

Supplemental Appendix

Dominated pension investments: the role of search frictions and unawareness

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Lorentzon: SNS, Center for Business and Policy Studies. This study is registered in the AEA RCT Registry and the unique identifying number is: AEARCTR-0003139 ([Kinnerud and Lorentzon, 2020](#)).
Link to pre-analysis plan: <https://www.socialscisceregistry.org/trials/3139>

A Comments on the pre-analysis plan

This section contains information about differences between the published pre-analysis plan and the analysis undertaken in this paper. Let us first highlight some changes in notation. The title of the paper is changed from: “The Choice of Pension Funds – An Information Experiment”, in the pre-analysis plan. We also renamed the treatment letters to make them more closely connected to their contents.

Previous name	New name
Basic1	A (Aware)
Basic2	A-certain (Aware-certain)
A	AN (Aware+Name)
B	AI _a (Aware+Impl)
C	ANI (Aware+Name+Impl)

Furthermore, we renamed the hypothesis *Asymmetric Information* to *Awareness* and the hypothesis *Financial Illiteracy* to *Monetary implication*.

Implementation

The experiment was conducted in one round only.¹

Data

We did not apply for additional individual data from Statistics Sweden, as we mentioned that we would consider.

Analysis

In the pre-analysis plan, we stated that we would estimate discount factors. Unfortunately, the analysis is uninformative due to too little variation in the probability of switching funds across different levels of expected future rewards.

¹We prespecified the possibility of conducting a second round, in order to adjust the total sample size and to get an observation at a different point in time.

In addition to the prespecified heterogeneity analysis, we analyze heterogeneity across levels of residential urbanization and time since the most recent fund choice. We also include in the paper calculations of consumers’ net gain of the treatments, which were not prespecified.

B Descriptive analysis

B.1 The funds

Fund	Index name	No. savers	Fee	Correlation
Fund ^h	SIX30	17,334	0.25	0.9880
Fund ^m	OMXS30	27,131	0.20	0.9999
Fund ^l	SIX30RX	83,347	0.00	1

Table B.1: Characteristics of the funds

Note: Characteristics of the dominated funds, Fund^h and Fund^m, and the dominating fund, Fund^l. The three indices track the performance of the 30 most traded shares listed on the Stockholm Stock Exchange. The data is retrieved from the Swedish Pensions Agency as of June, 2018 and Morningstar Direct as of March, 2018 ([Morningstar, 2018](#); [Swedish Pensions Agency, 2019](#)). The number of savers only include Premium Pension savers ([Swedish Pensions Agency, 2019](#)). Fee refers to the net fee after Premium Pension rebates and is stated as a share of the savings in the fund ([Swedish Pensions Agency, 2019](#)). Correlation refers to the historical correlation of monthly returns with Fund^l, since the funds became available in the Premium Pension system ([Morningstar, 2018](#)).

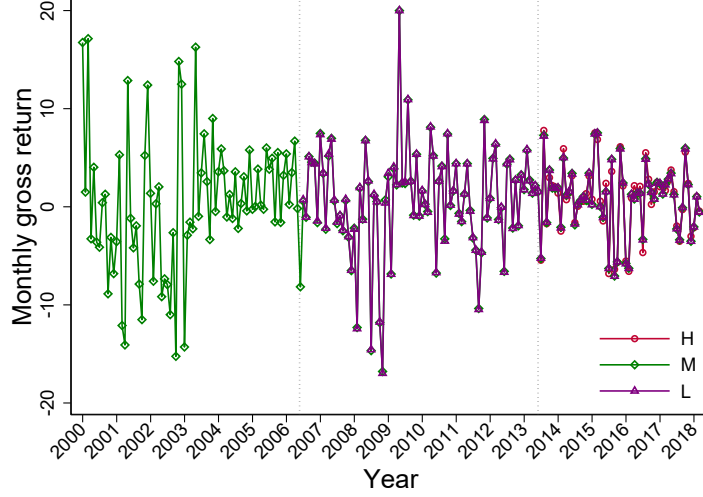


Figure B.1: Historical monthly gross returns for the three funds

Note: The monthly gross return for the three funds Fund^l , Fund^m , and Fund^h . The gross return shows the return that investors would have received had they not paid any expenses. The gray vertical lines mark the entry of Fund^l and Fund^h , respectively. The data is from Morningstar Direct ([Morningstar, 2018](#)).

B.2 Sample and population

Variable	Mean	Std. Dev.	Min	Max
Savings Fund^l	70,839	47,140	0	389,969
Savings Fund^m	49,383	60,323	0	654,782
Savings Fund^h	30,904	48,420	0	487,706
Fund share, Fund^l	0.28	0.14	0	0.97
Fund share, Fund^m	0.18	0.20	0	1
Fund share, Fund^h	0.10	0.16	0	1

Table B.2: Savings characteristics

Note: Savings (SEK) and fund shares of savers in Fund^m , Fund^h , and Fund^l . Savers in Fund^l are not part of the sample, but are shown for comparison. The data is retrieved from the Swedish Pensions Agency in June 2018 ([Swedish Pensions Agency, 2019](#)). 1 SEK was equal to 0.11 USD in July 2018.

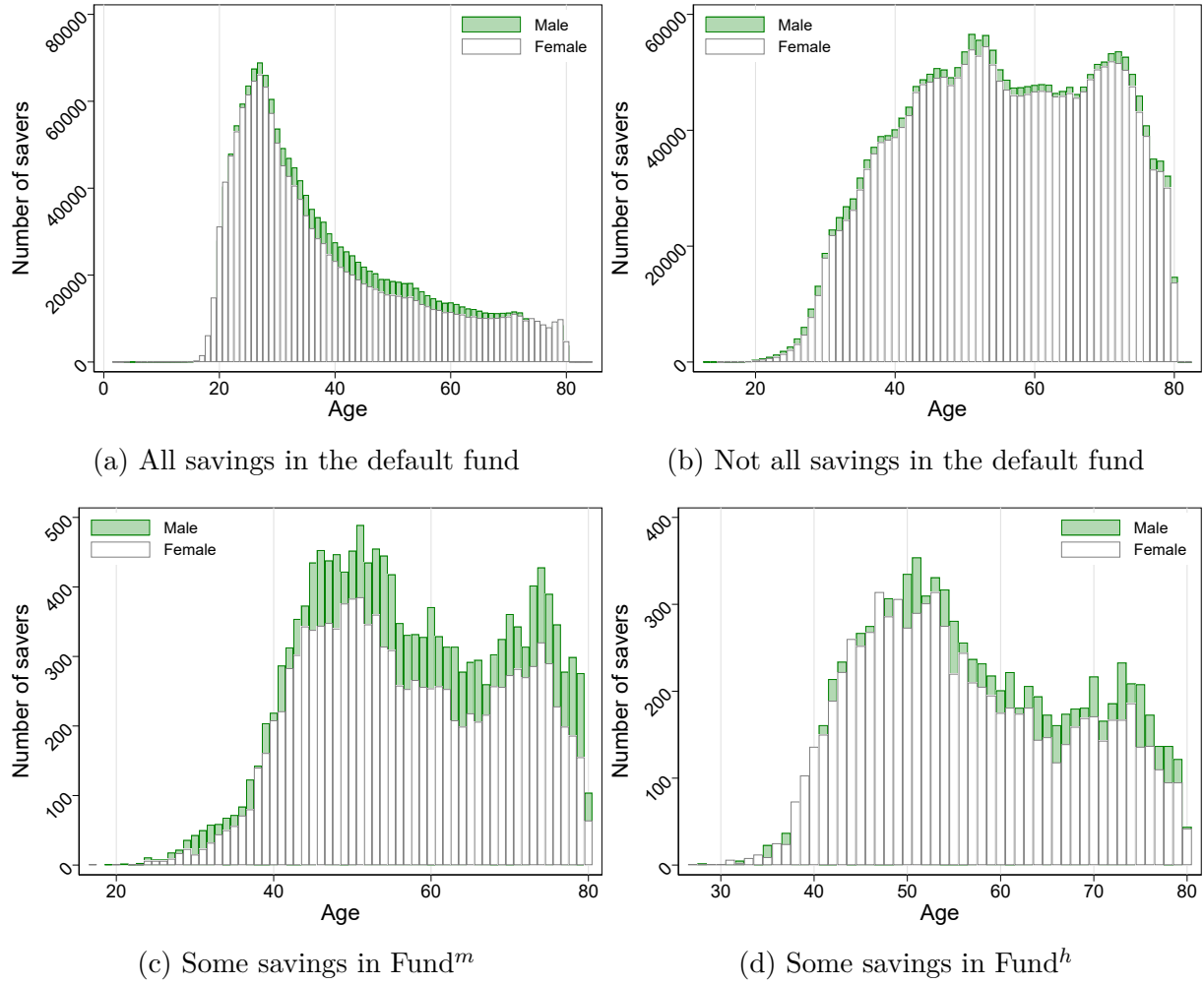
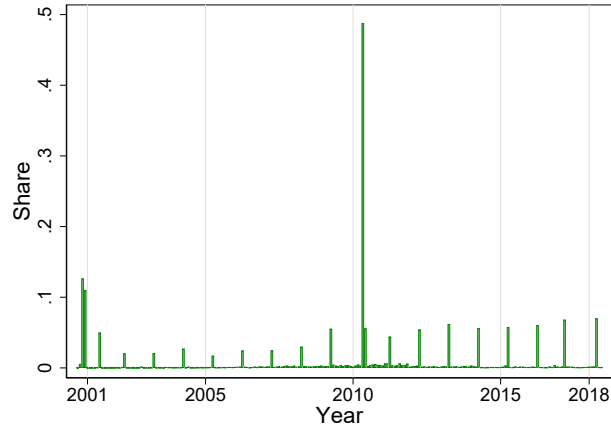
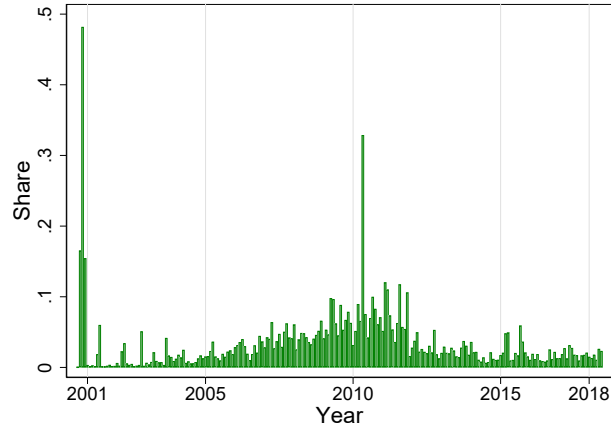


Figure B.2: Age distributions

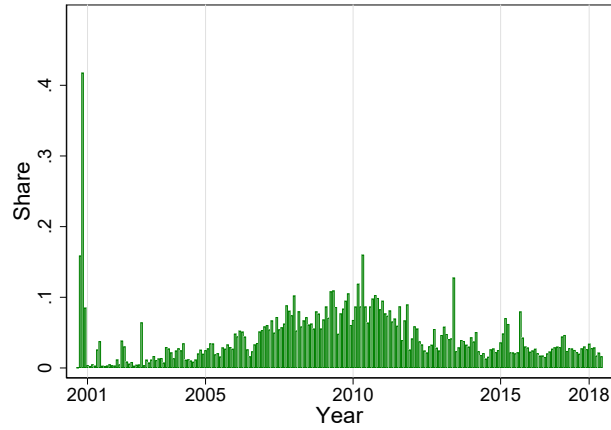
Note: Age distributions for all Premium Pension savers, displayed separately for women and men, and for those who save exclusively in the default fund, those who have actively chosen another fund than the default, and for savers in the two dominated funds. The data is retrieved from the Swedish Pensions Agency in November 2018, and shows the cross sections for June 18, 2018 ([Swedish Pensions Agency, 2019](#)).



(a) All savings in the default fund



(b) Not all savings in the default fund



(c) Some savings in Fund^l, Fund^m, or Fund^h

Figure B.3: Historical investment activity level

Note: Historical presentation of the fraction of savers who make an investment change for the Premium Pension savings, aggregated monthly and displayed separately for those who in June 18, 2018 save exclusively in the default fund, have actively chosen another fund than the default, and savers in Fund^l, Fund^m, or Fund^h. The periodic spikes that occur in December each year correspond to the inflow of new savings for the past year. If there is no change in the investment allocation, the new savings are allocated according to the previously chosen investment shares. In 2010, consultancy firms were allowed to perform automatic switches on behalf of Premium Pension savers, resulting in the significant spike of switches in that year. The data is retrieved from the Swedish Pensions Agency in November 2018 ([Swedish Pensions Agency, 2019](#)).

B.3 Balance across treatments

	Income	FR	Fund value	Fund share	Year of birth	Female	Married	Yrs since change
Aware	421,212	4,527	81,164	0.28	1967	0.46	0.55	6.3
Aware + Read	429,654	4,232	79,193	0.27	1967	0.45	0.63	6.7
Aware + Name	420,213	4,347	79,239	0.28	1967	0.47	0.54	6.2
Aware + Name + Read	410,207	4,509	85,215	0.28	1967	0.44	0.58	5.9
Aware + Impl	415,881	4,443	79,849	0.28	1967	0.46	0.53	6.2
Aware + Impl + Low reward	405,761	4,309	80,042	0.28	1967	0.46	0.56	6.0
Aware + Impl + Med reward	415,579	4,538	83,033	0.29	1967	0.47	0.52	6.3
Aware + Impl + High reward	417,458	4,750	81,463	0.29	1967	0.43	0.54	6.1
Aware + Name + Impl	418,511	4,387	79,605	0.28	1967	0.47	0.54	6.1
Control	415,116	4,464	80,682	0.28	1967	0.44	0.55	6.3
All treatments	418,265	4,436	80,181	0.28	1967	0.46	0.54	6.2

Table B.3: Pre-treatment characteristics across treatment groups

Note: The table shows mean values of covariates across treatment groups and the control group. Income refers to annual labor income in 2016. FR shows the expected future reward as defined in Appendix D. Fund value refers to savings in Fund^m or Fund^h, and Fund share is the Premium Pension portfolio share allocated to Fund^m or Fund^h. The covariates Female and Married are in shares. The right-most column shows the average time in years since the most recent investment change. The data is retrieved from the Swedish Pensions Agency in June 2018 ([Swedish Pensions Agency, 2019](#)). The variables Income, FR, and Fund value are in SEK. 1 SEK was equal to 0.11 USD in July 2018.

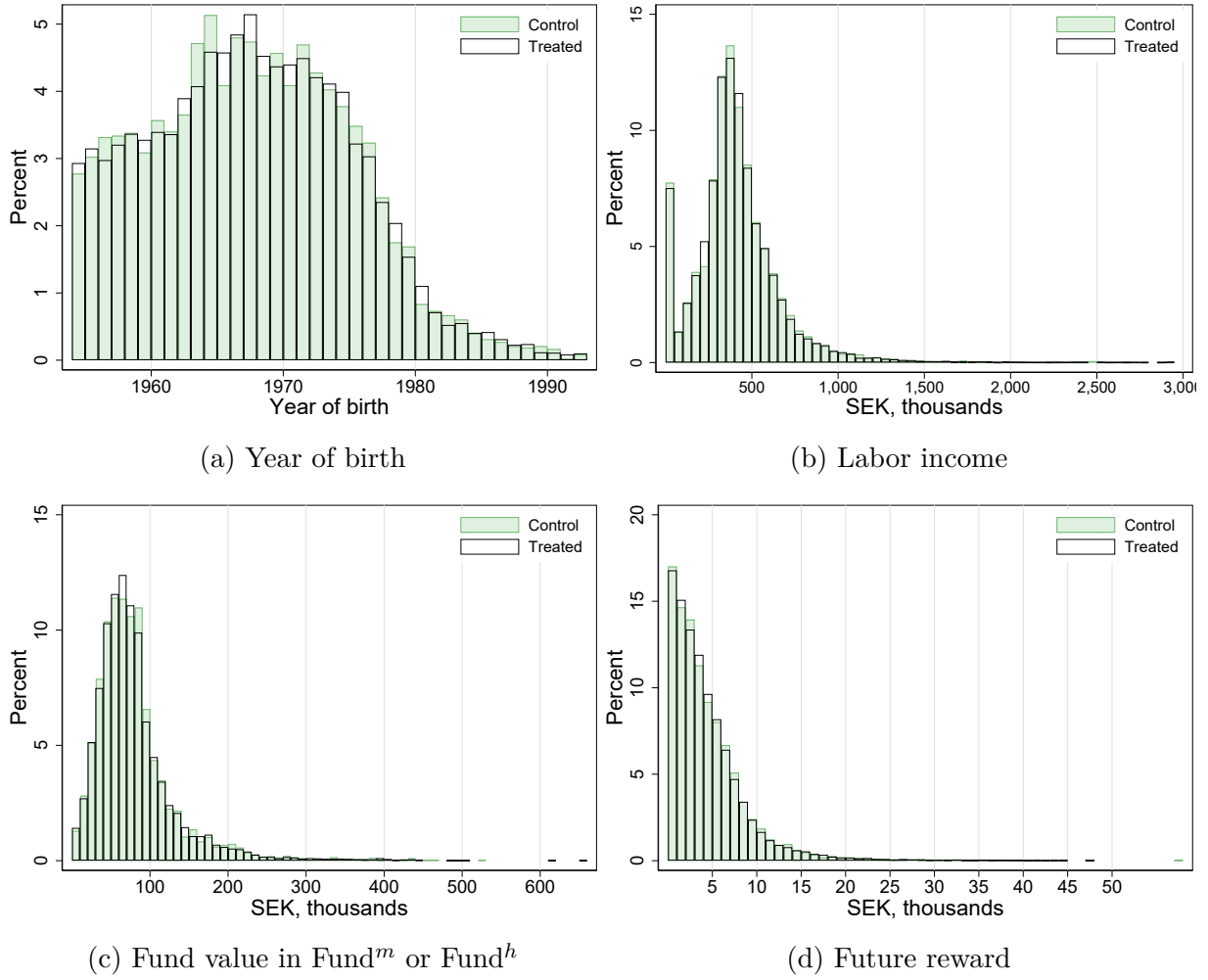


Figure B.4: Distributions for the control and the treatment groups

Note: Distributions of savers in the treatment groups vs the control group, over (a) Year of birth, (b) Labor income, (c) Fund value in the dominated fund, and (d) Expected future reward from switching funds, as defined in Appendix D. The data is retrieved from the Swedish Pensions Agency in June 2018 (Swedish Pensions Agency, 2019). 1 SEK was equal to 0.11 USD in July 2018.

B.4 Definitions of outcome variables

The outcome variables of interest include the following.

- $Y_{ik}^{switch} \in \{0, 1\}$, an indicator variable that equals one if the individual switches from the dominated to the dominating fund. We define a switch as a reduction in the chosen share of the Premium Pension portfolio invested in one of the dominated funds (Fund^m or Fund^h) and an increase in the chosen portfolio share invested in the dominating fund (Fund^l).

- $Y_{ik}^l \in \{0, 1\}$, an indicator variable that equals one if the individual increases their chosen portfolio share invested in the dominating fund, Fund^l .
- $Y_{ik}^{mh} \in \{0, 1\}$, an indicator variable that equals one if the individual decreases their chosen portfolio share invested in the dominated funds, Fund^m and Fund^h .
- $Y_{ik}^{any} \in \{0, 1\}$, an indicator variable that equals one if the individual makes any investment change to their Premium Pension portfolio.
- $Y_{iAI_a}^{search} \in \{0, 1\}$, an indicator variable that equals one if the individual completes the search task in treatment AI_a (we study both those who successfully complete the task, and those who complete the task but provide an answer that is incorrect).
- $Y_{ik}^{read} \in \{0, 1\}$, an indicator variable that equals one if the individual confirms reading a letter.

B.5 Framework – the investment choice

In the setting of this study, awareness refers to being aware of that there exists a dominating fund to the currently chosen fund. Our definition of search cost is the cost of finding the dominating fund from the choice set in the Premium Pension system. We refer to the effort of processing and potentially verifying the information in the treatments, making the fund choice, and executing the choice, as a decision cost that is separate from the search cost. The total adjustment cost is the sum of the search and decision costs.

To structure our thoughts, we consider the following framework of how the decision to switch from a dominated to a dominating fund is made. The choice depends on: individual i 's discount factor of the future reward that is realized t years into the future β_{it} ; the individual expectation of the future reward from immediately switching funds $E_i[R_{it}^{switch}]$; the size of any immediate search reward R_i^{search} ; the individual search cost associated with finding the dominating fund C_i^{search} ; and the individual decision cost of switching funds C_i^{dec} , which incorporates the cost of processing the information in the treatments, making the fund choice, and implementing the switch.² Furthermore, we assume that the choice to switch from the dominated to the dominating fund requires that an individual is aware of the fact that there exists a dominating fund to the currently chosen fund. We

²We provide the immediate search rewards R_i^{search} in the AI_a (Aware+Impl) treatment arm, where $a \in \{0, L, M, H\}$.

model this as a binary state captured by the indicator variable $I_i^{aware} \in \{0, 1\}$. Being aware does not necessarily imply that a person will switch funds, as some people may perceive the benefits to be too low as compared to the costs. The outcome variable that equals one if a person switches funds is described by

$$Y_i^{switch} = f(\beta_{it}, E_i[R_{it}^{switch}], R_i^{search}, C_i^{search}, C_i^{dec}, I_i^{aware}) + \varepsilon_i.$$

The function $f(\cdot)$ is weakly increasing in $\beta_{it}, E_i[R_{it}^{switch}], R_i^{search}, I_i^{aware}$, and weakly decreasing in C_i^{search}, C_i^{dec} . Whether or not to switch from the dominated to the dominating fund can be modeled with the following decision rule,

$$Y_i^{switch} = I_i^{aware} \times 1[Z_{it} > 0], \quad (\text{B.1})$$

where

$$Z_{it} = u(R_i^{search} - C_i^{search} - C_i^{dec}) + \beta_{it}u(E_i[R_{it}^{switch}]).$$

In our setting, reading treatment letter A (Aware) increases the probability of becoming aware that a dominating fund exists, i.e., $I_i^{aware} = 1$. The immediate rewards that we provide in treatment AI_a (Aware+Impl) control the level of immediate search rewards R_i^{search} . Providing the name of the dominating fund, in treatment AN and ANI, essentially removes the search cost of finding the dominating fund, C_i^{search} . Finally, the information about the expected monetary implication of a fund switch, in treatment AI and ANI, can lead to an update of the expected gain from switching, $E_i[R_{it}^{switch}]$.

B.6 Hypotheses

We are primarily interested in testing the following hypotheses.³ The hypotheses are described for the main outcome variable switch funds Y_{ik}^{switch} , but comparable hypotheses for the alternative outcome variables are also tested.

H1 Awareness

We test the null hypothesis that information about saving in a dominated fund does not

³Since treatments are randomized within strata, we condition on stratum dummies.

increase the probability of a fund switch. This is tested by comparing the probability of switching funds between treatment group A (Aware) and the Control group (no letter):⁴

$$H_0 : E[Y_{i,A}^*|S_{is}] - E[Y_{i,Control}^*|S_{is}] = 0, \quad (B.2)$$

$$H_1 : E[Y_{i,A}^*|S_{is}] - E[Y_{i,Control}^*|S_{is}] > 0.$$

H2 *Search costs*

We test the null hypothesis that reduced search costs, through information about the name of a dominating fund, do not increase the probability of a fund switch. This is tested by comparing the probability of switching funds between treatment groups AN (Aware+Name) and A (Aware), as well as between treatment groups ANI (Aware+Name+Impl) and AI₀ (Aware+Impl):

$$H_0 : E[Y_{i,AN}^*|S_{is}] - E[Y_{i,A}^*|S_{is}] = 0, \quad (B.3)$$

$$H_1 : E[Y_{i,AN}^*|S_{is}] - E[Y_{i,A}^*|S_{is}] > 0,$$

and

$$H_0 : E[Y_{i,ANI}^*|S_{is}] - E[Y_{i,AI_0}^*|S_{is}] = 0, \quad (B.4)$$

$$H_1 : E[Y_{i,ANI}^*|S_{is}] - E[Y_{i,AI_0}^*|S_{is}] > 0.$$

H3 *Monetary implication*

We test the null hypothesis that information about the expected future monetary implication of a fund switch does not increase the probability of a fund switch. This is tested by comparing the probability of switching funds between treatment groups AI₀ (Aware+Impl) and A (Aware), as well as between treatment groups ANI (Aware+Name+Impl) and AN (Aware+Name):

$$H_0 : E[Y_{i,AI_0}^*|S_{is}] - E[Y_{i,A}^*|S_{is}] = 0, \quad (B.5)$$

$$H_1 : E[Y_{i,AI_0}^*|S_{is}] - E[Y_{i,A}^*|S_{is}] > 0,$$

⁴Since the control group receives no letter, the treatment effect from the Aware letter also captures any potential effect from the saver being reminded of the current fund choice.

and

$$\begin{aligned} H_0 : E[Y_{i,ANI}^* | S_{is}] - E[Y_{i,AN}^* | S_{is}] &= 0, \\ H_1 : E[Y_{i,ANI}^* | S_{is}] - E[Y_{i,AN}^* | S_{is}] &> 0. \end{aligned} \tag{B.6}$$

C Information letter: Aware

All the treatment letters are available upon request and are also included in the Replication Package.



**Stockholms
universitet**

Information om studien

Det här brevet ingår i en akademisk studie som undersöker olika aspekter kring fondval. Syftet med studien är att ge ökad förståelse kring hur olika typer av information kan påverka fondval. Förhoppningen är att studien ska bidra till förbättrad information kring pensionsinvesteringar. Studien genomförs av forskare vid Stockholms universitet.

Personer som sparar sin premiepension i vissa utvalda fonder är med i denna studie. Vi som forskare använder pseudonymiserade uppgifter från Pensionsmyndigheten i vår analys. Eftersom uppgifterna är pseudonymiserade behandlar vi som forskare varken ditt personnummer, ditt namn eller din adress när vi analyserar uppgifterna. Dessa uppgifter används enbart för att administrera utskick. Uppgifterna som vi analyserar inkluderar fondval för premiepensionen, andel av premiepensionen som placeras i de utvalda fonderna, premiepensionssaldo i fonderna, datum då någon av fonderna valts, ålder, kön, civilstånd, inkomst samt bostadskommun. Den rättsliga grunden för behandling av personuppgifter är att forskning som bedrivs vid svenska lärosäten definieras som allmänt intresse. Vi behandlar din information så att obehöriga inte kan ta del av den. Studiens resultat kommer presenteras i en akademisk artikel. Resultaten och artikeln kommer inte att innehålla några personuppgifter. Den akademiska artikeln kommer att vara tillgänglig vid Stockholms universitet. Pseudonymiserade personuppgifter kopplade till studien bevaras hos forskarna tills vidare, dock i minst tio år efter det att forskningsresultatet är färdigställt, syfte att kunna göra fortsatta analyser samt för eventuell kontroll av studien.

Du har rätt att inge klagomål till tillsynsmyndigheten Datainspektionen/ Integritetsskyddsmyndigheten. Du har också enligt dataskyddsförordningen (EU 2016/679) rätt att i tillämpliga fall vända dig till Stockholms universitet och begära tillgång till personuppgifter som behandlas om dig och att begära rättelse eller radering av dessa personuppgifter i enlighet med artiklarna 15- 17. Du har rätt att begära begränsning av behandling av personuppgifter som rör dig (art 18) och att invända mot en sådan behandling (art 21). Du har även rätt att begära dataportabilitet i enlighet med artikel 20.

Du har härmed informerats om studien och har du frågor är du välkommen att kontakta oss.

Forskningshuvudman:	Stockholms universitet
Adress:	Universitetsvägen 10A
	SE-106 91 Stockholm
Tele:	08-16 20 00
Huvudansvarig forskare:	Per Petterson Lidborn
Personuppgiftsansvarig:	Stockholms universitet
Dataskyddsbud:	Benita Falenius
E-mail:	gdpr@su.se
Kontaktpersoner/forskare:	Karin Kinnerud och Louise Lorentzon
E-mail:	studie.pension@su.se

General information about the letter.

The information describes that the letter is part of an academic study, the data is analyzed anonymously, it is possible to withdraw from the study, and it contains the contact information of the researcher and relevant people at Stockholm University.

Figure C.1: Letter, page 1

Ditt personliga nummer: "Kodnummer"

Information om Ditt Premiepensionsval

Det här brevet ingår i en studie vid Stockholms universitet, där vi undersöker olika aspekter kring fondval.

Bland fonderna i Premiepensionsvalet finns det fonder som har samma placeringsinriktning, men som har olika höga avgifter. Du sparar per den 18 juni 2018 i indexfonden

"Fund_name".

Den är dock inte den billigaste indexfonden med den placeringsinriktningen. Den billigaste fonden, som följer ett index, med samma placeringsinriktning som din nuvarande fond, har en "Fee" % lägre avgift.^{1,2} På nästa sida följer instruktioner hur du kan hitta och byta till den billigaste fonden.

Vid frågor, e-maila oss forskare på studie.pension@su.se.

Information about the current fund choice and that there exists another fund with the same investment strategy, but with a lower fee.

Information about how to compare and choose funds.

Att välja fonder - Premiepensionen

Premiepensionen är den del av den allmänna pensionen där du själv har möjlighet att välja fonder. På Pensionsmyndighetens webbplats kan du jämföra fonder.

www.pensionsmyndigheten.se

Du kan till exempel rangordna fonder baserat på deras avgifter. För att hitta de fonder som likt den fond du har valt, placerar i svenska aktier, följ guiden nedan.

För att jämföra och byta fonder följ dessa steg:

1. Gå in på Pensionsmyndighetens webbplats:

www.pensionsmyndigheten.se

2. Klicka på Logga in i högra hörnet:

Logga in

3. Logga in på Mina sidor med ett av de fyra inloggningssätten. Se därefter informationsrutan om Din Premiepension längre ner på sidan.

Din premiepension

4. Klicka på Byt fonder och därefter Byta fonder:

Byt fonder

Byta fonder »

5. Klicka på Sök och välj fonder:

Sök och välj fonder »

¹ Med samma placeringsinriktning menar vi att dessa fonder uppger att de avser spegla utvecklingen av de 30 värdestämmande mest omsatta aktierna på Stockholmsbörsen.

² Om ett fondbolag i framtiden väljer att ändra sin avgift skickas det ut ett fondhändelsebrev till sparnarna i fonden antingen via post eller via digital brevlåda.

Figure C.2: Letter, page 2 and 3

6. Välj Fondtyp Aktiefonder, för att se fonder av samma typ som din nuvarande fond.

7. Välj kategorin Sverige och därefter Filtrera, för att se fonder i samma kategori som din nuvarande fond.

8. För att rangordna fonderna efter avgift, klicka på rubriken Fondavgift %.

9. För att göra ett fondval, klicka på Lägg till vid den fond du vill lägga till.

Du kan därefter välja hur stor del av din premiepension som du vill placera i fonden.

Övrig information

Vi hoppas att du vill läsa detta utskick, men det är frivilligt.

Information about that it is voluntary to read the letter.

Information about how to compare and choose funds.

The screenshot shows a fund selection interface. On the left, a sidebar contains filters for 'Miljö- och etiska fonder', 'Risknivå', and 'Fondtyp'. Under 'Fondtyp', 'Aktiefonder' is selected. Under 'Risknivå', 'Mycket låg risk' is selected. Under 'Miljö- och etiska fonder', 'M/E Fonder med miljö-etisk märkning' is selected. On the right, a list of funds is displayed with columns for 'Fond-nummer', 'Fond-namn', 'Fond-avgift %', 'Risk', '2018', '2017', and 'Drott 5 år'. Arrows indicate the steps: 6 points to 'Aktiefonder' in the sidebar, 7 points to 'Sverige' in the 'Visa kategorier' list, 8 points to the 'Fond-avgift %' column header, and 9 points to the 'Lägg till' button in the fund list.

Fond-nummer	Fond-namn	Fond-avgift %	Risk	2018	2017	Drott 5 år
734491	Avenza Zero - Fonden utan avgifter	0,00	13	1	8	10
465814	Handelsbanken Sverige OMXS30 Index	0,16	13	1	10	11
587337	Länsförsäkringar Sverige Indexnå MJE	0,16	13	1	10	11
212332	SPP Aktiefond Sverige MJE	0,16	13	1	11	12
719674	Swedbank Robur Access Sverige	0,16	-	1	10	-
706275	SPP Sverige Plus MJE	0,17	-	0	11	-
681783	AMP Aktiefond Sverige MJE	0,18	13	2	8	12
976828	Falkarm LO Sverige MJE	0,18	13	2	12	13
905265	Falkarm LO Västfonden MJE	0,18	13	1	12	13
292193	Skandia Sverige Engineering MJE	0,19	13	1	10	-
874903	Aktieparana Direktavkastning	0,20	-	-1	9	-
290072	Aktieparana Topp Sverige	0,20	13	1	7	10
789271	Swedbank Robur Sverigefond MEGA MJE	0,20	14	2	14	14
893396	Handelsbanken Sverige Index Criteria MJE	0,21	13	1	8	12
460303	Indecap Gusto Q30	0,21	-	3	-	-
577833	Önman Etik Index Sverige MJE	0,22	13	1	9	11
610410	Evt Sverige Aktiefond	0,25	13	0	8	-
916189	Handelsbanken Sverigefond MJE	0,27	13	4	8	12
838441	Catella Sverige Index	0,29	13	1	9	12
291806	Dahner & Gerge Aktiefond	0,30	13	2	10	15
585216	Monex Svenska Alder	0,30	13	2	8	13

Figure C.3: Letter, page 4 and 5

D Expected future rewards

In this section we describe the method and assumptions made to compute the expected future reward at age 65 from immediately switching funds. We calculate the expected difference in pension savings, between saving in one of the dominated funds and saving in the dominating fund. First, we forecast individual Premium Pension account balances at age 65 under the two scenarios. Second, we compute the difference between the two forecasts. To compute the forecasts, we use individual level data on: age, labor income, fund balance in the dominated fund, portfolio share in the fund, saving rate, as well as data on the Swedish Pensions Agency's administrative fee, fund fees, and fund returns.

The forecasts are based on the following assumptions, taken from the standard for Swedish pension forecasts where applicable. The frequency of timing is yearly.

Income

The yearly labor income for individual i , set at time t and paid at time $t + 1$, is denoted y_{it} . The real labor income growth is assumed to be zero and thus, $y_{it} = y_i \forall t$.

Fund balance

The individual Premium Pension fund balance in one of the dominated funds, at time t , is denoted k_{it} . k_{it} corresponds to the fund balance at the beginning of year t , when the contribution from the previous year has just been added to the account.

For the forecasts, we assume that the portfolio shares in the chosen funds for the Premium Pension are constant over time. We also assume that the current fund balance in the dominated fund corresponds to the share of the Premium Pension account allocated to that particular fund.⁵

⁵If the chosen funds have realized different net returns since the allocation choice was made, this assumption may be violated. However, this assumption only impacts when the cap of the administrative fee is reached, and how much of the administrative fee is paid from the considered fund, as discussed below. The administrative fee is small relative to expected fund returns and fund fees, and hence the impact of this assumption on the forecast is low.

Saving rate

The saving rate for the Premium Pension is a share s of labor income, up to an earnings cap y^{cap} . The saving rate and the cap are assumed to be constant for all future time periods. Thus, for individual i , at time t , the saving rate as a share of labor income is provided by

$$s_{it} = \min\{s, s \cdot y^{cap}/y_{it}\}.$$

Given the assumption of zero real labor income growth, the saving rate is constant over time for a given individual, i.e., $s_{it} = s_i \forall t$.

Administrative fee

The Swedish Pensions Agency's administrative fee is a share a of the total portfolio balance, up to an account balance cap AB^{cap} . The administrative fee is assumed to be constant for all future time periods. To compute if and for what time periods the administrative fee cap applies, we assume that the current share θ_i , of the Premium Pension account balance that is allocated to the dominated fund, remains the same in the future. In other words, we assume that the funds in the current portfolio have the same net return.⁶ Thus, for individual i , at the end of year t , the administrative fee, as a share of the fund balance in the fund considered, is given by

$$a_{it} = \min\left\{a, a \cdot \frac{\theta_i \cdot AB^{cap}}{k_{it}(1 + R)}\right\},$$

where R denotes the gross real rate of return of the fund.

Fund fees

The fund fee f is a yearly rate of the fund balance. We assume that the fund fees of the three funds are constant over time, $f \in \{f^h, f^m, f^l\}$.

⁶The assumption of constant portfolio shares only affects when the cap of the administrative fee is reached, and how much of the administrative fee is paid from savings in the considered fund.

Fund return

The expected gross real rate of return of the funds is denoted R , and is assumed to be constant over time. The expected net real rate of return of a fund in year t is given by the gross real rate of return minus the fund fee and the administrative fee expressed as a share of the fund balance, i.e., $r_{it} = R - f - a_{it}$.

D.1 The forecasts

The expected fund balance, q years into the future, at year t , is given by

$$k_{i,t+q}(f) = k_{i,t} \prod_{n=0}^{q-1} (1 + r_{i,t+n}(f)) + \sum_{j=0}^{q-1} \left[s_i \theta_i y_i \prod_{n=q-j}^{q-1} (1 + r_{i,t+n}(f)) \right]$$

where

$$\begin{aligned} \prod_{n=q}^{q-1} (1 + r_{i,t+n}(f)) &= 1 \\ \prod_{n=q-1}^{q-1} (1 + r_{i,t+n}(f)) &= (1 + r_{i,t+q-1}(f)) \\ r_{i,t}(f) &= R - f - a_{it} \\ f &\in \{f^h, f^m, f^l\}. \end{aligned}$$

The current ($t = 0$) expected difference in pension savings, q years into the future, based on fund fee differences, is

$$\begin{aligned} R_{iq}^{lh} &= k_{i,q}(f^l) - k_{i,q}(f^h), \\ R_{iq}^{lm} &= k_{i,q}(f^l) - k_{i,q}(f^m), \end{aligned}$$

where R_{iq}^{lh} and R_{iq}^{lm} denote the differences generated by the high and medium fees as compared to the low fee, respectively. These variables are what we refer to as R_{it}^{switch} , the future reward from switching, in the paper.

D.2 Data

The individual yearly labor income is from 2016, which is the most recent data available in 2018. The individual fund balance in a dominated fund is retrieved in June, 2018. All new contributions are allocated in accordance with the reported portfolio shares as of June 2018.

A saving rate of $s = 2.5\%$ is based on the saving rate in 2018 and is assumed to be constant in all future time periods. With the 2016 labor income data, the saving rate cap applies when earnings exceed $y^{cap} = 444,750$ SEK, based on

$$\begin{aligned} y^{cap} &= 7.5 \cdot \text{2016 income base amounts} \\ &= 7.5 \cdot 59,300 \text{ SEK} \\ &= 444,750 \text{ SEK.} \end{aligned}$$

The administrative fee in 2016 was $a = 0.11\%$ of the total portfolio balance, up to a fee cap of 120 SEK. Thus, the fee cap applies when the total portfolio balance exceeds $AB^{cap} = 120/0.0011 = 109,091$ SEK. For the yearly gross real rate of return of the funds, we use the Swedish Pensions Agency's assumption for stocks of $R = 2.7$ percent.⁷

The forecast is stated in constant 2018 SEK. Data on labor income and the Pensions Agency's administrative fee cap are from the end of 2016. The letters with the forecasts were sent in July, 2018. We adjust the data from 2016 for inflation, using the Consumer Price Index (CPI) in January 2017 and May 2018 (the most recent CPI level in July 5, 2018) (SCB, 2018). The inflation adjustment is given by

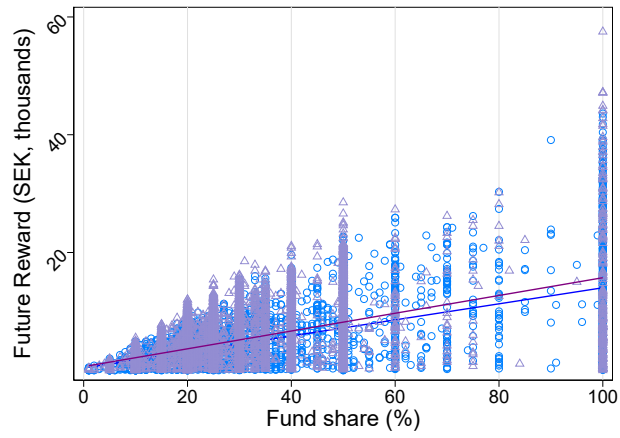
$$\pi_{adj} = \frac{I_{May}^{2018}}{I_{Jan}^{2017}} \approx 1.0325.$$

D.3 Descriptive statistics of expected future rewards

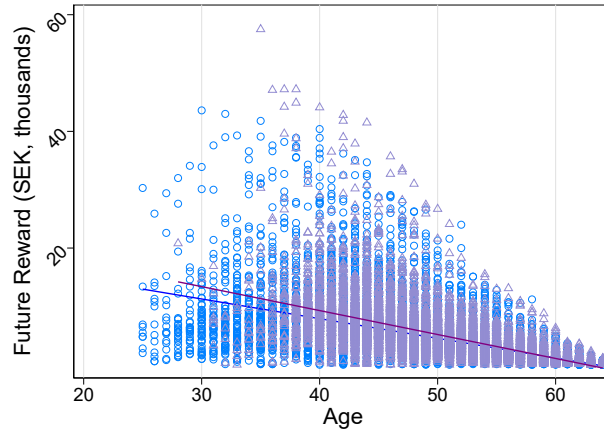
⁷The Swedish Pensions Agency's assumption of fund returns is $R = 2.1$ percent, but since the funds we consider only contain stocks, we use their specific assumption for stocks.



(a)



(b)



(c)

Figure D.1: Scatter plots of expected future rewards

Note: Scatter plots of the expected future reward at age 65 from immediately switching from the dominated to the dominating fund, over (a) labor income, (b) fund share allocated to the dominated fund, and (c) age. The data is retrieved from the Swedish Pensions Agency in June 2018 ([Swedish Pensions Agency, 2019](#)). Labor income is capped at 2 million SEK.

	Mean	Std. Dev.	Min	Max
Future reward, Fund ^m	4,362	4,474	0	43,600
Future reward, Fund ^h	4,562	4,353	0	57,500
Discounted future reward, Fund ^m	1,715	1,391	0	12,320
Discounted future reward, Fund ^h	1,916	1,426	0	14,133

Table D.1: Descriptive statistics of expected future rewards

Note: Expected future rewards for the savers in Fund^m and Fund^h. A discount rate of 5 percent is used to compute the discounted future rewards. The data is retrieved from the Swedish Pensions Agency in June 2018 ([Swedish Pensions Agency, 2019](#)). The values are in SEK. 1 SEK was equal to 0.11 USD in July 2018.

E Additional results

Unless otherwise stated, the data is retrieved from the Swedish Pensions Agency in October 2018 ([Swedish Pensions Agency, 2019](#)).

Reward comparison	Correct search		Switch	
	Coef. diff.	P-value	Coef. diff.	P-value
Low-Zero	0.011	0.05	0.012	0.04
Medium-Zero	0.012	0.03	-0.004	0.23
High-Zero	0.036	0.00	0.018	0.01

Table E.1: Coefficient differences - search rewards

Note: Considering only treatment AI_a (Aware+Impl). The table shows the differences in coefficients across reward levels, separately for the outcomes correctly completing the search task, and for switching funds. The p-values are from Wald tests, testing the equality of the coefficients.

Treatments	Outcomes			
	Switch	Increase L	Decrease M/H	Any change
Aware	0.019*** (0.002)	0.020*** (0.002)	0.038*** (0.004)	0.036*** (0.005)
+Impl	0.009*** (0.002)	0.009*** (0.002)	0.023*** (0.004)	0.021*** (0.005)
+Impl+Task Reward	0.018*** (0.003)	0.018*** (0.003)	0.033*** (0.005)	0.030*** (0.006)
+Name	0.031*** (0.003)	0.032*** (0.003)	0.049*** (0.004)	0.046*** (0.005)
+Name+Impl	0.029*** (0.003)	0.029*** (0.003)	0.040*** (0.004)	0.038*** (0.005)
Observations	22,728	22,728	22,728	22,728
R^2	0.011	0.011	0.012	0.010
Mean of control group	0.000	0.001	0.015	0.038

Table E.2: Treatment effects

Note: Regression coefficients γ_k from regression (1), separately for each outcome variable. Robust standard errors are in parentheses, and the corresponding p-values are denoted by: *** p<0.01, ** p<0.05, * p<0.1. P-values from randomization inference are < 0.000 in all regressions.

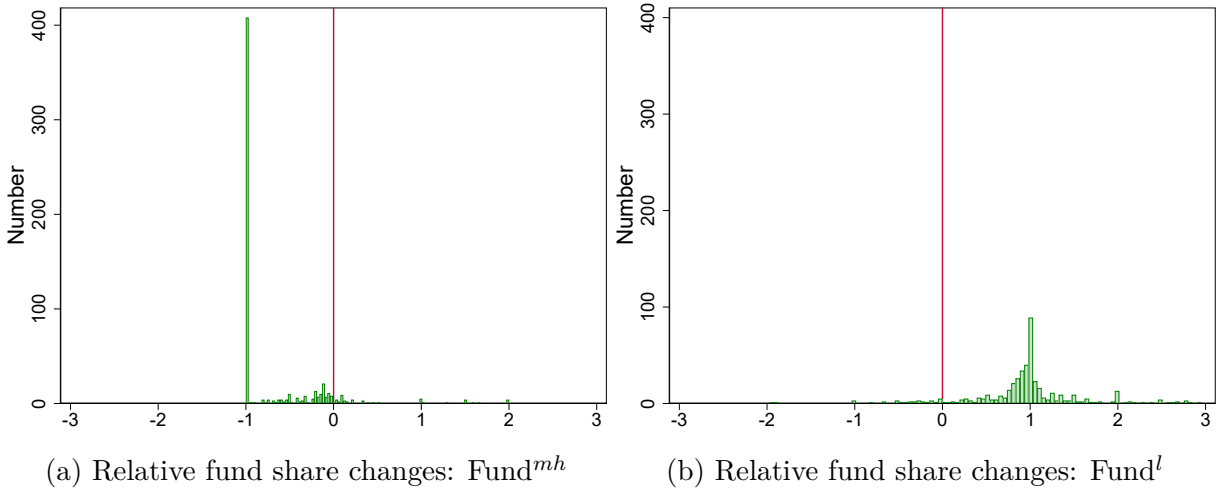


Figure E.1: Relative fund share changes

Note: Fund share changes relative to the initial share invested in Fund^m or Fund^h . The distributions show only those who made the relevant fund share change. For visual purposes, the x-axes are cut at -3 and +3.

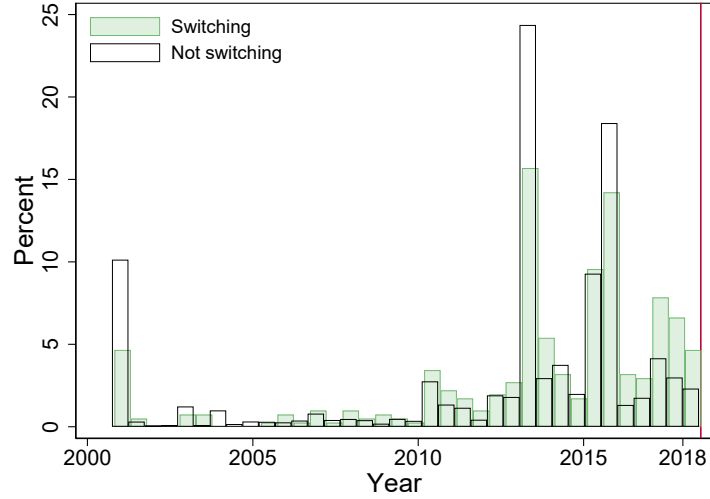


Figure E.2: Time of most recent investment change

Note: Distribution of the time of the most recent investment change for the treated sample, separated into those who switched funds and those who did not switch funds. The red vertical line shows the treatment date.

E.1 Heterogeneous treatment effects

Dominated choice and previous activity level

	Fund ^h	Fund ^m	Fund ^m not dom.
Labor income	410,290	431,907	392,081
Year of birth	1966	1968	1966
Female	0.48	0.43	0.48
Married	0.53	0.55	0.54
Fund value	77,220	76,618	100,760
Fund share	0.26	0.28	0.35
Future reward	4,562	4,202	4,881
Years since fund change	4.3	4.5	17.1

Table E.3: Characteristics of savers – dominated choice

Note: Mean values of pre-treatment characteristics of savers in Fund^h, Fund^m if the fund was chosen after Fund^l was introduced, and Fund^m if it was chosen before Fund^l was available. Fund value refers to Premium Pension savings in Fund^m or Fund^h, and Fund share is the Premium Pension portfolio share allocated to Fund^m or Fund^h. Future reward refers to the expected future reward from switching funds to the dominating fund. Years since fund change refers to the time since the most recent change of the Premium Pension portfolio. The variables Labor income, Fund value, and Future reward are in SEK. 1 SEK was equal to 0.11 USD in July 2018.

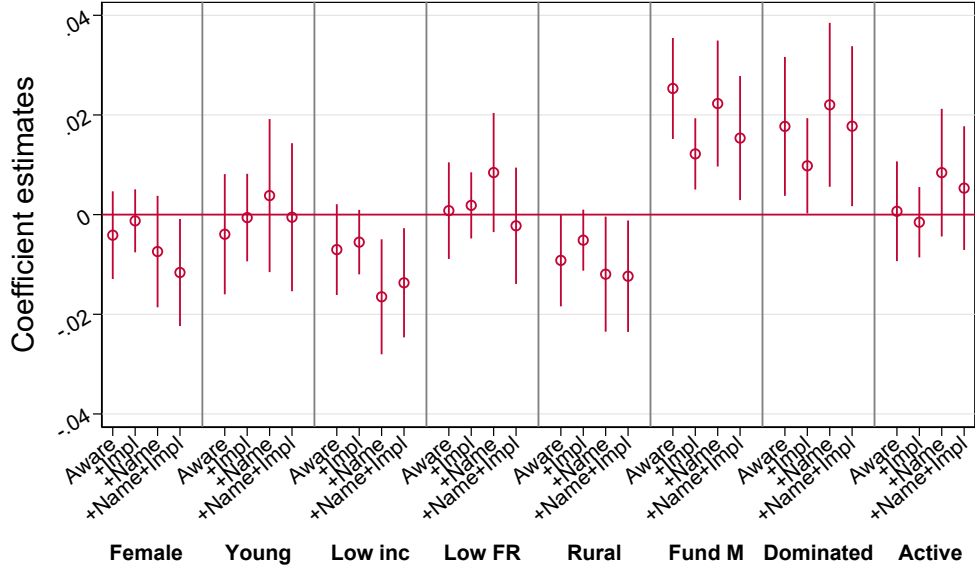


Figure E.3: Heterogeneous treatment effects

Note: Heterogeneous treatment effects across gender, age, labor income, expected future reward from a switch, residential region, fund, if the fund choice what dominated at the time of the choice, and time since last investment choice. Age, labor income, expected future reward, and time since last choice are each separated into two quantiles; gender is divided into male and female, residential region is divided into urban and rural, Fund^m is shown relative to Fund^h, and dominated is relative to those who chose Fund^m before Fund^l was introduced. The coefficient estimates show the relative differences in treatment effects to the other partition of the sample. The outcome variable is the indicator variable for switching from the dominated to the dominating fund Y^{switch} . The 95 percent confidence intervals are depicted around the coefficient estimates.

Year of birth

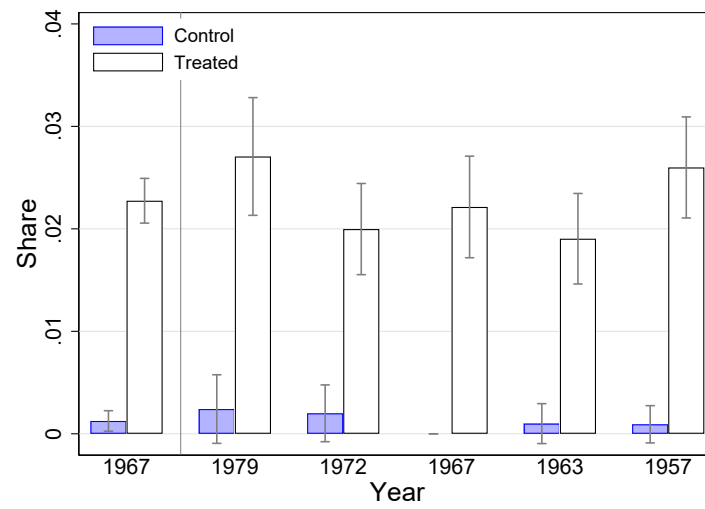


Figure E.4: Heterogeneous treatment effect across year of birth

Note: Shares of people switching funds, by year of birth quintile, separate for the control group and all treatment groups combined. The mean year of birth in each quintile is shown below the corresponding bars. The left most bars show the averages for all.

Expected future reward from switching

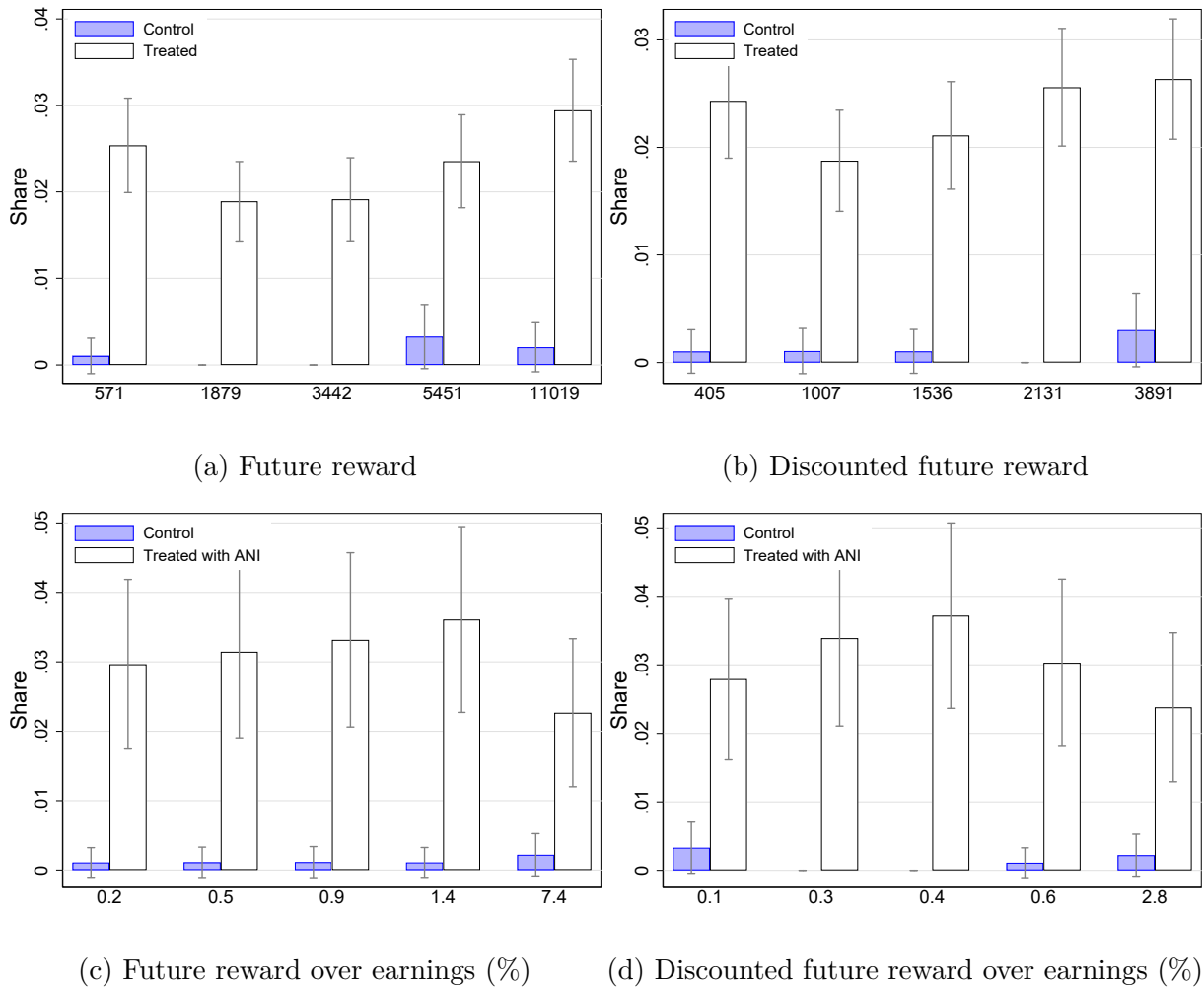


Figure E.5: Heterogeneous treatment effects across future rewards

Note: Shares who switch from the dominated to the dominating fund, across quintiles of (a) expected future reward, in SEK, (b) discounted expected future reward, in SEK, (c) expected future reward relative to labor income, in percent, and (d) discounted expected future reward relative to labor income, in percent. 1 SEK was equal to 0.11 USD in July 2018. The vertical lines indicate the 95 percent confidence intervals. The numbers under the bars denote the mean of the quintile. Figure (a) and (b) include all treatment groups relative to the control. Figure (c) and (d) include only treatment ANI relative to the control.

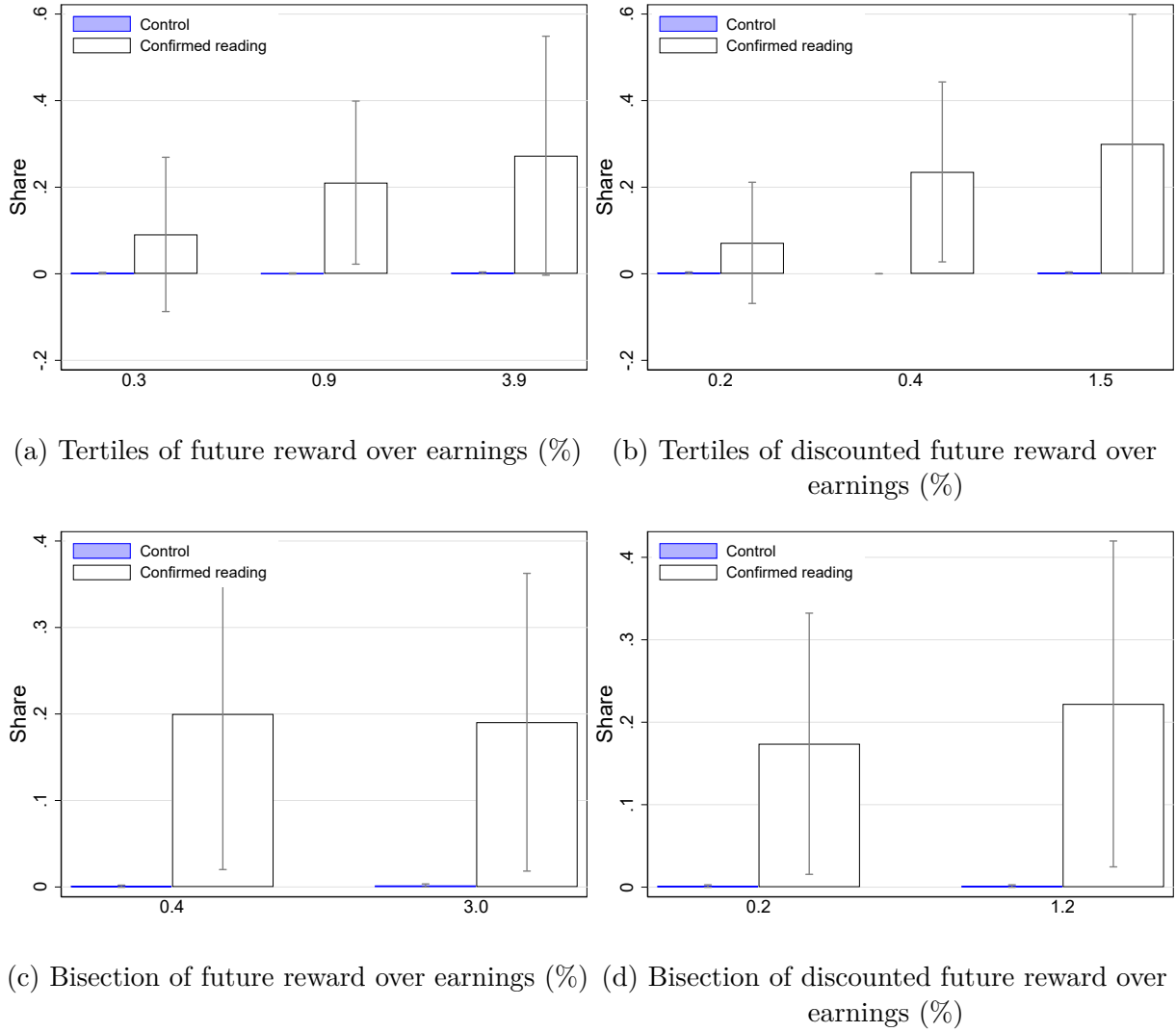


Figure E.6: Heterogeneous treatment effects among those who confirmed reading a letter
Note: Shares who switch from the dominated to the dominating fund, across (a) tertiles of expected future reward relative to labor income, in percent, (b) tertiles of discounted expected future reward relative to labor income, in percent, (c) expected future reward relative to labor income, split by the median, in percent, and (d) discounted expected future reward relative to labor income, split by the median, in percent. The vertical lines indicate the 95 percent confidence intervals. The numbers under the bars denote the mean of the group.

E.2 Additional analyses and results

Does search uncertainty matter?

A saver that attempts to find a dominating fund may feel uncertain regarding whether he or she has actually found it. A fear of future regret could then contribute to a reluctance to switch funds. A randomly chosen subset of the savers that received treatment letter A

(Aware) were also given the opportunity to verify that they had successfully identified the dominating fund. This subset consisted of 1,992 savers, (none of which were given the reading task). The treatment letters, denoted A-certain, included a one-attempt offer to verify the name of the dominating fund of the selected investment strategy, at the project website. Figure E.8 provides screen shots of the project website, where the savers are first asked to fill out the number of the letter that they received and then the name of the fund.

By comparing treatment Aware (here including only those who did not receive the additional offer to verify the fund name) and Aware-certain, we test whether the uncertainty with respect to having found the dominating fund matters for the likelihood to switch funds. Our results indicate that the additional benefit to verify the fund name does not increase the response rate to the treatment. Instead, we see significantly smaller treatment effects when the option to verify the name of the dominating fund is given (Figure E.7 and Table E.4). Hence, uncertainty with respect to having found the dominating fund does not appear to contribute to a reluctance to switch funds. These results provide indicative support for the information overload hypothesis in, e.g., Agnew and Szykman (2005). Another reason for the smaller effects may be that the opportunity to verify the dominating fund signals that finding it may be difficult.

	Aware	Aware-certain	P-values
Switch	0.024	0.014	0.032
Increase L	0.025	0.015	0.038
Decrease M/H	0.045	0.030	0.049
Any change	0.043	0.029	0.093

Table E.4: Treatment effects - uncertainty

Note: Treatment effects for Aware and Aware-certain. The p-values are from Wald tests of the coefficient equality between the treatment groups Aware and Aware-certain.

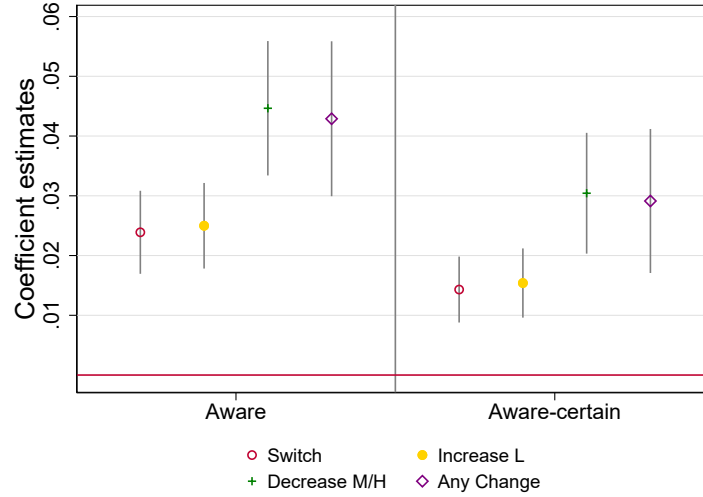


Figure E.7: Treatment effects - uncertainty

Note: Regression coefficients γ_k from regression (1), with $*$ $\in \{switch, l, mh, any\}$, reporting $k \in \{A, A\text{-certain}\}$, where A only includes those that were not given the offer to verify the fund name. The control group is the reference and has a mean of 0.000, 0.001, 0.015, and 0.038, for the respective outcome variables. The markers show the point estimates and the lines indicate the 95 percent confidence intervals.



Figure E.8: Screenshots of the project website

Note: (a) Please fill out the number that is printed in the top-right corner of your letter. (b) Please fill out the fund number of the fund we asked about. (c) Unfortunately, incorrect answer. Thank you for participating! (d) Correct answer! You have found the cheapest fund that follows this index.

How costly is the fund switch?

We are also interested in how costly people perceive a pension investment decision to be. Here we consider adjustment costs in a broad sense, where these include not only search costs but also costs of processing and verifying the information in the treatments, making a decision, and implementing the fund choice. Hence, these adjustment costs do not necessarily correspond to switching costs in the conventional sense, since they may also capture other reasons for inertia in investments such as behavioral biases.

We estimate a cumulative distribution of the adjustment costs for switching to the dominating fund. To estimate this distribution, we make use of how the probability of switching funds varies with different immediate and discounted expected future rewards. For people who complete the search task and switch funds, we assume that the utility from the total present value of the rewards (the immediate search reward and the discounted expected future reward from switching) exceeds the disutility of switching funds.⁸ Thus, for a given present value of the sum of the immediate and expected future reward, the estimated share of people switching funds provides an estimate for the share of people with adjustment costs smaller than this amount.

In Figure E.9a we see that only 18 percent of people are estimated to have adjustment costs smaller than 13,300 SEK (1,463 USD). The figure presents the shares of savers switching from the dominated to the dominating fund over deciles of the present values of rewards. The figure displays the findings for treatment group AI (Aware+Impl), where immediate search rewards are varied. The shares are presented both in terms of the fraction of switches among those who were sent a letter, and scaled by the reading-confirmation share. We note that more than 80 percent of the savers find it more costly than 13,300 SEK to search and switch to the dominating fund, as indicated by the rightmost bar with the scaled share. In Figure E.9b we see that the variation in immediate rewards generates most of the differences in shares of switchers. As discussed in Section IV, there is little variation in switch behavior across levels of discounted future rewards.

⁸Since the expected future reward is stated in the AI_a (Aware+Impl) letters, we find it reasonable to assume that the individual expectation of the future reward is equal to this amount, i.e., $E_i[R_{it}^{switch}] = R_{it}^{switch}$.

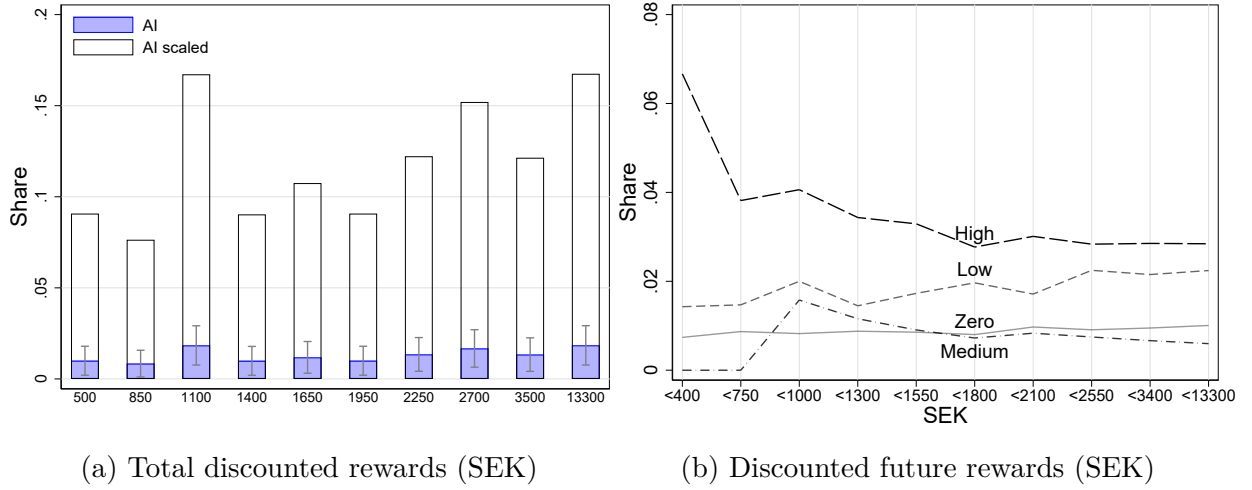


Figure E.9: Shares of people switching funds across discounted rewards

Note: (a) The share of people who switch funds, across deciles of total discounted rewards from switching (immediate and discounted expected future rewards), for treatment AI (Aware+Impl). The taller bars are scaled by the share who confirmed reading (0.11). The highest value of the total discounted reward of each decile is depicted under each bar. The vertical lines indicate the 95 percent confidence intervals. (b) The share of people who switch funds, among savers with less than the indicated discounted expected future rewards on the x-axis (not including the immediate rewards). The shares are depicted separately for groups with different immediate rewards from switching, for treatment AI (Aware+Impl), and are not scaled by the share who confirmed reading. The numbers on the x-axis show the highest discounted future reward from switching in each decile of the sample. 1 SEK was equal to 0.11 USD in July 2018.

Duration of treatment effects

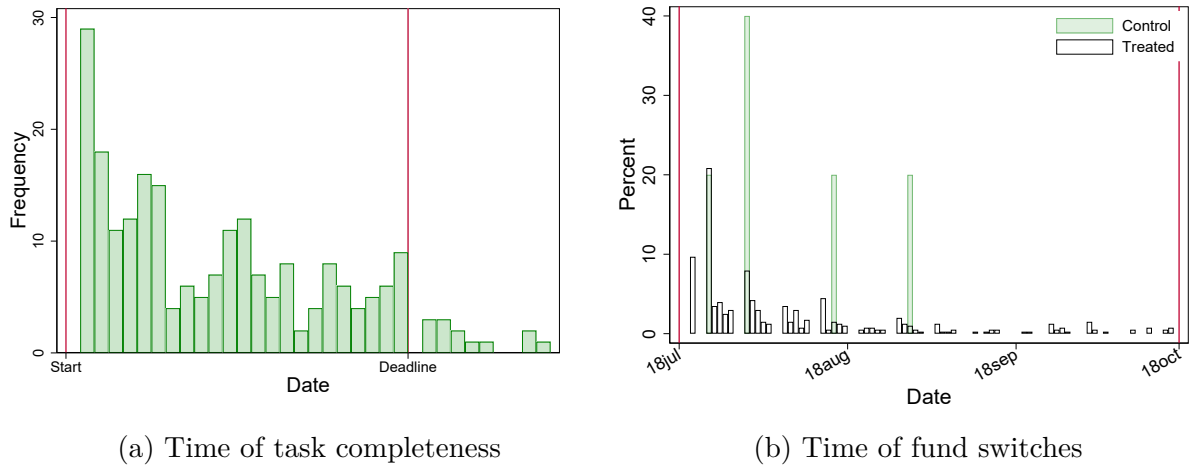


Figure E.10: Time of choices

Note: (a) Distribution of the time when the search task, the reading confirmation, or the verification of the dominating fund name, was performed, for the people who completed these tasks. The vertical red lines indicate the treatment date and the deadline for these tasks. The time from the start to the deadline was 22 days. (b) Distribution of the time of fund switches, following the treatment, shown separately for the control group and all treatment groups combined. The vertical red lines indicate the treatment date and the date when we collected the data, respectively. Fund changes made during weekends are registered on the following weekday.

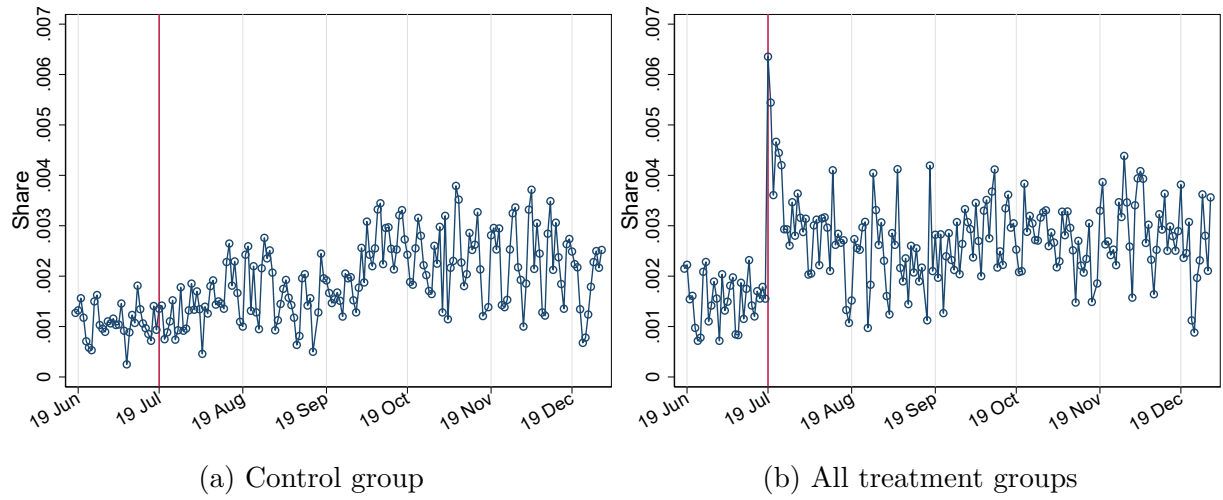


Figure E.11: Logins at the Premium Pension website

Note: Shares of savers that each day log in to their account at the Pensions Agency's website, over time. The vertical red line indicates the treatment date. The data is retrieved from the Swedish Pensions Agency in January 2019 ([Swedish Pensions Agency, 2019](#)).

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