

Out of Sight No More? The Effect of Fee Disclosures on 401(k) Investment Allocations

Mathias Kronlund

University of Illinois at Urbana-Champaign

Veronika Pool

Indiana University

Clemens Sialm

University of Texas at Austin, NBER, and AQR

Irina Stefanescu

Federal Reserve Board and OECD

May 2019

Introduction

Over the last decades there have been significant changes in the structure of retirement savings in the United States:

- The relative importance of government-provided social security has declined.
- Firms have switched from Defined Benefit (DB) to Defined Contribution (DC) plans.

More responsibility about retirement savings has been transferred to households, who have to decide how much to save and how to allocate their savings across different investment options.

Introduction

Over the last decades there have been significant changes in the structure of retirement savings in the United States:

- The relative importance of government-provided social security has declined.
- Firms have switched from Defined Benefit (DB) to Defined Contribution (DC) plans.

More responsibility about retirement savings has been transferred to households, who have to decide how much to save and how to allocate their savings across different investment options.

Introduction

Over the last decades there have been significant changes in the structure of retirement savings in the United States:

- The relative importance of government-provided social security has declined.
- Firms have switched from Defined Benefit (DB) to Defined Contribution (DC) plans.

More responsibility about retirement savings has been transferred to households, who have to decide how much to save and how to allocate their savings across different investment options.

Access to Information

Retail investors may not always have the necessary information, time, and ability to make optimal investment decisions.

- Barber, Odean, and Zheng (2005) find that households are more likely to react to salient and attention-grabbing information and ignore information that is 'out of sight.'
- Participants in DC pension plans have been shown to be inert (e.g., Benartzi and Thaler (2001); Madrian and Shea (2001); Agnew, Balduzzi, and Sunden (2003); Sialm, Starks, and Zhang (2015))

Participant-Level Disclosure Reform

In 2012, the Department of Labor (DOL) introduced new participant-level disclosure rules (404(a)(5)) aiming to increase participant's awareness of key features on the investment menu in 401(k) plans:

- Fiduciaries have to provide expense- and investment-related summary statements directly to participants.
- While the information contained in these disclosures was publicly available before the reform, it was often buried in long fund prospectuses or regulatory filings.
- Hence, the new rule brings the information more 'in sight.'

Research Questions

- Does the disclosure of fund expenses affect the flows to the investment options in a plan?
- Does the disclosure of prior performance affect the flows to the investment options in a plan?
- Does the disclosure effect differ across participants with different financial sophistication?

Research Questions

- Does the disclosure of fund expenses affect the flows to the investment options in a plan?
- Does the disclosure of prior performance affect the flows to the investment options in a plan?
- Does the disclosure effect differ across participants with different financial sophistication?

Research Questions

- Does the disclosure of fund expenses affect the flows to the investment options in a plan?
- Does the disclosure of prior performance affect the flows to the investment options in a plan?
- Does the disclosure effect differ across participants with different financial sophistication?

Preview of the Results

- Flows by 401(k) participants become more sensitive to expenses after the disclosure reform.
- Flows by 401(k) participants become more sensitive to short-term performance after the disclosure reform.
- The disclosure effects are less pronounced for plans with relatively small average contributions and for plans that have many options.

Preview of the Results

- Flows by 401(k) participants become more sensitive to expenses after the disclosure reform.
- Flows by 401(k) participants become more sensitive to short-term performance after the disclosure reform.
- The disclosure effects are less pronounced for plans with relatively small average contributions and for plans that have many options.

Preview of the Results

- Flows by 401(k) participants become more sensitive to expenses after the disclosure reform.
- Flows by 401(k) participants become more sensitive to short-term performance after the disclosure reform.
- The disclosure effects are less pronounced for plans with relatively small average contributions and for plans that have many options.

Contribution to the Literature

Impact of information on household behavior:

- Bertrand and Morse (2011); Dranove et al. (2003); Figlio and Lucas (2016); and Gao and Huang (2017).

Design of DC plans:

- Benartzi and Thaler (2001); Madrian and Shea (2001); Choi, Laibson, Madrian, and Metrick (2002, 2004); Agnew, Balduzzi, and Sunden (2003); Huberman and Jiang (2006); Elton, Gruber, Blake (2006, 2007); Brown, Liang, and Weisbenner (2007); Carroll et al. (2009); Tang et al. (2010); Dvorak (2015); Sialm, Starks, and Zhang (2015); and Pool, Sialm, and Stefanescu (2016); and Badoer, Costello, and James (2018).

Contribution to the Literature

Impact of information on household behavior:

- Bertrand and Morse (2011); Dranove et al. (2003); Figlio and Lucas (2016); and Gao and Huang (2017).

Design of DC plans:

- Benartzi and Thaler (2001); Madrian and Shea (2001); Choi, Laibson, Madrian, and Metrick (2002, 2004); Agnew, Balduzzi, and Sunden (2003); Huberman and Jiang (2006); Elton, Gruber, Blake (2006, 2007); Brown, Liang, and Weisbenner (2007); Carroll et al. (2009); Tang et al. (2010); Dvorak (2015); Sialm, Starks, and Zhang (2015); and Pool, Sialm, and Stefanescu (2016); and Badoer, Costello, and James (2018).

Relevance of 401(k) Plans

401(k) plans are employer-sponsored defined contribution (DC) retirement plans:

- 401(k) plans cover more than half of the retirement assets in the private sector.
- The value of 401(k) assets reached \$5.3 trillion dollars in 2017, and 67% is invested in mutual funds.
- 401(k) savings are the main source of retirement wealth for many participants.

Relevance of 401(k) Plans

401(k) plans are employer-sponsored defined contribution (DC) retirement plans:

- 401(k) plans cover more than half of the retirement assets in the private sector.
- The value of 401(k) assets reached \$5.3 trillion dollars in 2017, and 67% is invested in mutual funds.
- 401(k) savings are the main source of retirement wealth for many participants.

Relevance of 401(k) Plans

401(k) plans are employer-sponsored defined contribution (DC) retirement plans:

- 401(k) plans cover more than half of the retirement assets in the private sector.
- The value of 401(k) assets reached \$5.3 trillion dollars in 2017, and 67% is invested in mutual funds.
- 401(k) savings are the main source of retirement wealth for many participants.

Relevance of 401(k) Plans

401(k) plans are employer-sponsored defined contribution (DC) retirement plans:

- 401(k) plans cover more than half of the retirement assets in the private sector.
- The value of 401(k) assets reached \$5.3 trillion dollars in 2017, and 67% is invested in mutual funds.
- 401(k) savings are the main source of retirement wealth for many participants.

Example: Protective Life Corp. 401(k) Plan, 2012

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

Example: Protective Life Corp. 401(k) Plan, 2012

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

Example: Protective Life Corp. 401(k) Plan, 2012

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

Example: Protective Life Corp. 401(k) Plan, 2012

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

Disclosure Reform

The DOL issued a series of regulatory initiatives to enhance the information about the plans for both plan fiduciaries and participants:

- Rule 404(a)(5): requires plan fiduciaries to disclose information on plan fees, expenses, and performance to participants.
 - First step in developing the disclosure rule was in 2007 (Request for Information).
 - Final compliance date was April 1, 2012.
- Rule 408(b)(2): Requires service providers to furnish information to the plan's fiduciaries on the direct and indirect fees these providers collect for the services rendered to the plan.
 - Proposed rule was published in 2007.
 - Effective date was January 1, 2012.

Disclosure Reform

The DOL issued a series of regulatory initiatives to enhance the information about the plans for both plan fiduciaries and participants:

- Rule 404(a)(5): requires plan fiduciaries to disclose information on plan fees, expenses, and performance to participants.
 - First step in developing the disclosure rule was in 2007 (Request for Information).
 - Final compliance date was April 1, 2012.
- Rule 408(b)(2): Requires service providers to furnish information to the plan's fiduciaries on the direct and indirect fees these providers collect for the services rendered to the plan.
 - Proposed rule was published in 2007.
 - Effective date was January 1, 2012.

Disclosure Reform

The DOL issued a series of regulatory initiatives to enhance the information about the plans for both plan fiduciaries and participants:

- Rule 404(a)(5): requires plan fiduciaries to disclose information on plan fees, expenses, and performance to participants.
 - First step in developing the disclosure rule was in 2007 (Request for Information).
 - Final compliance date was April 1, 2012.
- Rule 408(b)(2): Requires service providers to furnish information to the plan's fiduciaries on the direct and indirect fees these providers collect for the services rendered to the plan.
 - Proposed rule was published in 2007.
 - Effective date was January 1, 2012.

Example of Fee Disclosure

Name/ Type of Option	TOTAL ANNUAL OPERATING EXPENSES		Shareholder-Type Fees
	As a %	Per \$1,000	
Equity Funds			
A Index Fund/S&P 500	0.18%	\$1.80	The \$20 annual service charge is subtracted from investments held in this option if valued at less than \$10,000.
B Fund/Large Cap	2.45%	\$24.50	The 2.25% deferred sales charge is subtracted from the amounts withdrawn within 12 months of purchase.
C Fund/Int'l Stock	0.79%	\$7.90	The 5.75% sales charge is subtracted from the amounts invested.
D Fund/Mid Cap ETF	0.20%	\$2.00	The 4.25% sales charge is subtracted from the amounts withdrawn.

Source: AICPA

Example of Performance Disclosure

Name/ Type of Option	Average Annual Total Return as of 12/31/XX				Benchmark			
	1yr	5yr	10yr	Since Inception	1yr	5yr	10yr	Since Inception
Equity Funds								
A Index Fund/ S&P 500 website address	26.5%	.34%	-1.03%	9.25%	26.5%	.42%	-.95%	9.3%
					S&P 500			
B Fund/ Large Cap website address	27.6%	.99%	N/A	2.26%	27.8%	1.02%	N/A	2.77%
					U.S. Prime Market 750 Index			
C Fund/ Int'l Stock website address	36.73%	5.26%	2.29%	9.37%	40.40%	5.40%	2.40%	12.09%
					MSCI EAFE			
D Fund/ Mid Cap website address	40.22%	2.28%	6.13%	3.29%	46.29%	2.40%	-.52%	4.16%
					Russell Midcap			

Source: AICPA

Data Sources

- We collect plan menus using different samples.
 - Hand-collected plan menus from Form 11-K filings between 1998-2013 from Pool, Sialm, and Stefanescu (2016).
 - Plan menus from the 1000 largest 401(k) plans between 2010-2013 based on Form 5500 filed with the DOL.
 - Form 5500 provides information on compensation and other plan characteristics.
- Match menu options with CRSP Survivorship-Bias-Free Mutual Fund database.
- When possible, we match at the share class level; otherwise assume share class with lowest expense ratio.

Representativeness of Sample

- Our final sample contains the investment menus for 5,577 plan-year observations; or around 1,400 plans per year.
- In 2013, our sample covers around \$1.3 trillion in retirement assets for approximately 18 million participants.
- This represents around 25% of the total 401(k) assets.

Sample Selection

- Main sample period: 2010-2013
- Limit sample to plans with between 3 and 100 fund options.
- Exclude funds that are newly added or deleted in a year.
- Exclude target-date funds.

Plan-Year Level Summary Statistics

	mean	sd	p1	p25	p50	p75	p99	N
Plan size (\$m)	799	2,004	2	67	322	748	8,536	5,577
# Plan participants	13,023	41,943	125	1,330	4,442	11,459	139,439	5,576
Assets per participant (\$ '000)	77	63	4	14	20	25	62	5,576
# Funds in plan (incl. newly added)	20.57	10.07	4	14	20	25	62	5,577
# Funds in plan (continued)	17.63	9.17	1	11	18	23	46	5,577
# Funds in plan, (continued non-target date)	11.85	7.23	1	8	11	14	41	5,577
# Funds in plan, (continued target date)	5.78	5.09	0	0	6	11	13	5,577
Fee dispersion within plan (%)	0.776	0.243	0.090	0.640	0.800	0.940	1.290	5,566

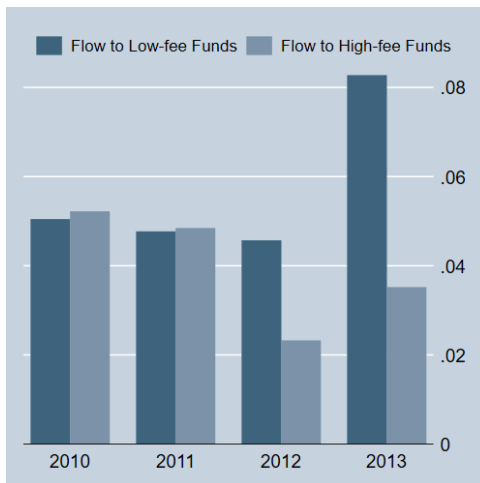
Option-Plan-Year Level Summary Statistics

	mean	sd	p1	p25	p50	p75	p99	N
Fund value (\$1,000)	25,821	75,439	2	1,037	6,050	23,737	299,173	64,995
Fund plan share (%)	4.0	3.9	0.0	1.1	2.9	5.7	17.0	64,559
Expense ratio (%)	0.60	0.36	0.04	0.32	0.62	0.85	1.39	64,483
Flow (to lag sum of funds) (%)	0.117	1.708	-4.459	-0.355	0.023	0.430	7.89	60,957
Flow (to lag fund size) (%)	6.624	26.682	-41.692	-7.078	1.086	13.197	90.44	60,957
Positive flow (indicator)	0.537	0.501	0	0	1	1	1	60,957
Return 1-year	0.14	0.15	-0.16	0.04	0.14	0.23	0.57	64,881
Return 5-year	0.03	0.03	-0.05	0.01	0.03	0.05	0.12	63,438
Return 10-year	0.06	0.04	-0.02	0.04	0.06	0.08	0.16	59,543

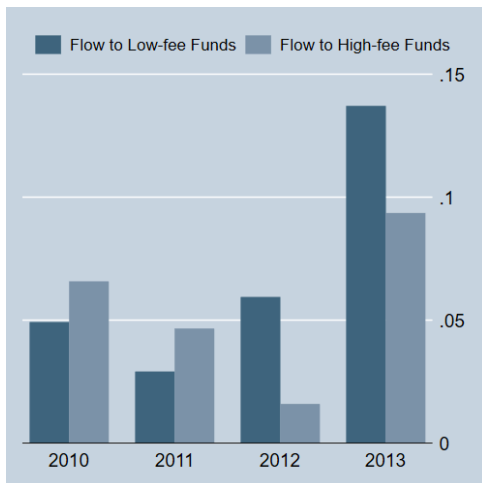
Option Choice Sets

	Option-Plan-Year level				Plan-year level				
	Total options	Non-Target options	Target options	Avg. exp. ratio (%)	% of plan-years with at least one option	#options if ≥ 1	p10	p50	p90
Balanced	18,525	3,596	14,929	0.545	77%	4.32	1	4	11
Domestic Equity	50,461	36,737	13,724	0.583	98%	9.38	4	8	15
Domestic Fixed Income	17,187	13,584	3,603	0.390	94%	2.16	1	3	6
Foreign Equity	10,653	10,653	0	0.703	92%	3.35	1	2	3
Foreign Fixed Income	530	530	0	0.743	8%	1.28	1	1	2
Other	973	973	0	0.804	13%	1.55	1	1	2

Aggregate Fund Flows By Fee (All Funds)



Aggregate Fund Flows By Fee (Domestic Equity Funds)



Empirical Specification

We estimate the following baseline specification:

$$Flow_{p,f,t} = \beta_1 Exp_{p,f,t-1} + \beta_2 Exp_{p,f,t-1} \times Post_t + \mathbf{\Gamma}' \mathbf{Controls}_{p,f,t-1} + \epsilon_{p,f,t}.$$

- $Flow_{p,f,t}$ is one of three measures of fund flow to fund f in plan p in year t .
- $Exp_{p,f,t-1}$ is the lagged expense ratio of fund f in plan p .
- $Post$ takes a value of one for 2012 and 2013.
- $Size \times Year$ controls for the impact of relative option size in plan.
- Fixed Effects:
 - Plan \times Fund
 - Plan \times Style \times Year
 - Fund Company \times Year
- Cluster (two-way) by fund management company and DC plan.

Measures of Fund Flows

We use three measures of fund flows:

$$\begin{aligned}Flow_{p,f,t}^1 &= \frac{V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t})}{\sum_f V_{p,f,t-1}} \\Flow_{p,f,t}^2 &= \frac{V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t})}{V_{p,f,t-1}} \\Flow_{p,f,t}^3 &= I(V_{p,f,t} - V_{p,f,t-1}(1 + R_{f,t}) < 0)\end{aligned}$$

Fee-Flow Sensitivities (All Funds)

	Flow (to sum of lagged options)		Flow (to lagged option size)		I[Negative flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.561*** (-10.14)	-0.559*** (-5.86)	-6.046*** (-5.32)	-6.573*** (-4.73)	0.196*** (8.31)	0.230*** (9.33)
Expense ratio	0.186 (1.47)	0.204 (1.64)	2.518 (1.05)	5.663** (2.42)	-0.097* (-1.71)	-0.183*** (-3.20)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes	No	Yes
R ²	0.812	0.821	0.745	0.758	0.688	0.702
N	47,829	47,623	47,829	47,623	47,829	47,623

Fee-Flow Sensitivities (Domestic Equity Funds)

	Flow (to sum of lagged options)		Flow (to lagged option size)		I[Negative flow]	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio * Post	-0.672*** (-11.64)	-0.586*** (-6.40)	-8.640*** (-9.37)	-7.309*** (-5.40)	0.242*** (10.79)	0.229*** (7.94)
Expense ratio	0.128 (0.62)	0.179 (0.92)	3.679 (1.11)	8.531*** (2.69)	-0.123* (-1.67)	-0.204*** (-2.72)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes	No	Yes
R ²	0.805	0.815	0.738	0.753	0.673	0.690
N	29,677	29,528	29,677	29,528	29,677	29,528

Fee-Flow Sensitivities: Fees from 2009

	All funds (1)	Domestic equity only (2)
Expense ratio (2009) * Post	-0.521*** (-10.56)	-0.598*** (-10.24)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R ²	0.812	0.805
N	47,661	29,628

Fee-Flow Sensitivities Without Plan x Fund Fixed Effects

	All funds	Domestic equity only
	(1)	(2)
Expense ratio * Post	-0.289*** (-7.70)	-0.385*** (-8.09)
Expense ratio	-0.196*** (-3.75)	-0.199*** (-2.94)
Size*Year controls	Yes	Yes
Plan*Year FE	No	Yes
Plan*Style*Year FE	Yes	No
R ²	0.596	0.597
N	53,675	33,109

Minimum and Maximum fees

	All funds			Domestic equity only		
	(1)	(2)	(3)	(4)	(5)	(6)
Minimum fee * Post	0.529*** (9.21)	0.515*** (8.97)	0.317*** (3.97)	0.595*** (10.03)	0.565*** (9.93)	0.356*** (5.19)
Minimum fee	-0.290*** (-3.85)	-0.209*** (-4.55)	-0.018 (-0.34)	-0.283** (-2.50)	-0.211*** (-4.70)	-0.038 (-0.80)
Maximum fee * Post		-0.280*** (-3.77)	-0.163*** (-2.63)		-0.263** (-2.34)	-0.136 (-1.18)
Maximum fee		0.048 (1.11)	-0.042 (-0.94)		0.061 (1.49)	-0.009 (-0.22)
Expense ratio * Post			-0.406*** (-5.47)			-0.435*** (-5.78)
Expense ratio			0.152 (1.06)			0.078 (0.33)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.812	0.812	0.812	0.805	0.806	0.806
N	47,840	47,840	47,840	29,692	29,692	29,692

Effects on Indexing

	All funds (1)	Domestic equity only (2)
Index Fund * Post	0.434*** (9.63)	0.498*** (9.01)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R ²	0.812	0.805
N	48,198	29,905

Differential effects across Active vs. Index funds

	Only active funds		Only index funds	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.250***	-0.405***	-0.605*	-0.661
	(-2.89)	(-4.49)	(-1.77)	(-1.64)
Expense ratio	0.032	-0.039	-0.293	0.056
	(0.21)	(-0.18)	(-0.39)	(0.06)
Sample	All	Domestic equity	All	Domestic equity
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes
R ²	0.831	0.833	0.840	0.847
N	36,591	22,539	5,759	5,157

Placebo: Fee-sensitivities Among Target Funds

	(1)	(2)
Expense ratio * Post	-0.122	-0.111
	(-0.40)	(-0.35)
Expense ratio	1.834***	1.897***
	(4.27)	(4.37)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
Fund Company*Year FE	No	Yes
R ²	0.751	0.751
N	28,021	28,019

“Placebo” Periods: Fee-Flow Sensitivities (All Funds)

Period:	2000- 2003	2001- 2004	2002- 2005	2003- 2006	2004- 2007	2005- 2008	2006- 2009	2007- 2010	2008- 2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Expense ratio * Post	0.022 (0.11)	-0.441** (-2.02)	-0.163 (-1.03)	0.011 (0.09)	0.124 (1.15)	-0.128 (-1.10)	-0.130 (-1.34)	0.144 (1.08)	0.030 (0.29)
Expense ratio	0.094 (0.26)	0.502 (1.06)	0.472 (1.06)	0.354 (1.22)	0.383 (1.19)	0.552* (1.73)	0.482** (2.11)	0.114 (0.45)	-0.073 (-0.38)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company *Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.838	0.840	0.830	0.822	0.824	0.814	0.784	0.791	0.803
N	12,965	18,158	22,445	25,719	26,821	27,396	27,756	28,150	37,233

Placebo Periods: Fee-Flow Sensitivities (Domestic Equity)

Period:	2000- 2003	2001- 2004	2002- 2005	2003- 2006	2004- 2007	2005- 2008	2006- 2009	2007- 2010	2008- 2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Expense ratio * Post	0.062 (0.23)	-0.400 (-1.42)	-0.218 (-1.22)	-0.034 (-0.29)	0.092 (0.82)	-0.108 (-0.82)	-0.046 (-0.30)	0.223 (1.12)	0.186 (1.45)
Expense ratio	-0.492 (-1.29)	0.237 (0.34)	0.508 (0.80)	0.299 (0.78)	0.591 (1.50)	0.441 (1.24)	-0.013 (-0.03)	-0.324 (-0.83)	-0.385 (-1.40)
Plan*Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plan*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Company *Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.833	0.843	0.835	0.832	0.835	0.825	0.788	0.796	0.803
N	8,730	12,347	15,389	17,687	18,604	19,079	19,334	19,582	24,885

Cross-Sectional Differences in Flow-Fee Sensitivities

- Average Contribution Amount
 - Proxy for Sophistication
 - Proxy for Economic Importance
- Number of fund options
 - Many options to choose from may make relative comparison more difficult.

Cross-Sectional Differences in Flow-Fee Sensitivities

- Average Contribution Amount
 - Proxy for Sophistication
 - Proxy for Economic Importance
- Number of fund options
 - Many options to choose from may make relative comparison more difficult.

Fee-Flow Sensitivities by Participant Contributions

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-year adj.)	0.145 (0.77)	0.155 (0.61)
Expense ratio * Post	-0.454*** (-5.43)	-0.526*** (-5.60)
Expense ratio * Large contributions	0.056 (0.25)	-0.095 (-0.39)
<i>Expense ratio * Post * Large contributions</i>	-0.208** (-2.12)	-0.274** (-2.51)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R ²	0.813	0.806
N	46,187	28,664

Fee-Flow Sensitivities by Number of Choices

	All fund styles	Domestic equity
	(1)	(2)
Expense ratio (plan-year adj.)	0.480**	0.434
	(2.19)	(1.50)
Expense ratio * Post	-0.699***	-0.847***
	(-6.34)	(-7.22)
Expense ratio * Number of choices	-0.011***	-0.012*
	(-3.18)	(-1.77)
<i>Expense ratio * Post * Number of choices</i>	0.006*	0.008**
	(1.75)	(2.16)
Plan*Fund FE	Yes	Yes
Size*Year controls	Yes	Yes
Plan*Style*Year FE	Yes	Yes
R ²	0.812	0.805
N	46,636	28,930

Cross-Sectional Differences in Flow-Fee Sensitivities

- Affiliated vs. Unaffiliated Investment Options
 - Disclosure might level the playing field between affiliated and unaffiliated investment options reducing favoritism (Pool, Sialm, and Stefanescu 2016).
- Company Stock and Cash vs. Mutual Fund Options
 - There are typically no fees of investing in company stock or cash options.
 - An unintended consequence of the disclosure reform could be an increase in investments in such zero-fee options.

Plan-Level Reallocation between Affiliated and Unaffiliated Funds

Dependent variable: Percent of total fund assets in affiliated funds

Expense ratio difference [Aff – Non-aff funds] * Post	-0.026*** (-2.79)
Expense ratio difference [Aff – Non-aff funds]	-0.008 (-0.23)
Plan FE	Yes
Time FE	Yes
R ²	0.950
N	2,567

Plan-Level Reallocation between Employer Stock and Cash vs. Mutual Fund Options

Dependent variable: Percent of total plan assets in:

	Employer stock	Cash
Expense ratio (plan average) * Post	0.013*	0.008***
	(1.74)	(2.83)
Expense ratio	-0.020*	-0.000
	(-1.77)	(-0.07)
Plan FE	Yes	Yes
Time FE	Yes	Yes
R2	0.969	0.737
N	3,415	5,216

Empirical Specification

We estimate the following baseline specification:

$$\begin{aligned} Flow_{p,f,t} &= \beta_1 Perf_{f,t-1} + \beta_2 Perf_{f,t-1} \times Post_t \\ &+ \beta_3 Exp_{p,f,t-1} + \beta_4 Exp_{p,f,t-1} \times Post_t + \mathbf{\Gamma}' \mathbf{Controls}_{p,f,t-1} + \epsilon_{p,f,t}. \end{aligned}$$

- $Flow_{p,f,t}$ is one of three measures of fund flow to fund f in plan p in year t .
- $Perf_{f,t-1}$ is the lagged raw return over the prior 1, 5, or 10 years of fund f .
- $Exp_{p,f,t-1}$ is the lagged expense ratio of fund f in plan p .
- $Post$ takes a value of one for 2012 and 2013.
- $Size \times Year$ controls for the impact of relative option size in plan.
- Fixed Effects:
 - Plan \times Fund
 - Plan \times Style \times Year
 - Fund Company \times Year

Performance-Flow Sensitivities

	All funds		Domestic equity only	
	(1)	(2)	(3)	(4)
Return 1-year * Post	1.465*** (3.30)	2.008*** (4.23)	1.836*** (4.16)	0.860** (2.41)
Return 5-year * Post	1.436 (1.18)	2.659*** (2.87)	-0.852 (-0.68)	0.892 (1.17)
Return 10-year * Post	0.074 (0.07)	-1.043 (-0.81)	-1.228 (-1.12)	-1.500* (-1.82)
Expense ratio * Post	-0.459*** (-8.90)	-0.512*** (-5.34)	-0.446*** (-7.90)	-0.235*** (-4.26)
Return 1-year	0.445*** (3.35)	0.442*** (3.52)	0.587*** (2.82)	0.458*** (3.18)
Return 5-year	1.455 (0.90)	-0.281 (-0.18)	4.263** (2.45)	0.595 (0.54)
Return 10-year	3.934*** (4.27)	3.720*** (4.10)	3.811*** (4.44)	1.825*** (3.22)
Expense ratio	0.047 (0.39)	0.156 (1.19)	-0.027 (-0.14)	0.127 (1.04)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Year FE	No	No	Yes	Yes
Plan*Style*Year FE	Yes	Yes	No	No
Fund Company*Year FE	No	Yes	No	Yes
R ²	0.818	0.826	0.812	0.802
N	43,486	43,343	27,499	27,390

Aggregate Fund-Level Specifications

$$\begin{aligned}
 Flow_{f,t} &= \beta_1 Exp_{f,t-1} + \beta_2 Exp_{f,t-1} \times Post_t + \beta_3 Exp_{f,t-1} \times DC_{f,t-1} \\
 &+ \beta_4 Post_t \times DC_{f,t-1} + \beta_5 Exp_{f,t-1} \times Post_t \times DC_{f,t-1} \\
 &+ \mathbf{\Gamma}' \mathbf{Controls}_{p,f,t-1} + \epsilon_{p,f,t}.
 \end{aligned}$$

- $Flow_{f,t}$ is growth of new money to fund f in year t .
- $Exp_{f,t-1}$ is the lagged expense ratio of fund f .
- $Post$ takes a value of one for 2012 and 2013.
- $DC_{f,t-1}$ is the lagged DC intensity of fund f :
 - Indicator whether fund is included in any DC plan
 - $\text{Log}(1 + \text{Number of Plans that Include Fund } f)$
 - Percent of 401(k) assets for fund f .
- $Size \times Year$ is based on $\text{log}(1 + TNA_{t-1})$
- Fixed Effects:
 - Fund
 - Style \times Year
 - Index \times Year

Fund-Level Summary Statistics

	mean	sd	p1	p25	p50	p75	p99	N
Flow, monthly average (%)	1.67	7.91	-7.42	-1.17	-0.13	1.62	54.30	37,934
Expense ratio (%)	0.86	0.45	0.09	0.54	0.83	1.11	2.25	29,630
Return, 1-year (%)	11.88	16.24	-25.70	1.05	10.85	19.41	65.32	36,975
Return, 5-year (%)	2.17	3.90	-9.76	0.40	2.42	4.41	11.80	22,084
Return, 10-year (%)	4.59	3.71	-5.01	2.17	4.37	6.44	15.36	16,294
Log(Total Net Assets)	5.25	1.99	0.69	3.88	5.32	6.62	9.74	39,081
Fund included in any plan	0.28	0.45	0.00	0.00	0.00	1.00	1.00	35,838
Percent of fund assets in plans (%)	2.53	11.38	0.00	0.00	0.00	0.01	78.68	35,838
Number of plans with fund	2.20	13.96	0	0	0	1	43	35,838
Percent of fund assets in plans >0 (%)	8.77	19.40	0.00	0.15	1.52	7.44	100.00	9,944
Number of plans with fund >0	7.93	25.63	1	1	2	5	101	9,944

Fund-Level Sensitivity to Expenses

Dependent variable: Fund flow	<i>Measure of DC intensity:</i>					
	<i>Fund in any plan</i>		<i>Percent of fund assets in plan</i>		<i>Log(Number of plans with fund+1)</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Expense ratio (lagged, style adj.)	0.8010 (1.55)	0.7283 (1.39)	0.7682 (1.59)	0.6761 (1.37)	0.9058* (1.81)	0.8373* (1.65)
Expense ratio * Post	-0.3907 (-1.57)	-0.2944 (-1.00)	-0.5453** (-2.54)	-0.4214 (-1.56)	-0.3287 (-1.38)	-0.2463 (-0.86)
Expense ratio * DC intensity	0.0953 (0.08)	0.0536 (0.05)	3.3936 (0.47)	3.4379 (0.48)	-0.3988 (-0.69)	-0.4165 (-0.72)
Post * DC intensity	-0.4790*** (-2.99)	-0.4630*** (-2.88)	-0.6994 (-0.77)	-0.6402 (-0.71)	-0.3736*** (-4.32)	-0.3601*** (-4.16)
<i>Expense ratio * Post * DC intensity</i>	-0.7974** (-2.10)	-0.7494** (-1.99)	-3.8053** (-2.31)	-3.6615** (-2.23)	-0.7307*** (-3.87)	-0.6993*** (-3.76)
Size*Year control	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-style * Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Indxfund * Year FE	No	Yes	No	Yes	No	Yes
R ²	0.489	0.489	0.489	0.489	0.489	0.489
N	26,635	26,635	26,635	26,635	26,635	26,635

Fund-Level Effects on Indexing

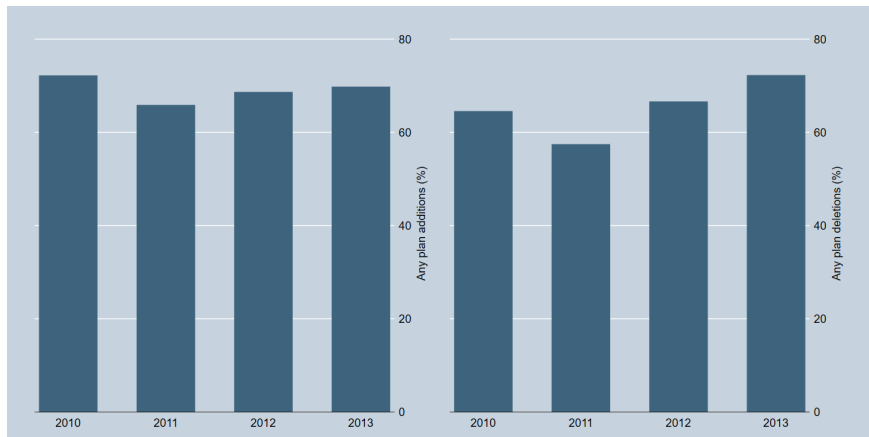
Dependent variable: Fund flow

	<i>All funds</i>	<i>Sample: Funds not part of DC plans</i>	<i>Funds part of DC plans</i>
	(1)	(2)	(3)
Index fund * Post	0.0735 (0.35)	-0.1570 (-0.61)	0.8121** (2.39)
Size*Year control	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes
Fund-style * Year FE	Yes	Yes	Yes
R ²	0.541	0.554	0.468
N	36,519	27,697	8,822

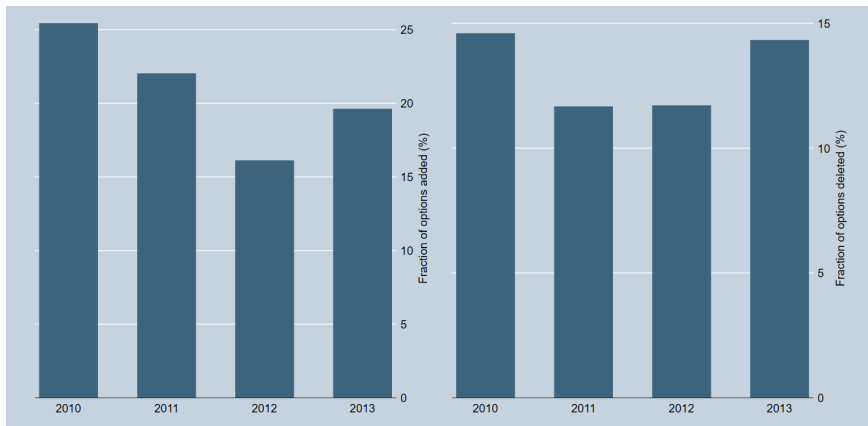
Changes in 401(k) Menus Around Reform

- Plan sponsors and providers could also adjust plans around regulatory reform.
- To address this question, we study fund deletions and fund additions around reform.

Reshuffling of Menus: Any Plan Additions and Deletions



Reshuffling of Menus: Fraction of Options Added or Deleted



Sensitivity of Plan Deletions to Fees

Dependent variable: Option deleted (indicator)		
	All funds Domestic equity	
	(1)	(2)
Expense ratio * Post	0.001 (0.07)	-0.023 (-0.43)
Expense ratio	-0.016 (-0.92)	-0.065* (-1.75)
Log (Total Net Assets of Fund)	-0.041*** (-16.05)	-0.039*** (-8.43)
Pct of Plan Assets Invested in Fund (lagged)	-0.018*** (-5.43)	-0.018*** (-4.53)
Target Fund*Year FE	Yes	Yes
Plan*Style*Year FE	Yes	No
Plan*Year FE	No	Yes
R ²	0.372	0.405
N	70,611	39,276

Robustness: Excluding Plans with Deletions

	No deleted funds in plan		No deleted funds within style	
	(1)	(2)	(3)	(4)
Expense ratio * Post	-0.595***	-0.699***	-0.407***	-0.548***
	(-6.61)	(-4.20)	(-6.12)	(-3.89)
Expense ratio	0.167	0.125	0.017	0.110
	(0.50)	(0.46)	(0.10)	(0.62)
Plan*Fund FE	Yes	Yes	Yes	Yes
Size*Year controls	Yes	Yes	Yes	Yes
Plan*Style*Year FE	Yes	Yes	Yes	Yes
Fund Company*Year FE	No	Yes	No	Yes
R ²	0.859	0.872	0.842	0.853
N	11,236	11,058	25,646	25,423

Conclusions

- Flows by 401(k) participants become more sensitive to expenses after the disclosure reform.
- Flows by 401(k) participants become more sensitive to short-term performance after the disclosure reform.
- The disclosure effects are less pronounced for plans with relatively small contributions and for plans with many options.