Financial Sophistication and Conflicts of Interest: Evidence from 401(k) Investment Menus

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Motivation: The Relevance and Organization of 401(k) Plans

Defined contribution (DC) pension plans have gained substantial popularity:

- In U.S. around 90% of private contributions goes to DC plans (Poterba, Venti, and Wise, 2008).
- Similar retirement systems have been established in other countries, like Australia, Chile, and Sweden.
- U.S. 401(k) plans hold around $5.8 trillion in retirement assets (Investment Company Institute, 2019).
- In 401(k) plans, participants are responsible to decide on the contribution rate and investments.

Agents involved in the investment process in 401(k) pension plans:

- **Employer** (company) sponsoring the plan: design the menu of available investment options.
- Financial firm serving as a **trustee** of the plan: design the menu of available investment options.
- **Plan participants**: asset allocation within the menu of available investment options.

Agency Conflicts and Financial Sophistication

401(k) plans can produce conflicts of interest between the service providers and individuals:

- Plan sponsors and trustees have a fiduciary duty to act in the best interest of plan participants.
- But also conflicting incentives to benefit their affiliated companies at the expense of plan participants (Elton, Gruber, and Blake, 2006; Cohen and Schmidt, 2009; Pool, Sialm, and Stefanescu, 2016).
- Plan participants do not fully overcome the inefficiencies in menu design (Benartzi and Thaler, 2007).

Financial literacy is positively related to many desirable outcomes in DC retirement plans, such as accumulated wealth, enrollments and contribution rates (Agnew, 2006; Lusardi and Mitchell, 2007).

This paper: Can financial literacy mitigate conflicts of interest in DC plans?

Our Setting – Financial Literacy

Research question: Can financial literacy mitigate conflicts of interest in DC plans?

Assumption: Sponsors and employees of financial companies are relatively more financially sophisticated than the sponsors and employees of companies operating in other industries.

- Our assumption is about the average employee.
- Financial companies have, on average, a larger proportion of employees with financial education, skills and prior experience.

The greater financial literacy could affect 401(k) investments through several channels:

- Financially more sophisticated sponsors could negotiate better deals with the trustees.
- Financially more sophisticated employees could put more pressure on the sponsor and trustee.
- Within the available options, more literate participants could make better investment decisions.

Our Setting – Conflicts of Interest

Research question: Examine the relation between the sponsoring firm and the trustee.

Empirical design: Within the sample of finance firms, we distinguish between:

- Finance firms that hire an independent external trustee for their pension plan.
- Finance firms that serve also as a trustee of their own pension plan (no independent party).

	Finance Firms Outsource Trustee	Finance Firms In-House Trustee	Other Firms Outsource Trustee
Financial literacy	Higher	Higher	**Lower**
Agency conflicts	Lower	**Higher**	Lower

Proxies for agency conflicts: allocation to employer stock and options affiliated with the trustee.

Example of Our Setting

Research question: Examine the relation between the sponsoring firm and the trustee.

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- Finance firms that serve also as a trustee of their own pension plan (no independent party).

	Finance Firms Outsource Trustee	Finance Firms In-House Trustee	Other Firms Outsource Trustee
Sponsor	Goldman Sachs	State Street	Intel
Trustee	State Street	State Street	State Street
Financial literacy	Higher	Higher	**Lower**
Agency conflicts	Lower	**Higher**	Lower

Main Results

Employees with a higher **financial literacy** reduce their exposure to options susceptible to agency conflicts only when the menu is designed by an **external trustee** and not solely by the plan sponsor:

1. **Employer stock:** 5.2 to 6.9 percentage points lower allocation to sponsor equity.
2. **Trustee options:** 13.9 to 16.8 percentage points lower allocation to affiliated options.
3. **Mutual fund deletions and additions:** more sensitive to performance.
4. **Mutual fund deletions and additions:** do not favor trustee funds.
5. **Performance improvements:** removed options underperform in the following year.

Data on 401(k) Plans Offered by 144 Firms during 2010–2016 Period

Information from **DOL Form 5500**, Schedule H, Line 4(i) Schedule of Assets (Held at End of Year).
In 2016, these plans had around **$807 billion** assets under management (17% of 401(k) industry).
Match mutual fund options with **CRSP database** based on fund name and share class.

	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD	Obs.	Mean	Median	SD
	Finance Firms Outsource Trustee				**Finance Firms In-House Trustee**				**Other Firms Outsource Trustee**			
#Plans	51				21				73			
#Plan-year	352				142				495			
#Plan-year-option	10,412				5,846				12,135			
Plan Size	352	2,867.222	2,137.328	2,151.672	142	5,883.134	2,881.005	7,346.426	495	6,089.811	4,123.819	6,594.006
Number of Options	352	29.580	30.000	10.659	142	41.169	31.000	35.035	495	24.515	24.000	8.480
Funds Trustee	1,622	122.733	44.163	270.690	3,034	66.323	22.910	120.200	3,806	195.498	89.409	344.402
Funds Nontrustee	6,880	80.794	36.874	160.578	2,061	157.874	47.099	341.850	6,268	197.663	85.799	429.510
Cash Trustee	198	41.824	6.317	123.610	101	398.034	67.229	909.877	189	97.733	13.209	177.138
Cash Nontrustee	350	98.493	42.616	145.814	134	101.948	4.720	251.763	278	168.509	40.478	291.047
Participant Loans	345	50.095	32.741	43.639	138	120.151	47.140	204.819	485	91.002	57.919	87.916
Sponsor Equity	214	255.050	167.732	307.504	94	1,259.235	493.532	2,366.790	398	1,364.597	553.164	2,366.653
Insurance Products	383	150.139	56.894	261.218	122	513.213	214.248	791.380	148	953.530	383.487	2,081.142
Brokerage Account	111	122.369	55.581	249.459	43	135.466	59.248	181.629	171	205.299	150.132	254.947
Master Trust	13	831.931	996.042	358.311	6	2,369.484	2,367.047	574.413	65	983.917	497.558	1,266.292
Other Assets	296	195.291	46.310	436.646	113	330.432	9.179	727.876	327	424.125	123.313	801.026

Example: Target Corporation 401(K) Plan in 2010; State Street is Trustee

Asset class	Manager	Option	Value	Allocation
Cash	**State Street**	State Street Bank & Trust Co. Short-term Investment Fund	23,311,457	**0.41%**
Equity	**Sponsor**	Target Corporation Common Stock Fund	2,225,467,830	**39.29%**
Mutual fund	Barclays	Barclays Global Investors US Real Estate Index Fund	68,458,510	1.21%
Mutual fund	Barclays	Barclays Global Investors BGI S&P 500 Growth	191,712,711	3.38%
Mutual fund	**State Street**	State Street Bank & Trust Co. Emerging Markets Index Non-Lending Series Fund	172,068,042	**3.04%**
Mutual fund	**State Street**	State Street Bank & Trust Co. U.S. Inflation Protected Bond Index Non-Lending Series Func	212,736,549	**3.76%**
Mutual fund	**State Street**	State Street Bank & Trust Co. S&P 500 Index Non-Lending Series Fund	356,892,928	**6.30%**
Mutual fund	**State Street**	State Street Bank & Trust Co. International Index Non-Lending Series Fund	286,587,326	**5.06%**
Mutual fund	**State Street**	State Street Bank & Trust Co. Russell Small Cap Index Non-Lending Series Fund	187,752,749	**3.31%**
Mutual fund	Blackrock	Blackrock Lifepath Index Retirement Fund	79,346,464	1.40%
Mutual fund	Blackrock	Blackrock Lifepath Index 2015 Fund	66,828,220	1.18%
Mutual fund	Blackrock	Blackrock Lifepath Index 2020 Fund	83,501,851	1.47%
Mutual fund	Blackrock	Blackrock Lifepath Index 2025 Fund	88,700,661	1.57%
Mutual fund	Blackrock	Blackrock Lifepath Index 2030 Fund	90,741,280	1.60%
Mutual fund	Blackrock	Blackrock Lifepath Index 2035 Fund	94,450,387	1.67%
Mutual fund	Blackrock	Blackrock Lifepath Index 2040 Fund	96,550,788	1.70%
Mutual fund	Blackrock	Blackrock Lifepath Index 2045 Fund	84,769,169	1.50%
Mutual fund	Blackrock	Blackrock Lifepath Index 2050 Fund	88,158,047	1.56%
Insurance GIC		Total Synthetic Guaranteed Investment Contracts	1,054,987,384	18.63%
Loans		Participant Loans	111,259,429	1.96%
Total			**5,664,281,782**	

Empirical Analysis

Tests of the hypothesis that greater financial sophistication and independent governance structure lead to better investments within 401(k) plans:

1. Inclusion and percentage allocation to employer stock.
2. Percentage allocation to options affiliated with the trustee.
3. Changes in the list of options offered on the menu.

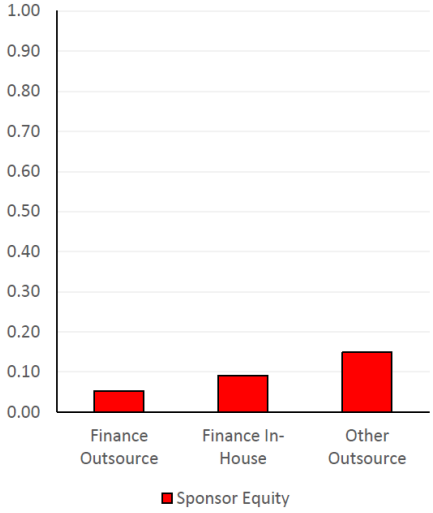
Plan Type and Percentage Allocation to Sponsor Equity

Inclusion of employer stock on the menu could be beneficial for the sponsoring firm:

- Friendly employee ownership can deter takeovers (Rauh, 2006).

Allocation to employer stock exposes employees to under-diversification and more idiosyncratic risk:

- Employee's human capital is closely bounded with future prospect of the employer (Benartzi, Thaler, Utkus, and Sunstein, 2007).
- Employees perceive the inclusion of company stock on the menu as an implicit investment advice (Brown, Liang, and Weisbenner, 2006).
- Employees experience around 20% loss in retirement income due to the higher allocation to company stock (Cohen, 2008).



Plan Type and Percentage Allocation to Sponsor Equity

Menu design: Finance firms with external trustees seem to be less likely to offer sponsor equity.

Allocations: Column (2) all plan-year observations; Column (3) condition on offering; Column (4) condition on matching with stock market data.

Results: Pension plans of finance firms with an external trustee have 6.9 and 5.2 percentage points lower allocation to sponsor equity.

Controls for riskiness of sponsor equity in line with (Brown, Liang, and Weisbenner, 2006).

	Offered	Percentage Allocation		
	(1)	(2)	(3)	(4)
Non Finance Outsource	0.064	0.063***	0.078**	0.069**
	[0.097]	[0.024]	[0.036]	[0.034]
Finance In-House	0.076	0.038*	0.037	0.052**
	[0.117]	[0.021]	[0.028]	[0.025]
Plan Size	0.125**	0.037***	0.025	-0.007
	[0.050]	[0.013]	[0.018]	[0.021]
Number of Options	-0.005**	-0.001***	-0.003	-0.001
	[0.002]	[0.000]	[0.002]	[0.002]
Sponsor Size				0.037***
				[0.013]
Past Return				0.012
				[0.027]
Past Standard Deviation				-0.660*
				[0.362]
Year FE	Yes	Yes	Yes	Yes
Observations	989	989	602	555
R^2		0.136	0.135	0.211

Empirical Analysis

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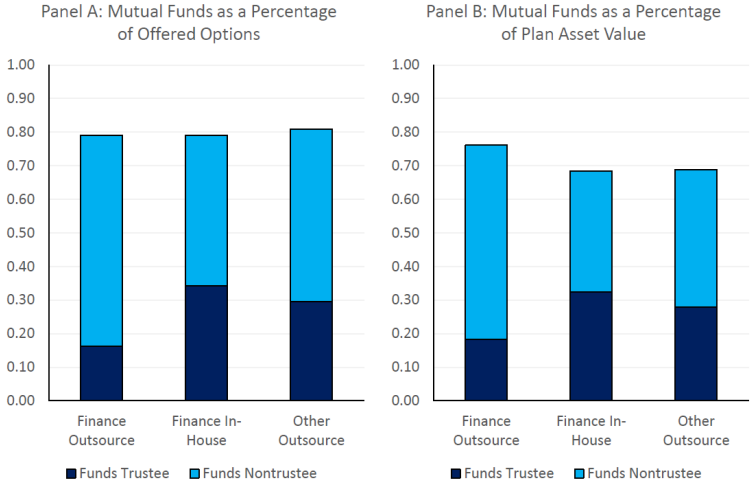
Plan Type and Percentage Allocation to Trustee Options

Trustees have an incentive to favor own options:
– Stable AUM and flows (Sialm, Starks, and Zhang, 2015).
– Subsidize own underperforming mutual funds (Pool, Sialm, and Stefanescu, 2016).

Trustee options are mostly mutual funds, but also insurance products and brokerage accounts.

Mutual funds account for around 80% of the number of options on the menu and 70% of the asset allocation.



Plan Type and Percentage Allocation to Trustee Options

Manu design: The menus offered by finance firms with external trustees contain 16 percentage points less options affiliated with the trustee.

Allocations: Pension plans of finance firms with an external trustee have 13.9 and 16.8 percentage points lower allocation to trustee options.

Results driven primarily by **mutual fund options**.

For **finance firms with in-house trustees**, the other (non-mutual fund) trustee options also receive substantial allocations from the participants.

	Percentage Offered		Percentage Allocation	
	(1)	(2)	(3)	(4)
Panel A: All Options Affiliated with the Trustee				
Non Finance Outsource	0.155***	0.162**	0.139**	0.139*
	[0.056]	[0.072]	[0.060]	[0.077]
Finance In-House	0.134*	0.166*	0.135*	0.168**
	[0.074]	[0.084]	[0.075]	[0.083]
Plan Size	-0.005	0.036	-0.027	0.005
	[0.026]	[0.039]	[0.027]	[0.043]
Number of Options	0.005***	0.003	0.005***	0.003
	[0.001]	[0.003]	[0.001]	[0.003]
Sponsor Size		-0.075***		-0.081**
		[0.028]		[0.031]
Past Return		0.038		0.025
		[0.046]		[0.043]
Past Standard Deviation		-1.037***		-0.948**
		[0.382]		[0.395]
Year FE	Yes	Yes	Yes	Yes
Observations	989	740	989	740
R^2	0.111	0.133	0.105	0.140

Empirical Analysis

Tests of the hypothesis that greater financial sophistication and independent governance structure lead to better investments within 401(k) plans:

1. Inclusion and percentage allocation to employer stock.
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3. Changes in the list of options offered on the menu.

Investment Menu Changes

Analysis of mutual fund options merged with CRSP database.

Examine changes in 401(k) plans investment menu over time by plan type:

- **Deletions** – sensitivity to past performance and trustee affiliation.
- **Additions** – sensitivity to past performance and trustee affiliation.
- Performance-induced changes are **beneficial** only if mutual fund (under-)performance is **persistent**.
- **Track performance** of added or removed mutual funds.

Additional control variables:

- **Performance** – percentile ranking based on the returns in the previous 3 years within the same style.
- **%Allocation to option** – relative importance of each option in the pension plan.
- Indicator variable for **target date funds**:
  – Frequently classified as a default investment option (Mitchell and Utkus, 2012).
  – More likely to be added to match the expected retirement year of new younger employees.
- **Mutual fund characteristics:** mutual fund size, turnover, expense ratio and investment style.

Mutual Fund Deletions from Investment Menu

The baseline probability of deletion is 9.75%.

Performance sensitivity: deletion sensitivity to performance is significantly larger for finance sponsors with an independent external trustee as compared to non-finance sponsors.

Trustee affiliation: non-finance sponsors and finance sponsors with an in-house trustee seem to favor trustee-affiliated funds.

Logit Regressions: Mutual Fund Deletions

	(1)	(2)	(3)	(4)
Non Finance Outsource	0.034***	0.001	0.028***	-0.008
	[0.007]	[0.013]	[0.007]	[0.013]
Finance In-House	-0.017	-0.005	-0.015	-0.014
	[0.012]	[0.021]	[0.012]	[0.019]
Performance	-0.068***	-0.102***	-0.070***	-0.107***
	[0.017]	[0.022]	[0.012]	[0.016]
Non Finance Outsource × Performance		0.071***		0.078***
		[0.022]		[0.020]
Finance In-House × Performance		0.015		0.030
		[0.031]		[0.027]
Trustee Option	0.015	0.036**	-0.003	0.026
	[0.012]	[0.017]	[0.009]	[0.016]
Non Finance Outsource × Trustee Option		-0.018		-0.031**
		[0.012]		[0.012]
Finance In-House × Trustee Option		-0.044***		-0.045***
		[0.015]		[0.014]
Plan Controls	Yes	Yes	Yes	Yes
Mutual Fund Controls	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes
Trustee FE	Yes	Yes	Yes	Yes
Observations	13,019	13,019	11,277	11,277

Mutual Fund Additions to Investment Menu

Universe of candidate funds: mutual funds which have been offered by at least one pension plan in the sample.

The baseline probability of addition is 0.07%, so we show odds ratios.

Performance sensitivity: finance firms with internal trustees do not condition on performance when adding new mutual funds.

Trustee affiliation: all plan types are more likely to add trustee-affiliated funds, but especially plans of finance sponsors with an in-house trustee.

Logit Regressions: Mutual Fund Additions

	(1)	(2)	(3)	(4)
Non Finance Outsource	-0.065	0.032	-0.017	-0.007
	[0.078]	[0.152]	[0.086]	[0.190]
Finance In-House	0.141	-0.219	0.257**	-0.046
	[0.117]	[0.221]	[0.131]	[0.270]
Performance	0.326**	0.509***	0.631***	0.752***
	[0.134]	[0.184]	[0.163]	[0.226]
Non Finance Outsource × Performance		-0.134		-0.033
		[0.230]		[0.275]
Finance In-House × Performance		-0.639**		-0.655*
		[0.283]		[0.338]
Trustee Option	2.204***	1.724***	1.997***	1.426***
	[0.099]	[0.158]	[0.116]	[0.197]
Non Finance Outsource × Trustee Option		-0.044		0.075
		[0.188]		[0.213]
Finance In-House × Trustee Option		2.592***		2.753***
		[0.226]		[0.268]
Plan Controls	Yes	Yes	Yes	Yes
Mutual Fund Controls	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes
Trustee FE	Yes	Yes	Yes	Yes
Observations	1,114,898	1,114,898	1,003,388	1,003,388

Future Performance of Mutual Funds

- Persistence and incentives to put effort vs. rebalancing and trading costs.
- Persistence mainly in bad performance (Carhart, 1997).
- Some persistence in the underperformance of mutual funds deleted by Finance Outsource plans.

	Future Performance							
	All Firms		Finance Outsource		Finance In-House		Non Finance Outsource	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Deletion	-0.016*	-0.013	-0.035***	-0.026*	0.031*	0.021	-0.020*	-0.014
	[0.008]	[0.009]	[0.013]	[0.014]	[0.017]	[0.019]	[0.012]	[0.013]
Addition	-0.008	0.005	-0.022*	-0.012	0.004	0.030	-0.001	0.011
	[0.008]	[0.008]	[0.012]	[0.012]	[0.018]	[0.019]	[0.011]	[0.012]
Performance	0.195***	0.096***	0.173***	0.083***	0.175***	0.101***	0.224***	0.098***
	[0.017]	[0.021]	[0.020]	[0.027]	[0.020]	[0.023]	[0.022]	[0.028]
Trustee Option	0.014**	0.018***	0.019**	0.013	0.005	0.016*	0.016**	0.011
	[0.005]	[0.006]	[0.007]	[0.008]	[0.008]	[0.009]	[0.008]	[0.008]
Plan Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mutual Fund Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,143	13,041	5,746	4,905	3,123	2,800	6,274	5,336

Mutual Fund Flows

Flow measure based on $ value and return on MF option:

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

Control for plan growth.

Flows driven by menu changes, not participant decisions.

Stronger **flow-performance** relation for Finance Outsource pension plans.

Finance In-house pension plans direct more flows to **trustee funds**.

	All Flows		Participant Flows	
	(1)	(2)	(3)	(4)
Non Finance Outsource	-0.031***	0.010	-0.001	-0.001
	[0.009]	[0.020]	[0.005]	[0.010]
Finance In-House	-0.001	0.021	-0.029***	-0.023
	[0.016]	[0.029]	[0.008]	[0.014]
Performance	0.087***	0.138***	0.014	0.016
	[0.018]	[0.026]	[0.009]	[0.011]
Non Finance Outsource × Performance		-0.083***		0.004
		[0.029]		[0.014]
Finance In-House × Performance		-0.079**		-0.013
		[0.033]		[0.016]
Trustee Option	-0.009	-0.034*	-0.006	-0.002
	[0.012]	[0.018]	[0.005]	[0.008]
Non Finance Outsource × Trustee Option		0.031		-0.009
		[0.020]		[0.010]
Finance In-House × Trustee Option		0.061**		0.000
		[0.027]		[0.013]
Plan Controls	Yes	Yes	Yes	Yes
Mutual Fund Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Investment Style FE	Yes	Yes	Yes	Yes
Trustee FE	Yes	Yes	Yes	Yes
Observations	11,033	11,033	9,942	9,942

Conclusion

Financial literacy among plan participants and sponsoring company can reduce exposure to options prone to agency conflicts:

- Employer stock: 5.2 to 6.9 percentage points lower allocation to sponsor equity.
- Trustee options: 13.9 to 16.8 percentage points lower allocation to affiliated options.
- Mutual fund deletions and additions: more sensitive to performance.
- Mutual fund deletions and additions: do not favor trustee funds.
- Performance improvements: removed options underperform in the following year.

Financial literacy works only in combination with governance by an independent external trustee.

The problems of DC pension funds are also on the institutional (organizational) side.

Programs targeting financial literacy of plan participants will not necessarily improve the functioning of DC retirement systems.