

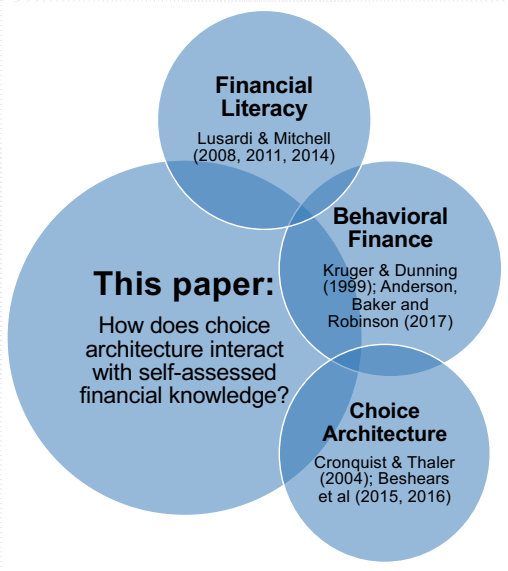
# Who Feels the Nudge? Knowledge, Self-Awareness and Retirement Savings Decisions

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Early 1990s: Swedish Krona devalues, this sets off chain of economic reforms. Late 1990s: changed the pension system to one with a significant defined contribution component

- 2.5% of wage allocated freely among large number of registered mutual funds (456 in 2000 to 855 in 2016)
- Gov't initially promoted active choice through large-scale advertising campaign (Thaler and Cronqvist, 2004)
- Those who made no choice were placed in a well diversified, low cost equity fund
  - 12 bps compared median alternative of 51bps
- Tele-marketers evolved, selling trading advice (Dahlquist et al., 2015, 2017)
  - Monthly fees
  - Coordinated trades in and out of funds across large numbers of investors
- This activity was banned in 2011, remaining advisors opened actively managed fund-of-funds



- Survey a random sample of 12,000 Swedes aged 18-65 and match it to registry data
  - From a working age population of 5,985,147
  - 2,854 responses (Average response rate 23.8%)
  - 2,502 complete surveys remaining after matching to characteristics from Statistics Sweden and the Swedish Pension Authority (SPA)
  - Use sampling weights to adjust for survey response bias
- Measure financial literacy, self-perceptions and attitudes
- Extend financial literacy to pick up knowledge specific to mutual fund investing
- Match responses to socio-demographics and actual pension decisions
- Exploit the fact that one cohort was subjected to a big nudge, while later cohorts were not

1. *Compounding.* Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

  - a) **More than \$102** (92%)
  - b) Exactly \$102 (2%)
  - c) Less than \$102 (3%)
  - d) Don't know (2%)
2. *Inflation.* Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

  - a) More than today (6%)
  - b) Less than today (81%)
  - c) Exactly the same as today (3%)
  - d) Don't know (8%)
3. *Bond Pricing.* If interest rates fall, what should happen to bond prices?

  - a) **They will rise** (23%)
  - b) They will fall (17%)
  - c) They will stay the same (45%)
  - d) Don't know (14%)
4. *72-rule.* Imagine you received a gift of 10,000 and want to save it. You want to double the amount by saving it for 10 years without touching it. What interest is needed to reach this goal?

  - a) Around 15% (6%)
  - b) Around 10% (45%)
  - c) **Around 7%** (43%)
  - d) Don't know (5%)
5. *Diversification.* Buying a single company's stock usually provides a safer return than a stock mutual fund.

  - a) True (4%)
  - b) **False** (76%)
  - c) Don't know (19%)

For the previous five multiple choice questions, you could have answered between zero and five correctly. We would like to know how many you think you got correct. Please assign a probability for each possible outcome below.

Enter whole numbers and total should add to 100.

	Total
Probability that I have all five correct	0 <input type="text"/> %
Probability that I have exactly four correct	0 <input type="text"/> %
Probability that I have exactly three correct	0 <input type="text"/> %
Probability that I have exactly two correct	0 <input type="text"/> %
Probability that I have exactly one correct	0 <input type="text"/> %
Probability that I have no correct answers	0 <input type="text"/> %
Don't know	<input type="checkbox"/>
Prefer not to answer	<input type="checkbox"/>
	Total: 0 %



In addition to the “Big 5” Financial Literacy questions along with self-assessed scores, we ask if:

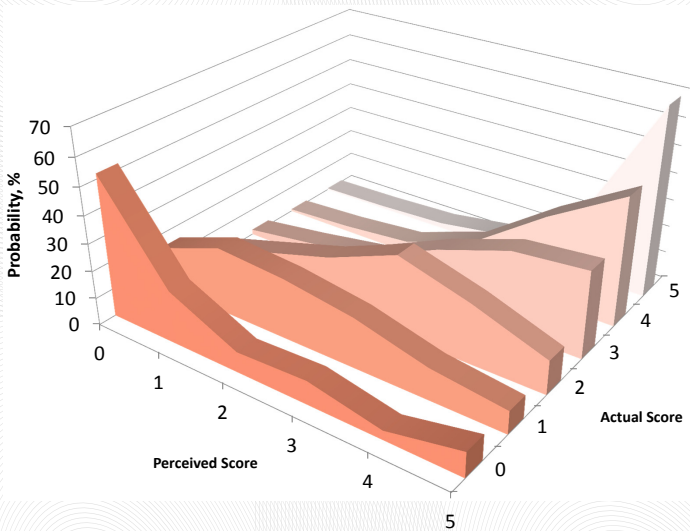
“When selecting a mutual fund, past returns are more important than fees”

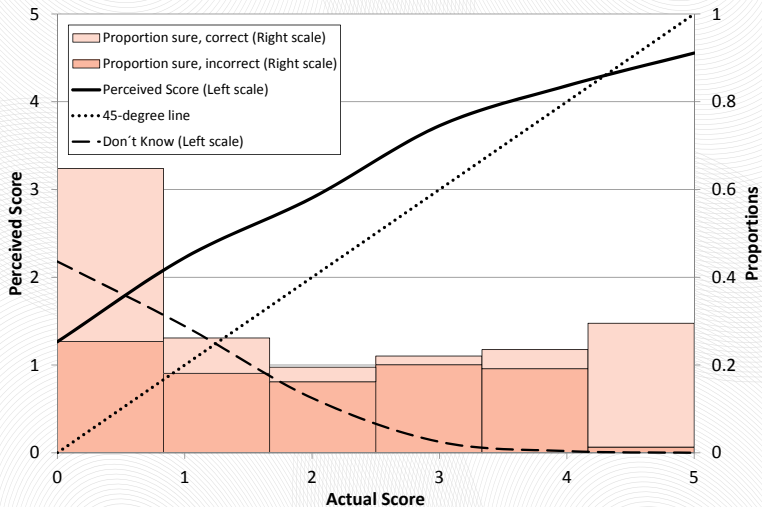
Responses	Category	No. observations
Strongly Agree	MF Return	257
Agree somewhat	Fence / Excluded	812
Disagree somewhat	Fence / Excluded	457
Strongly disagree	MF Fee	215
Don't know	MF DK	590
Prefer not to say	MF DK	63

- Mutual fund responses relate to actual and perceived “Big 5” scores and capture variation in choice
- Big difference between those who were nudged vs. those who were not
  - Nudges pushes people to make a choice based on information *and beliefs*
  - Nudges and self-assessments *interact* in making these choices
- Those who “don’t know they don’t know”:
  - Overestimate their financial knowledge
  - Opt out of default
  - Pay higher fees
  - Work with large tele-marketeting advisors
  - This results in underperformance



# Big 5 responses: Metacognition





# Mutual fund choice (Probit)

	Past Returns More Important			Fees More Important			Don't Know		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financial Lit.	<b>0.018***</b> (0.005)	0.008 (0.006)		<b>0.032***</b> (0.005)	0.020*** (0.006)		<b>-0.140***</b> (0.008)	-0.108*** (0.009)	
Perceived Fin. Lit.		<b>0.019***</b> (0.007)			<b>0.025***</b> (0.007)			<b>-0.058***</b> (0.009)	
Fin. Mistakes			0.001 (0.007)			-0.022*** (0.006)			0.065*** (0.011)
DK			<b>-0.039***</b> (0.008)			<b>-0.046***</b> (0.009)			<b>0.192***</b> (0.013)
Nudged Cohort	0.022 (0.020)	0.023 (0.020)	0.018 (0.020)	0.010 (0.018)	0.012 (0.017)	0.008 (0.018)	<b>-0.141***</b> (0.034)	<b>-0.144***</b> (0.033)	<b>-0.124***</b> (0.035)
Married	<b>0.029**</b> (0.013)	<b>0.028**</b> (0.013)	<b>0.028**</b> (0.013)	-0.010 (0.012)	-0.012 (0.011)	-0.011 (0.011)	<b>-0.073***</b> (0.019)	<b>-0.068***</b> (0.019)	<b>-0.070***</b> (0.020)
Female	-0.018 (0.013)	-0.013 (0.013)	-0.021* (0.013)	-0.016 (0.012)	-0.010 (0.012)	-0.017 (0.011)	<b>0.132***</b> (0.019)	<b>0.112***</b> (0.019)	<b>0.150***</b> (0.019)
Age	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)
Log Income	0.002 (0.007)	0.002 (0.006)	0.002 (0.006)	<b>0.023**</b> (0.010)	<b>0.020**</b> (0.009)	<b>0.021**</b> (0.009)	<b>-0.031***</b> (0.009)	<b>-0.030***</b> (0.008)	<b>-0.030***</b> (0.008)
University	<b>-0.029**</b> (0.013)	<b>-0.029**</b> (0.013)	<b>-0.026**</b> (0.013)	0.011 (0.012)	0.011 (0.012)	0.012 (0.012)	0.015 (0.021)	0.014 (0.021)	0.005 (0.021)
Observations	2,502	2,502	2,502	2,502	2,502	2,502	2,502	2,502	2,502
Pseudo R <sup>2</sup>	0.0189	0.0234	0.0288	0.0502	0.0612	0.0545	0.219	0.233	0.255

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Mutual fund choice (Probit)

	Past Returns More Important			Fees More Important			Don't Know		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financial Lit.	0.018*** (0.005)	<b>0.008</b> (0.006)		0.032*** (0.005)	<b>0.020***</b> (0.006)		-0.140*** (0.008)	<b>-0.108***</b> (0.009)	
Perceived Fin. Lit.		<b>0.019***</b> (0.007)			<b>0.025***</b> (0.007)			<b>-0.058***</b> (0.009)	
Fin. Mistakes			0.001 (0.007)			-0.022*** (0.006)			0.065*** (0.011)
DK			-0.039*** (0.008)			-0.046*** (0.009)			0.192*** (0.013)
Nudged Cohort	0.022 (0.020)	0.023 (0.020)	0.018 (0.020)	0.010 (0.018)	0.012 (0.017)	0.008 (0.018)	-0.141*** (0.034)	-0.144*** (0.033)	-0.124*** (0.035)
Married	0.029** (0.013)	0.028** (0.013)	0.028** (0.013)	-0.010 (0.012)	-0.012 (0.011)	-0.011 (0.011)	-0.073*** (0.019)	-0.068*** (0.019)	-0.070*** (0.020)
Female	-0.018 (0.013)	-0.013 (0.013)	-0.021* (0.013)	-0.016 (0.012)	-0.010 (0.012)	-0.017 (0.011)	0.132*** (0.019)	0.112*** (0.019)	0.150*** (0.019)
Age	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)
Log Income	0.002 (0.007)	0.002 (0.006)	0.002 (0.006)	0.023** (0.010)	0.020** (0.009)	0.021** (0.009)	-0.031*** (0.009)	-0.030*** (0.008)	-0.030*** (0.008)
University	-0.029** (0.013)	-0.029** (0.013)	-0.026** (0.013)	0.011 (0.012)	0.011 (0.012)	0.012 (0.012)	0.015 (0.021)	0.014 (0.021)	0.005 (0.021)
Observations	2,502	2,502	2,502	2,502	2,502	2,502	2,502	2,502	2,502
Pseudo R <sup>2</sup>	0.0189	0.0234	0.0288	0.0502	0.0612	0.0545	0.219	0.233	0.255

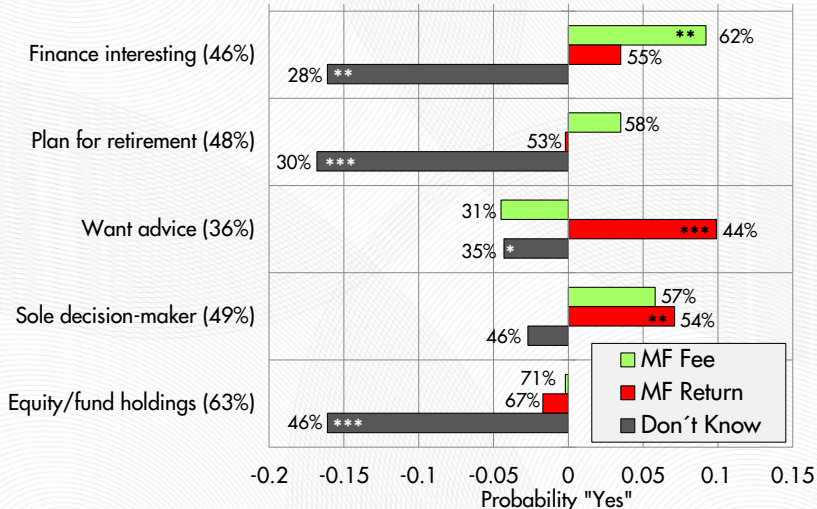
Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Household decisions (Probits)



Bars show marginal probabilities from Probit next to group means (%)



	(1)	(2)	(3)
<b>MF Return</b>	<b>0.072***</b>	-0.032	0.057*
	(0.027)	(0.059)	(0.032)
<b>MF Fee</b>	<b>-0.087**</b>	-0.028	-0.044
	(0.043)	(0.061)	(0.039)
<b>MF Don't know</b>	<b>-0.053*</b>	-0.179***	-0.108***
	(0.030)	(0.041)	(0.027)
Financial Literacy	-0.008	-0.007	-0.005
	(0.010)	(0.016)	(0.009)
Married	0.046**	0.017	0.056**
	(0.021)	(0.044)	(0.022)
Female	-0.010	0.026	-0.015
	(0.022)	(0.038)	(0.022)
Age	-0.001	0.010***	0.002
	(0.001)	(0.003)	(0.001)
Log Income	0.029**	0.059*	0.049***
	(0.011)	(0.032)	(0.016)
University	-0.009	0.032	0.005
	(0.023)	(0.043)	(0.023)
Nudged Cohort			0.434***
			(0.033)
<b>Sample</b>	<b>Nudged</b>	Later	Full
Observations	1,768	734	2,502
Pop. weights	Yes	Yes	Yes
Wald Ret=Fee	0.01	0.96	0.03



	(1)	(2)	(3)
<b>MF Return</b>	0.072*** (0.027)	-0.032 (0.059)	<b>0.057*</b> (0.032)
<b>MF Fee</b>	-0.087** (0.043)	-0.028 (0.061)	<b>-0.044</b> (0.039)
<b>MF Don't know</b>	-0.053* (0.030)	-0.179*** (0.041)	<b>-0.108***</b> (0.027)
Financial Literacy	-0.008 (0.010)	-0.007 (0.016)	-0.005 (0.009)
Married	0.046** (0.021)	0.017 (0.044)	0.056** (0.022)
Female	-0.010 (0.022)	0.026 (0.038)	-0.015 (0.022)
Age	-0.001 (0.001)	0.010*** (0.003)	0.002 (0.001)
Log Income	0.029** (0.011)	0.059* (0.032)	0.049*** (0.016)
University	-0.009 (0.023)	0.032 (0.043)	0.005 (0.023)
Nudged Cohort			0.434*** (0.033)
<b>Sample</b>	Nudged	Later	<b>Full</b>
Observations	1,768	734	2,502
Pop. weights	Yes	Yes	Yes
Wald Ret=Fee	0.01	0.96	0.03

	Any (1,000 trades)			50 <sup>th</sup> (12,000 trades)		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>MF Return</b>	<b>0.023</b>	-0.001	0.012	<b>0.057*</b>	0.018	0.042**
	(0.033)	(0.019)	(0.022)	(0.030)	(0.019)	(0.020)
<b>MF Fee</b>	<b>-0.050</b>	0.003	-0.024	<b>-0.047*</b>	0.012	-0.014
	(0.034)	(0.019)	(0.023)	(0.028)	(0.016)	(0.019)
<b>MF Don't know</b>	<b>-0.005</b>	-0.021	-0.021	<b>0.014</b>	-0.008	-0.000
	(0.029)	(0.015)	(0.018)	(0.025)	(0.009)	(0.014)
Financial Literacy	-0.011	0.001	-0.006	-0.016**	-0.000	-0.009**
	(0.010)	(0.004)	(0.006)	(0.008)	(0.002)	(0.005)
Married	0.011	0.016	0.017	-0.021	0.011	-0.004
	(0.021)	(0.018)	(0.015)	(0.018)	(0.011)	(0.011)
Female	-0.020	0.002	-0.012	-0.009	0.007	-0.003
	(0.022)	(0.014)	(0.015)	(0.018)	(0.007)	(0.011)
Age	-0.001	0.001**	0.001	0.001	0.001*	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Log Income	-0.002	0.029***	0.009	0.000	0.012**	0.006
	(0.012)	(0.009)	(0.009)	(0.006)	(0.006)	(0.004)
University	-0.045**	-0.020*	-0.033**	-0.031*	-0.007	-0.019*
	(0.021)	(0.011)	(0.014)	(0.018)	(0.006)	(0.010)
Nudged Cohort			0.112***			0.072***
			(0.021)			(0.017)
<b>Sample</b>	<b>Nudged</b>	Later	Full	<b>Nudged</b>	Later	Full
Observations	1,768	734	2,502	1,768	734	2,502
Pop. weights	Yes	Yes	Yes	Yes	Yes	Yes
Wald Ret=Fee	0.11	0.89	0.23	0.02	0.77	0.04

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

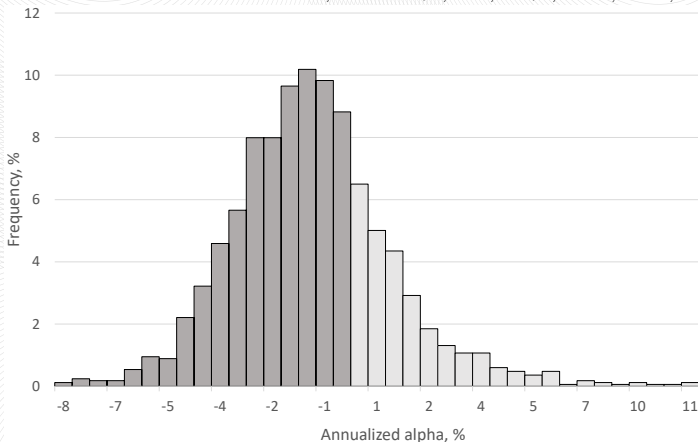
	Sample Restricted to Opt-out only				Full-Sample
	(1)	(2)	(3)	(4)	(5)
MMA 50	0.064*** (0.013)	0.061*** (0.009)		0.059*** (0.009)	0.076*** (0.011)
MF Return			0.028** (0.011)	0.025** (0.011)	0.023** (0.011)
MF Fee			-0.015 (0.014)	-0.013 (0.014)	-0.013 (0.011)
MF Don't know			-0.004 (0.009)	-0.005 (0.009)	-0.028*** (0.007)
Financial Literacy	0.005 (0.004)	0.002 (0.003)	0.000 (0.004)	0.001 (0.003)	0.002 (0.003)
Nudged Cohort	0.001 (0.017)	-0.014 (0.014)	-0.011 (0.014)	-0.014 (0.014)	0.074*** (0.010)
Demographics	Yes	Yes	Yes	Yes	Yes
Population weights	Yes	Yes	Yes	Yes	Yes
Strategy weights	No	Yes	Yes	Yes	Yes
Observations	1,678	1,678	1,678	1,678	2,502
R-squared	0.024	0.866	0.864	0.866	0.785
Wald Ret=Fee	-	-	0.01	0.03	0.02

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

8 bps can be compared to the default fund which charges 12 bps

Two factor market model,  $R_{i,t} = \alpha_i + \beta_{i,S}R_{S,t} + \beta_{i,W}R_{W,t} + \epsilon_{i,t}$



VARIABLES	(1) MKT	(2) MKT	(3) MKT	(4) FFC	(5) FFC	(6) FFC
MMA / 50th			-1.112*** (0.157)			-0.778*** (0.150)
MF Return	-0.252 (0.242)	-0.316 (0.197)	-0.264 (0.196)	-0.100 (0.236)	-0.187 (0.187)	-0.150 (0.186)
MF Fee	0.481 (0.309)	0.250 (0.219)	0.230 (0.220)	0.442 (0.298)	0.231 (0.212)	0.218 (0.213)
MF Don't know	0.247 (0.169)	0.231* (0.123)	0.239** (0.121)	0.097 (0.162)	0.144 (0.119)	0.149 (0.118)
Financial Literacy	0.120* (0.066)	0.085 (0.053)	0.073 (0.053)	0.122* (0.064)	0.080 (0.050)	0.071 (0.050)
Sample	Nudged	Full	Full	Nudged	Full	Full
Observations	1,768	2,502	2,502	1,768	2,502	2,502
R-squared	0.029	0.569	0.576	0.029	0.589	0.593
Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Cohort	No	Yes	Yes	No	Yes	Yes
Pop. weights	Yes	Yes	Yes	Yes	Yes	Yes
MF Ret-MF Fee=0	0.05	0.04	0.07	0.13	0.11	0.16

Standard errors in parentheses

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VARIABLES	(1) MKT	(2) MKT	(3) MKT	(4) FFC	(5) FFC	(6) FFC
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Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Cohort	No	Yes	Yes	No	Yes	Yes
Pop. weights	Yes	Yes	Yes	Yes	Yes	Yes
MF Ret-MF Fee=0	0.05	0.04	0.07	0.13	0.11	0.16

Standard errors in parentheses

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VARIABLES	(1) MKT	(2) MKT	(3) MKT	(4) FFC	(5) FFC	(6) FFC
MMA / 50th			-1.112*** (0.157)			-0.778*** (0.150)
MF Return	-0.252 (0.242)	-0.316 (0.197)	-0.264 (0.196)	-0.100 (0.236)	-0.187 (0.187)	-0.150 (0.186)
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Sample	Nudged	Full	Full	Nudged	Full	Full
Observations	1,768	2,502	2,502	1,768	2,502	2,502
R-squared	0.029	0.569	0.576	0.029	0.589	0.593
Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Cohort	No	Yes	Yes	No	Yes	Yes
Pop. weights	Yes	Yes	Yes	Yes	Yes	Yes
<b>MF Ret-MF Fee=0</b>	<b>0.05</b>	<b>0.04</b>	<b>0.07</b>	<b>0.13</b>	<b>0.11</b>	<b>0.16</b>

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1. There are three types of people in the world when it comes to financial sophistication:
  - Those who know that they know
  - Those who know that they don't know
  - Those who don't know that they don't know
2. These groups respond very differently to policy nudges
  - Nudges work by encouraging people to form beliefs or opinions and then to act on them
3. The choice architecture that leads to the nudge occurs in a market setting, not a vacuum
  - The strategic response of industry incumbents affects the belief formation process