finding that monthly mutual fund flows are increasing in the level of the 12b-1 fee but decreasing in the level of other operating expenses. To the extent that broker-sold funds with lower non-broker fees invest less in active management, they might be expected to underperform (Del Guercio and Reuter (2014)).

The evidence on return chasing is mixed. HIGH investors consider recent returns when selecting funds in month 1, but not in month 24. Therefore, to the extent that brokers help investors chase past returns, they only do so when initially selecting funds. However, the effects in month 1 are economically significant. A one-standard deviation increase in recent returns is predicted to increase the allocation to investment  $j$  by 10.6 percentage points. Whether we find that LOW investors consider recent returns depends on the specification. The baseline specifications suggest no return chasing in month 1 but modest return chasing in month 24. The specifications that include provider-broad asset class-month fixed effects suggest strong return chasing in months 1 and 24. The caveat is that because the LOW menu tends to offer a single fund within each broad asset class, the estimated coefficient in this specification is driven by allocations among the three equity funds.



## References

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**Table A1**

Overview of investment menus for HIGH, LOW, and NEW.

This table summarizes the investment menus available through HIGH, LOW, and NEW at the beginning and end of Regime 1 and throughout Regime 2. HIGH makes numerous changes to its investment menu during Regime 1, increasing the total number of investment options, but decreasing the number of investment options managed by asset management firms other than HIGH. LOW offers the same ten investment options between October 1996 and June 2007, adding nine new investment options in July 2007. NEW offers the same menu throughout Regime 2. Defaults options vary across providers but not in the time series within provider. The default option is a fixed annuity for HIGH, money market fund for LOW, and TDF for NEW.

Provider: Date:	HIGH			LOW			NEW	
	10/96	10/07	12/09	10/96	10/07	12/09	11/07	12/09
Total number of options	40	62	61	10	19	19	38	38
Money market	1	2	2	1	1	1	1	1
Fixed annuity	2	2	2	1	1	1	1	1
Fixed income	6	9	9	2	2	2	5	5
Balanced	5	11	10	1	1	1	0	0
TDF	0	0	0	0	0	0	12	12
U.S. equity	21	31	31	2	9	9	16	16
Global	5	7	7	2	3	3	3	3
Real estate	0	0	0	1	2	2	0	0
Passively managed	3	4	4	1	2	2	4	4
Actively managed	37	58	57	9	17	17	34	34
Managed by provider	16	52	51	10	19	19	16	16
Not Managed by provider	24	10	10	0	0	0	22	22
Default option	Fixed Annuity			Money Market			TDF	

**Table A2**

Demand for PERS versus ORP.

The probit regression specifications in this table are similar to those estimated in Table 3. The unit of observation is OUS employee  $i$ . The dependent variable equals one if OUS employee  $i$  chooses PERS as his or her retirement plan and zero if he or she chooses ORP. The set of independent variables differs in three ways from the set included in Table 3. First, we cannot include monthly salary because we only observe monthly salary for the subset of employees who choose ORP. Second, we include a dummy variable indicating if the choice between PERS and ORP occurs during ORP Regime 2 (after October 2007). Third, we include a dummy variable indicating if the choice between PERS and ORP occurs during PERS Regime 2, when the employer contribution rate for new employees was permanently reduced (after August 2003). Columns 1 and 2 focus on the portion of our sample period for which we observe the date of the choice (after January 1999); columns 3 and 4 are restricted to the last four years of our sample period; and columns 5 and 6 are restricted to the subset of campuses and calendar years for which we observe data on educational attainment. Columns 2, 4, and 6 include date of choice fixed effects. We report marginal effects. Standard errors are clustered on the date of the choice. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

Dependent variable:	1 if OUS employee chooses PERS, 0 otherwise					
Date range:	2/99 - 12/09	2/99 - 12/09	1/06 - 12/09	1/06 - 12/09	2/99 - 12/04	2/99 - 12/04
	(1)	(2)	(3)	(4)	(5)	(6)
ORP Regime 2	0.0359 (0.0338)		0.0441 (0.0449)			
PERS Regime 2	-0.0644 ** (0.0307)				-0.0466 (0.0563)	
Female	-0.0021 (0.0063)	-0.0019 (0.0063)	-0.0170 (0.0104)	-0.0150 (0.0118)	-0.0068 (0.0106)	-0.0049 (0.0110)
Age 30 to 39	-0.1132 *** (0.0131)	-0.1020 *** (0.0101)	-0.0952 *** (0.0172)	-0.0865 *** (0.0138)	-0.0564 *** (0.0184)	-0.0512 *** (0.0163)
Age 40 to 49	-0.0635 *** (0.0126)	-0.0582 *** (0.0113)	-0.0357 ** (0.0182)	-0.0281 * (0.0162)	0.0008 (0.0178)	-0.0013 (0.0178)
Age 50 or above	0.0296 *** (0.0095)	0.0170 (0.0105)	0.0464 *** (0.0174)	0.0330 ** (0.0163)	0.1025 *** (0.0165)	0.0824 *** (0.0171)
Asian	-0.0130 (0.0109)	-0.0077 (0.0102)	-0.0110 (0.0211)	-0.0052 (0.0208)	0.0153 (0.0168)	0.0132 (0.0162)
Black	-0.0529 *** (0.0199)	-0.0576 *** (0.0218)	-0.0410 (0.0352)	-0.0532 * (0.0336)	-0.1020 *** (0.0396)	-0.1057 *** (0.0447)
Hispanic	0.0392 *** (0.0128)	0.0418 *** (0.0114)	0.0491 ** (0.0211)	0.0615 *** (0.0188)	0.0338 (0.0232)	0.0238 (0.0225)
Other ethnicity	0.0283 (0.0170)	0.0273 (0.0165)	0.0369 (0.0309)	0.0198 (0.0341)	0.0185 (0.0308)	0.0020 (0.0318)
Faculty member	-0.0238 (0.0223)	-0.0275 (0.0172)	0.0132 (0.0352)	-0.0057 (0.0316)	0.0433 * (0.0244)	0.0323 (0.0222)
Business or economics	-0.0761 *** (0.0250)	-0.0636 *** (0.0230)	-0.1096 *** (0.0400)	-0.0978 *** (0.0381)	-0.0613 * (0.0393)	-0.0522 (0.0374)
Other quantitative dept.	-0.0576 *** (0.0093)	-0.0388 *** (0.0087)	-0.0649 *** (0.0181)	-0.0390 *** (0.0158)	-0.0240 * (0.0141)	-0.0186 (0.0146)
PhD					-0.2515 *** (0.0320)	-0.2069 *** (0.0226)
Masters					-0.0395 ** (0.0190)	-0.0390 ** (0.0164)
Oregon State	0.0101 (0.0125)	0.0172 (0.0113)	-0.0483 ** (0.0221)	-0.0441 ** (0.0219)	0.0501 *** (0.0190)	0.0600 *** (0.0138)
Portland State	0.1223 *** (0.0103)	0.1133 *** (0.0084)	0.1327 *** (0.0195)	0.1157 *** (0.0145)	0.1305 *** (0.0170)	0.1275 *** (0.0152)
Oregon Institute of Tech.	-0.0034 (0.0224)	0.0066 (0.0180)	-0.0492 (0.0425)	-0.0646 * (0.0418)	0.0387 (0.0337)	0.0613 ** (0.0228)
Eastern Oregon	0.0744 *** (0.0153)	0.0882 *** (0.0122)	0.1201 *** (0.0255)	0.1307 *** (0.0195)		
Southern Oregon	0.1213 *** (0.0128)	0.1248 *** (0.0089)	0.0732 *** (0.0229)	0.0820 *** (0.0200)		

Western Oregon	0.0763 *** (0.0140)	0.0861 *** (0.0112)	0.1008 *** (0.0235)	0.1079 *** (0.0205)		
Office of the Chancellor	-0.0870 ** (0.0443)	-0.0574 (0.0426)	-0.1789 ** (0.0975)	-0.1741 * (0.1038)		
Date of choice fixed effects?	No	Yes	No	Yes	No	Yes
Pseudo-R2	0.0622	0.1702	0.0670	0.1579	0.0916	0.2257
N	19,438	19,438	6,174	6,174	6,898	6,898

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**Table A3**

Testing for Differences in Survey Responses between End of Regime 1 and Regime 2.

This table compares the characteristics of ORP participants who join during the end of Regime 1 (between January 2006 and October 2007) to those who join during Regime 2 (between November 2007 and December 2009), without conditioning on the choice of provider. The survey answers summarized in Panels A, B, and C mirror those summarized in Panels A, D, and E of Table 4.

Panel A. Testing for differences in reliance upon financial advisers when deciding on asset allocation								
	Do you have an ongoing with a financial adviser?		I would feel comfortable making changes to my equity and bond balance without consulting my adviser.		How did you primarily decide on the fraction to invest in stocks?			
	Sample size	Yes	Sample size	"Agree" or "Strongly agree"	Sample size	My own research and knowledge of investing	Recommendation of adviser	Recommendation of friends, family, or co-workers
End of Regime 1	225	39.1%	85	36.5%	189	37.6%	52.9%	9.5%
Regime 2	151	36.4%	52	30.8%	123	39.0%	51.2%	9.8%
Difference		-2.7%		-5.7%		1.5%	-1.7%	0.2%
p-value		0.599		0.496		0.796	0.771	0.946

  

Panel B. Testing for differences in factors that influenced choice of ORP investment provider								
When choosing between ORP investment providers assess the importance of the following factor:								
	Access to face to face meetings with a financial adviser		The number of equity fund choices available		The level of fund expenses		Historical investment performance	
	Sample size	"Important" or "Very important"	Sample size	"Important" or "Very important"	Sample size	"Important" or "Very important"	Sample size	"Important" or "Very important"
End of Regime 1	244	45.9%	242	57.0%	246	72.8%	245	82.5%
Regime 2	163	44.2%	162	54.9%	110	67.9%	162	74.1%
Difference		-1.7%		-2.1%		-4.9%		-8.4%
p-value		0.731		0.679		0.292		0.043

  

Panel C. Testing for differences in risk aversion and financial literacy								
	Financial Literacy		Choice between jobs with certain versus uncertain income					
	Sample size	Fraction correct of four financial literacy questions	Sample size	Fraction who prefer job 2: +20% versus -15%	Sample size	Fraction Who Prefer Job 2 +20% versus -10%	Sample size	Fraction Who Prefer Job 2 +20% versus -5%
End of Regime 1	207	92.8%	144	28.5%	142	49.3%	158	85.4%
Regime 2	134	92.2%	107	26.2%	105	59.1%	109	85.3%
Difference		-0.6%		-2.3%		9.8%		-0.1%
p-value		0.747		0.686		0.129		0.978

**Table A4**

Demand for default investment option, by provider and regime.

Table 5 is restricted to the subsample of new participants for which the date of the choice is not censored at January 1999 and for whom we possess the demographic data required to estimate  $\Pr(\text{HIGH})$  in column 2 of Table 3. This table is the same as Table 5 except that it does not impose either sample restriction.

Sample period:		Regime 1		End of Regime 1		Regime 2	
Provider	Default option	Sample size	Invest 100% in default?	Sample size	Invest 100% in default?	Sample size	Invest 100% in default?
HIGH	Fixed annuity	1,492	2.9%	237	1.7%		
LOW	Money market fund	2,341	9.5%	554	17.7%	256	21.5%
NEW	TDF					272	64.0%
		3,833	6.9%	791	12.9%	528	43.4%

**Table A5**

Summary statistics for actual portfolios and counterfactual portfolios based on TDFs, 2000-2009.

This table is the same as Table 7 except that the sample of ORP participants is limited to those for whom we can predict Pr(HIGH) using the specification in column 2 of Table 3. The fact that we do not observe the date of the choice between HIGH and LOW before February 1999 explains why we exclude annual statistics for 1999 from this table.

	Actual portfolio				TDF counterfactual			
	Annual return	Volatility of monthly returns	CAPM beta	Broker fee	Annual return	Volatility of monthly returns	CAPM beta	Broker fee
Panel A. HIGH participants								
2000	-15.51%	6.28%	0.931	0.91%	-4.00%	4.35%	0.812	0.00%
2001	-21.42%	7.89%	1.288	0.93%	-10.83%	4.91%	0.795	0.00%
2002	-19.60%	4.84%	1.118	0.91%	-16.22%	4.44%	0.771	0.00%
2003	25.18%	2.91%	0.793	0.90%	27.81%	2.60%	0.751	0.00%
2004	9.65%	2.29%	0.841	0.89%	10.34%	2.15%	0.903	0.00%
2005	4.69%	2.18%	0.882	0.89%	8.48%	2.17%	0.841	0.00%
2006	10.42%	1.66%	0.809	0.90%	12.69%	1.97%	0.991	0.00%
2007	4.61%	2.38%	0.839	0.84%	9.06%	2.52%	0.875	0.00%
2008	-33.05%	5.91%	0.816	0.83%	-36.18%	6.17%	0.940	0.00%
2009	26.74%	5.42%	0.852	0.84%	30.42%	5.52%	0.854	0.00%
1999-2009	1.24%	3.76%	0.881	0.87%	4.07%	3.59%	0.874	0.00%
Panel B. LOW participants								
2000	-8.40%	4.37%	0.697	0.00%	-3.78%	4.30%	0.802	0.00%
2001	-10.66%	4.70%	0.733	0.00%	-10.06%	4.68%	0.759	0.00%
2002	-14.25%	3.69%	0.731	0.00%	-15.41%	4.25%	0.738	0.00%
2003	19.48%	1.90%	0.565	0.00%	26.83%	2.50%	0.718	0.00%
2004	8.56%	1.45%	0.536	0.00%	10.07%	2.08%	0.872	0.00%
2005	6.28%	1.43%	0.581	0.00%	8.32%	2.11%	0.818	0.00%
2006	10.79%	1.20%	0.530	0.00%	12.43%	1.92%	0.965	0.00%
2007	8.16%	1.52%	0.584	0.00%	8.97%	2.46%	0.854	0.00%
2008	-21.15%	3.55%	0.512	0.00%	-35.68%	6.08%	0.926	0.00%
2009	14.36%	3.07%	0.511	0.00%	30.16%	5.44%	0.841	0.00%
1999-2009	3.10%	2.35%	0.559	0.00%	4.50%	3.66%	0.859	0.00%

**Table A6**

Alternative version of Table 8 that includes return decomposition.

Table A6 differs from Table 8 in three ways. First, the sample is restricted to the subset of participant-years for which we can estimate six-factor alphas (column 4 of Table 8). Second, the goal is to decompose differences in after-fee annual net returns into (i) differences in broker fees, (ii) differences in predicted returns associated with differences in factor loadings, and (iii) differences in the six-factor alphas of the underlying investment options (when monthly returns are measured gross of broker fees but net of expense ratios). The estimated coefficients in column 3 are equal to the estimated coefficients in column 1 plus the estimated coefficients in column 2 (which measures the difference in annual broker fees). The estimated coefficients in column 3 are also equal to the estimated coefficient in column 4 plus the estimated coefficient in column 5. Within each panel, the % row reports the fraction of the return difference in column 1 that can be attributed to differences in broker fees, differences in predicted returns, and differences in 6-factor alphas. The "0.2%" under broker fees for LOW participants is driven by a small number of participants who switched from HIGH to LOW. We bootstrap standard errors using the same procedure described in the notes to Table 8. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

<i>Dependent variable:</i>	Difference in Annual Portfolio Net Returns	Difference in Annual Broker Fees	Difference in Annual Portfolio Net Returns After Adding Back Broker Fees	Difference in Predicted Annual Net Returns Estimated After Adding Back Broker Fees	Difference in Annual 6-Factor Net Alphas Estimated After Adding Back Broker Fees
	(1)	(2)	(3)	(4)	(5)
Panel A. HIGH participants					
HIGH	-0.0288 *** (0.0018)	0.0090 *** (0.0000)	-0.0198 *** (0.0018)	-0.0080 *** (0.0018)	-0.0118 *** (0.0009)
%	100.0%	31.2%		27.8%	41.0%
Sample size	3,938	3,938	3,938	3,938	3,938
Panel B. HIGH participants for whom we can predict Pr(HIGH)					
HIGH	-0.0277 *** (0.0027)	0.0088 *** (0.0000)	-0.0190 *** (0.0027)	-0.0065 ** (0.0027)	-0.0125 *** (0.0011)
%	100.0%	31.6%		23.4%	45.0%
Sample size	2,121	2,121	2,121	2,121	2,121
Panel C. HIGH participants with Pr(HIGH) in top quartile					
HIGH	-0.0238 *** (0.0055)	0.0087 *** (0.0001)	-0.0151 *** (0.0055)	-0.0011 (0.0053)	-0.0141 *** (0.0018)
%	100.0%	36.6%		4.4%	59.0%
Sample size	682	682	682	682	682
Panel D. LOW participants					
LOW	-0.0146 *** (0.0006)	0.0000 ** (0.0000)	-0.0146 *** (0.0006)	-0.0066 *** (0.0006)	-0.0080 *** (0.0003)
%	100.0%	0.2%		45.1%	54.8%
Sample size	14,363	14,363	14,363	14,363	14,363



**Table A7**

Alternative version of Table 8 estimated on sample of survey respondents.

This table is the same as Table 8 except that the sample is first expanded to include all ORP participants regardless of when they chose to join ORP, and then limited to participants who answer the following survey question: "When choosing between ORP providers assess the importance of the following factors: Access to face-to-face meetings with a financial adviser". The survey filter explains why the sample sizes are significantly lower than in Table 8. Panel A focuses on the sample of survey respondents who initially chose to invest through HIGH, and Panel B focuses on the subsample that rate "access to face-to-face meetings" as "very important." Panels C and D are similar except that they focus on the sample of survey respondents who initially chose to invest through LOW. We bootstrap standard errors by resampling from among the sample of survey respondents and then using all of the calendar years associated with each new sample of participants. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*, respectively.

Dependent variable:	Difference in annual net returns (1)	Difference in volatility of monthly returns (2)	Difference in CAPM betas (3)	Difference in annual six-Factor net alphas (4)	Difference in Sharpe ratios (5)
Panel A. HIGH participants who respond to survey					
HIGH	-0.0290 *** (0.0012)	0.0041 *** (0.0007)	0.0609 *** (0.0174)	-0.0213 *** (0.0012)	-0.0488 *** (0.0024)
N	1,679	1,679	1,419	1,160	1,679
Panel B. HIGH participants with highest stated demand for "access to face-to-face meetings"					
HIGH	-0.0305 *** (0.0017)	0.0039 *** (0.0010)	0.0572 ** (0.0250)	-0.0229 *** (0.0017)	-0.0522 *** (0.0029)
N	674	674	571	466	674
Panel C. LOW participants who respond to survey					
LOW	-0.0161 *** (0.0008)	-0.0072 *** (0.0006)	-0.1619 *** (0.0143)	-0.0089 *** (0.0005)	-0.0050 (0.0033)
N	2,902	2,902	2,902	2,895	2,902
Panel D. LOW participants with highest stated demand for "access to face-to-face meetings"					
LOW	-0.0167 *** (0.0019)	-0.0076 *** (0.0017)	-0.1806 *** (0.0371)	-0.0083 *** (0.0016)	0.0022 (0.0099)
N	407	407	407	405	407

**Table A8**

Alternative version of Table 10 estimated on sample of survey respondents.

Table A8 differs from Table 10 in two ways. First, as in Table A7, the sample is expanded to include all ORP participants regardless of when they chose to join ORP, and then limited to participants who answer the following survey question: "When choosing between ORP providers assess the importance of the following factors: Access to face-to-face meetings with a financial adviser." The survey filter explains why the sample sizes are significantly lower than in Table 10. Second, we interact answers to this question with dummy variables indicating whether the participant invests through HIGH or LOW. The variable ORP\_FACE takes on four possible values: 0 ("unimportant"), 0.33 ("somewhat important"), 0.67 ("important"), and 1 ("very important"). Because we observe too few calendar years to cluster standard errors on calendar year, we bootstrap standard errors. We begin by sampling with replacement from the sample of participants used to estimate the coefficients in column (1) of this table, subject to the constraint that we end up with the same number of HIGH and LOW participant observations as in the original sample. We use all of the returns associated with each of the resampled participants to re-estimate the specifications in this table. We repeat this process 10,000 times, and we report the standard deviation of each estimated coefficient below the point estimates obtained in the actual sample. We use the standard deviations of differences between the coefficients on  $ORP\_FACE \times HIGH$  and  $ORP\_FACE \times LOW$  to determine p-values for the hypothesis tests. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

Dependent variable:	Annual portfolio return (1)	Volatility of monthly returns (2)	CAPM beta (3)	Six-factor annual alpha (4)	Sharpe ratio (5)
HIGH?	-0.0132 *** (0.0029)	0.0087 *** (0.0017)	0.1337 *** (0.0384)	-0.0087 *** (0.0031)	-0.0266 *** (0.0069)
ORP_FACE $\times$ HIGH?	0.0012 (0.0033)	0.0002 (0.0019)	0.0312 (0.0428)	-0.0026 (0.0037)	-0.0053 (0.0065)
ORP_FACE $\times$ LOW?	0.0018 (0.0021)	-0.0045 *** (0.0015)	-0.1074 *** (0.0353)	0.0016 (0.0013)	0.0276 *** (0.0093)
p-value from test that coefficients are equal on interaction terms	0.8871	0.0508 *	0.0121 **	0.2743	0.0034 ***
Year fixed effects?	Yes	Yes	Yes	Yes	Yes
R2	0.8468	0.5577	0.1465	0.2277	0.8691
Sample size	4,581	4,581	4,321	4,062	4,581

**Table A9**

Predicting fraction allocated to available investment options.

In this table, we test whether the fraction of participant *i*'s contribution to fund *j* responds to the level of fund *j*'s return over the prior 12 months, the level of fund *j*'s broker fees, and the level of fund *j*'s fees that are not paid to a broker. The sample is restricted to ORP participants who join during Regime 1 and chose to invest through HIGH or LOW. It includes one observation for each investment option available to a HIGH or LOW participant in month *t*. We estimate one set of Tobit regressions in the first month that participant *i* contributes to HIGH or LOW and a comparable set of Tobit regressions in month 24. The independent variables of interest are the lagged after-fee return of fund *j* interacted with dummy variables indicating whether fund *j* is available through HIGH or LOW, the broker fee associated with fund *j* (which is zero for LOW), and the fund's nonbroker fee (annual fee minus the broker fee). No fund is simultaneously available through both providers. In columns 1 and 4, we include provider-by-date fixed effects, and dummy variables for the broad investment category of each fund: annuity, bond, domestic equity, international equity, etc. In columns 2 and 5, we interact the provider-by-date fixed effects with dummy variables for the full set of broad investment categories. In columns 3 and 6, we restrict the sample to domestic equity funds available through HIGH and interact the provider-by-date fixed effects with narrow (Lipper) investment category fixed effects (e.g., large-cap growth). In addition to controlling for fund investment objectives, lagged returns, and broker and nonbroker fees, we control for fund *j*'s lagged turnover and whether it is passively managed. We exclude participants who allocate 100% of their retirement contribution to the default investment option. All variables are scaled so that 1.000 equals 1.000%. Standard errors are clustered on the date of participant *i*'s contribution. We report *p*-values from hypotheses tests that the sensitivity to lagged returns and nonbroker fees are equal for HIGH and LOW. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

Dependent variable: Sample period: Sample of funds:	Fraction of participant <i>i</i> 's contributions allocated to fund <i>j</i>					
	Month 1			Month 24		
	All (1)	All (2)	HIGH equity (3)	All (4)	All (5)	HIGH equity (6)
Lagged return × HIGH	0.461 *** (0.042)	0.530 *** (0.053)	0.463 *** (0.000)	-0.057 (0.071)	-0.053 *** (0.000)	-0.062 *** (0.000)
Nonbroker fee × HIGH	-23.985 *** (1.087)	-24.584 *** (1.316)	-31.426 *** (0.064)	-19.865 *** (1.648)	-22.993 *** (0.063)	-26.462 *** (0.057)
Broker fee	41.645 *** (3.105)	46.152 *** (3.141)	70.595 *** (0.043)	39.173 *** (4.396)	44.572 *** (0.048)	65.175 *** (0.048)
Lagged return × LOW	0.112 (0.069)	1.139 *** (0.348)		0.320 *** (0.114)	1.270 *** (0.000)	
Nonbroker fee × LOW	-38.388 ** (15.491)	152.369 ** (61.608)		-45.005 *** (10.046)	-21.857 *** (0.047)	
p-value from test coefficients on lagged return are equal	0.000 ***	0.060 *		0.002 ***	0.000 ***	
p-value from test coefficients on nonbroker fee are equal	0.348	0.004 ***		0.011 **	0.000 ***	
Fund-level controls?	Yes	Yes	Yes	Yes	Yes	Yes
Provider-date fixed effects?	Yes	No	No	Yes	No	No
Provider-broad category-date fixed effects?	No	Yes	No	No	Yes	No
Provider-narrow category-date fixed effects?	No	No	Yes	No	No	Yes
Pseudo-R2	0.2197	0.2656	0.4075	0.2008	0.2527	0.4046
Sample size	74,547	74,547	34,672	61,574	61,574	26,704

**Table A10**

Predicting positive allocations to available investment options.

Alternative version of Table A9 that uses probit regressions to predict whether fund *j* receives a positive allocation from participant *i*. All variables are scaled so that 1.000 equals 1.000%. Standard errors are clustered on the date of participant *i*'s contribution. We report p-values from hypotheses tests that the sensitivity to lagged returns and nonbroker fees are equal for HIGH and LOW. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

Dependent variable: Sample period: Sample of funds:	Fraction of participant <i>i</i> 's contributions allocated to fund <i>j</i>					
	Month 1			Month 24		
	All	All	HIGH equity	All	All	HIGH equity
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged return × HIGH	0.229 *** (0.020)	0.271 *** (0.028)	0.245 *** (0.054)	-0.032 (0.039)	-0.027 (0.052)	-0.054 (0.085)
Nonbroker fee × HIGH	-11.067 *** (0.516)	-11.417 *** (0.625)	-16.203 *** (2.167)	-10.724 *** (0.923)	-12.851 *** (0.829)	-18.299 *** (2.848)
Broker fee	20.187 *** (1.442)	22.582 *** (1.527)	40.699 *** (2.466)	23.381 *** (2.313)	27.456 *** (2.546)	48.690 *** (3.005)
Lagged return × LOW	0.030 (0.037)	0.487 *** (0.174)		0.234 *** (0.076)	0.862 *** (0.106)	
Nonbroker fee × LOW	-9.094 (9.015)	82.574 ** (35.164)		-20.406 *** (6.185)	-6.630 (10.852)	
p-value from test coefficients on lagged return are equal	0.000 ***	0.188		0.001 ***	0.000 ***	
p-value from test coefficients on nonbroker fee are equal	0.827	0.007 ***		0.112	0.547	
Fund-level controls?	Yes	Yes	Yes	Yes	Yes	Yes
Provider-date fixed effects?	Yes	No	No	Yes	No	No
Provider-broad category-date fixed effects?	No	Yes	No	No	Yes	No
Provider-narrow category-date fixed effects?	No	No	Yes	No	No	Yes
Pseudo-R2	0.1820	0.2050	0.2279	0.1548	0.1775	0.2078
Sample size	74,547	72,392	25,051	61,574	58,840	19,231

**Table A11**

Predicting positive allocations to available investment options.

Alternative version of Table A10 that is estimated using linear probability models instead of probit regressions. Dependent variable equals one if fund *j* receives a positive allocation and zero otherwise. All variables are scaled so that 1.000 equals 1.000%. Standard errors are clustered on the date of participant *i*'s contribution. We report p-values from hypotheses tests that the sensitivity to lagged returns and nonbroker fees are equal for HIGH and LOW. Statistical significance at the 10%, 5%, and 1% level (in two-sided tests) is denoted by \*, \*\*, and \*\*\*.

Dependent variable: Sample period: Sample of funds:	Fraction of participant <i>i</i> 's contributions allocated to fund <i>j</i>					
	Month 1			Month 24		
	All	All	HIGH equity	All	All	HIGH equity
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged return × HIGH	0.216 *** (0.019)	0.269 *** (0.027)	0.199 *** (0.049)	-0.023 (0.026)	-0.022 (0.042)	-0.029 (0.046)
Nonbroker fee × HIGH	-10.219 *** (0.620)	-8.870 *** (0.677)	-10.963 *** (1.676)	-10.321 *** (0.959)	-9.742 *** (0.870)	-13.239 *** (2.014)
Broker fee	13.969 *** (0.942)	14.898 *** (0.923)	27.838 *** (2.466)	15.557 *** (1.317)	16.924 *** (1.321)	31.479 *** (2.483)
Lagged return × LOW	0.093 (0.121)	1.036 *** (0.377)		0.392 *** (0.149)	1.250 *** (0.097)	
Nonbroker fee × LOW	28.243 (21.625)	145.524 ** (61.063)		-20.476 * (10.727)	-6.700 (15.793)	
p-value from test coefficients on lagged return are equal	0.289	0.038 **		0.005 ***	0.000 ***	
p-value from test coefficients on nonbroker fee are equal	0.079 *	0.013 **		0.344	0.847	
Fund-level controls?	Yes	Yes	Yes	Yes	Yes	Yes
Provider-date fixed effects?	Yes	No	No	Yes	No	No
Provider-broad category-date fixed effects?	No	Yes	No	No	Yes	No
Provider-narrow category-date fixed effects?	No	No	Yes	No	No	Yes
Adjusted R2	0.1599	0.1945	0.2093	0.1361	0.1752	0.2239
Sample Size	74,547	74,547	34,672	61,574	61,574	26,704