

Default as advice?

A survey experiment on preselecting pension choices and the Endorsement effect

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Abstract

One of the most prominent aspects of choice architecture is the selection of a default option, for instance by preselecting an option in an online form. To understand what is driving the effect of a preselection nudge, we conducted an online experiment in the (Dutch) pension context (N=1.076). Respondents made hypothetical decisions regarding their pension funds' sustainable investment and interest risk policies. Preselecting an option had large effects on what respondents chose (19-28 percentage-points from a 45% to 50% baseline). The same preselection nudge without an implicit advice-component still had substantial effects (11-22 percentage points). The preselection nudge without the implicit advice-component was always less potent compared to the regular preselection nudge, but this difference was not statistically significant. This indicates that the effect of the preselection nudge in this survey experiment is driven, at least in part, by people's tendency to follow the path of least resistance. The effects of a preselection nudge seemed more pronounced for respondents scoring low on financial literacy. In designing choice environments in the Dutch pension system, providers should incorporate behavioral insights on the effects of defaults and other nudges, as well as on the mechanisms driving these effects.

Introduction

Small, seemingly inconsequential changes in how a choice is presented can have an impact on what people end up choosing. One of the most prominent aspects of choice architecture is the default option; the option that is selected for people who do not make an active choice. A famous example of the impact of default selection comes from the context of organ donation. Johnson and Goldstein (2003) show that the percentage of citizens who are registered as a potential organ donor is much higher in countries with an opt-out regime, where being an organ donor is the default, than in countries with an opt-in regime, where not being an organ donor is the default.

Preselecting an option, for instance in an online form, can be seen as a type of default. If the chooser accepts what is already selected, she does not have to take any action to implement that choice other than submitting the form. No action implies agreement with the choice already selected by the choice architect (i.e. the person or institution asking the question).

Policymakers who are mindful of the design features of a choice environment can use this as a policy tool and gently nudge people towards choosing specific options (Thaler & Sunstein, 2009). For instance, changing the default option has been used to increase enrollment into retirement plans (Madrian & Shea, 2001, Beshears et al., 2009), green energy contracts (Ebeling & Lotz, 2005; Pichert & Katsikopoulos, 2008), dynamic energy tariffs (Nicolson et al., 2018), influenza vaccination (Chapman et al., 2010), and HIV screening (Yudin et al., 2007). A change in the default option can also be employed to the potential disadvantage or dislike of decision-makers, such as when an online retailer preselects enrollment into a newsletter for a customer during the checkout process.

Previous research on the effects of nudging in the Dutch pension context has shown a large effect of simply preselecting a radio button on an online form (De Bresser & Knoef, 2020; Zijlstra et al., 2020). The designation of a default significantly steered people to keep the current situation; preselecting increased the share of people who chose not to change their monthly pension contribution rate with 6

to 13 percentage points, from a baseline of 59%. Nudging people by preselecting a change in contribution rate, either towards an increase or a decrease in contributions, had an even stronger effect; preselecting led to 22 percentage points increase in the share of people selecting a change in contribution rate (from a baseline of 4% for the decrease, and 10% for the increase in contribution). This paper builds on that research in preselection nudges, to disentangle different potential mechanisms (such as implicit advice), and to apply preselection nudges to different choices in the pension domain.

Individual and collective choices in the Dutch pension system

One goal of the ongoing reforms of the Dutch pension system is to open doors towards more individual freedom of choice, also within mandatory second-pillar pension schemes. In the outline for the design of the renewed pension system, the Dutch Ministry of Social Affairs states that more choice will make pensions more personal and more robust (SZW, 2019). The current second-pillar pension system in the Netherlands already allows for some individual choice, mainly concentrated around retirement age. For instance, plan participants can adjust their retirement age, can opt for a so-called high-low pay-out profile, or can trade off the accrued survivor's pension for a higher old-age pension. The choice for a (partial) lump-sum payout at retirement is now being incorporated in legislation.

In addition to these individual choices, most second-pillar plans have collective elements, which allow for the possibility to offer collective choices. Ultimately, it is up to the board of trustees to make balanced choices, balancing interests of all type of plan participants. A recent paper by Bauer et al. (2020) shows that pension fund boards with relatively older trustees allocate less to equity than boards with on average younger trustees. Ideally, the characteristics and preferences of the participants should constitute the major factors to base pension fund policies on, not the composition of the board of trustees. For these collective choices, a pension fund can ask plan participants to indicate their preference and then translate preferences into a collective investment policy. In the current experiment, we present respondents with hypothetical versions of such collective choices. Respondents state their preferences regarding sustainable investments or risk hedging. These individual preferences can be inputs for the collective investment policy of a fund regarding these topics.

From a traditional economic viewpoint, introducing more freedom of choice will contribute to welfare gains, by allowing people to tailor a pension plan to their preferences (Van Ewijk et al., 2017). In the case of collective choices, this freedom manifests itself for participants as the ability to steer the pension fund in their preferred direction. However, behavioral research has shown that choosing the optimal pension plan (or indicating a preference for a collective choice) is not easy; people are not always able to reap the benefits of an increase in choice (e.g., Beshears et al., 2018; Chernev et al., 2015).

Financial supervision

With these insights in mind, the Dutch conduct authority AFM formulated a vision on the new pension reforms: choices where possible, obligations where sensible (AFM, 2015). Empirical work has been carried out since to shed more light on this question (AFM, 2018; Zijlstra et al., 2020) and this current research fits in that line of research. In further developing her vision, the AFM is vigilant that not too many different choices are stacked on top of each other. Combined effects of choices might lead to

substantial lower pensions and many different choices may also lead to more confusion. Limiting the total number of active choices by participants would probably be wise. This research contributes by adding empirical evidence to help policy-makers make the right choices about choice.

Furthermore, the AFM is the supervisor for pension communications. Communication must be correct, clear and balanced. The pension provider must offer personal information that relates to the needs and characteristics of the plan participant (Article 48 Dutch Pension law). Guidance in choices for participants is an important issue in the supervisory strategy for the AFM working towards a reformed Dutch pension system.

The Dutch Central Bank, De Nederlandsche Bank (DNB), is the prudential supervisor for pension funds and their investments. In 2018, DNB issued a letter to the pension sector outlining success factors for implementing sustainable investing. A key recommendation was to ensure support and commitment. Engaging pension plan participants by asking their opinions is one possible way to do that. Querying participants in a valid manner also may help in aligning investment strategies to the participant population.

Understanding the preselection nudge: Endorsement, Ease, and Endowment

The effect of the default option on choice may seem simple and straightforward, but explaining why the effect occurs has proven to be surprisingly challenging. Past research has suggested that multiple psychological mechanisms may drive the default effect, which have been partitioned into three components: Endorsement, Ease, and Endowment (Dinner et al., 2011; Jachimowicz, 2019);

- *Endorsement*: When people are uncertain about what to choose, they may distill information from cues in the choice environment. They may believe that the selected default reflects an implicit Endorsement from the choice architect.
- *Ease*: Choosing the default typically requires less (mental) effort than choosing an alternative. Because people tend to follow the path of least resistance, they often end up with the default.
- *Endowment*: When making judgments and decisions, people tend to be reference dependent and loss averse. They evaluate potential outcomes relative to a reference point and give more weight to losses than to gains. People may take the default or preselected option as a reference point in their decision process. This combination of reference dependent reasoning and loss aversion may make people more likely to stick with the default option.

In order to responsibly employ behavioral insights in practice, it is important that we understand what is driving the effect of preselecting in the pension context. Knowing whether preselecting works because people follow the path of least resistance (i.e., Ease), or whether Endorsement and Endowment also play a role, can help choice architects to implement effective changes in the choice environment. In the current study, we focus on disentangling the Endorsement mechanism from the other mechanisms that are potentially underlying the effect of preselecting on pension choices.

We suspect that for pension choices, the effect of preselecting is in part driven by perceived Endorsement. Many people are unfamiliar with how pensions actually work and do not have a clear preference when asked to make a decision. In situations like these, where people have no clear preference, they may look for cues that help them come to a decision (Krijnen et al., 2017). These cues can be explicit, for instance when a friend or a colleague recommends you to increase your pension

contributions. However, these cues can also be implicit, when people draw inferences from the context about the preferences or recommendations of the choice architect. People may thus stick with a preselected option in part because they interpret this aspect of the choice environment as implicit advice.

Examples of how the choice environment implicitly conveys, or leaks, information also come from other settings. Lieberman et al. (2019) find that surcharges on plastic bags in grocery stores are in part effective because they implicitly convey social norms regarding plastic bag usage. McKenzie and Nelson (2003) show that the framing of logically equivalent messages reliably conveys implicit information regarding a speaker's reference point, and that listeners are sensitive to this information. Related to this, Gigerenzer (2014) writes: "[A] doctor's choice between logically equivalent frames can communicate unspoken information, including recommendations. A survival frame ["90% will survive"] communicates that the surgery is preferable to no surgery (or an alternative treatment); a mortality frame ["10% will die"] communicates the opposite message. Logically equivalent messages are not necessarily psychologically equivalent".

In this experiment we set out to isolate the potential effect of implicit Endorsement in preselecting choices. We do this by explicitly labeling the preselected option as randomly allocated for certain experimental groups. With this manipulation, we intend to remove the possibility that respondents interpret the preselected option as implicit advice. We then examine the size of the preselecting effect – that is, the extent to which people are more likely to select an option when it is preselected – in the different experimental conditions. If we find that the preselecting effect is smaller in the groups where it is stated that preselecting was done at random, we can conclude that Endorsement is at least in part driving the effect. If we find that there is a significant preselecting effect even in the groups where it is stated that preselecting was done at random, we can conclude that other mechanisms (i.e., Ease and Endowment) play a role as well.

Preference strength might be a modifier for the effectiveness of preselecting. To examine this in this experiment, we include a choice for which we expect people to have a strong preference (sustainability) and a choice for which we expect people to not have a strong preference (interest risk for a pension fund). 'Preference strength' is one additional variable that was not included in Jachimowicz' (2019) meta-study on default-effects due to a lack of available data. We hope to shed light on their hypothesis that defaults may be less likely to influence those who have strong preferences.

Contribution & Hypotheses

This research contributes in several ways to the academic literature and policy debates. We show:

- To what extent the effect of preselecting an option is due to perceived implicit advice of the choice architect.
- The power of choice architecture in general, and preselecting more specifically, within a Dutch pension context
- Preferences for sustainable investments in a pension context, and the effects of a default on a choice for sustainability, compared to a more financially related choice

The main hypotheses as described in our pre-registration are:

- Hypothesis 1a: The preselected option will be chosen significantly more often, compared to an identical choice where no option is preselected.
- Hypothesis 1b: The effect of preselecting will be more pronounced for the experimental groups without the added phrase “the preselected option was randomly allocated” compared to the groups with this statement.
- Hypothesis 2: The effect of preselecting is stronger in the direction of change (choice for more sustainable investing or more interest risk-hedging) than in the direction of the current situation (keep everything as is).
- Hypothesis 3: The effect of preselecting is stronger for the interest risk-example than in the sustainability example (because people have stronger (less malleable) preferences for sustainability than for interest risk).

Hypothesis 1 is based on the meta-analysis by Jachimowicz et al. (2019) that finds large effects of defaults (hypothesis 1a) and identifies three driving mechanisms, including Endorsement. Assuming our experimental set-up is successful to disentangle different drivers, we can test hypothesis 1b. Hypothesis 2 is strongly influenced by our earlier work (De Bresser & Knoef, 2019; Zijlstra et al., 2020) where we observe larger effects towards change compared to defaults that nudge to keep the current situation. This hypothesis was mainly empirically driven based on previous research.

To foreshadow our results, we see large effects of preselecting nudges in our experiment (confirm Hypothesis 1a). Teasing out the advice-component diminishes the effects but not to a statistically significant lesser effect than the default that includes both Ease and Endorsement (reject hypothesis 1b). Effects were similar in the change and direction (reject Hypothesis 2), and for choices on sustainability and interest risk (reject Hypothesis 3).

In our pre-registration, we also formulated subsidiary hypotheses. For instance, one could expect different (sizes of) effects for people who are less knowledgeable and who might be more prone to be persuaded by the choice architect. If interest is a proxy for knowledge, you would expect younger respondents to be more persuadable by nudging than older people for whom retirement is more salient. Furthermore, women tend to score lower for financial literacy, suggesting they might be more easily swayed by nudges than men (Bucher-Koenen et al., 2017, 2021). Knoef et al. (2020) find that basic knowledge about the Dutch pension system is similar for men and women. However, women are less confident about their knowledge. We will present and discuss some differences in our results based on gender, age, and financial literacy.

Method

We used a between-subject design, where we presented each respondent with two choices in the pension context. The first choice is about whether to invest more in sustainable investments: “The pension fund asks its participants what to do: continue the current investment strategy or invest more in sustainable investments?”. The second choice is about whether the pension fund should increase their interest-risk hedge (“The pension fund asks its participants what to do: continue the current risk strategy or cover more interest risk?”). The order of choices is randomized, with half of respondents first making a choice about sustainable investment and half of respondents first making a choice about interest-risk. All choices were hypothetical in the sense that they had no influence on the actual investment and interest-risk strategy of a respondent’s pension fund. Respondents did not receive any feedback on their choice after making it.

For each choice, the option to keep the fund’s strategy as it is (which we label as “Keep” from now on), was listed first. The option to change the fund’s strategy, either towards more sustainable investments or more interest-risk hedging (which we label as “Change” from now on) was listed second (see Appendix B for screen shots and Appendix C for questionnaire).

We did not randomize the order of the two options. In our scenario, “Change” was always towards more sustainable investment (or more interest risk coverage). Theoretically, choices might be different between the case where the current status is to invest more sustainable, and the case where choosing to change entails a less sustainable investment strategy. Bauer et al. (2019) did employ a design where some respondents could choose for more sustainable investment and some for less sustainable investment. They found that framing or differences in the initial situation did not affect the choice for more sustainable investments. This finding, combined with practical considerations within this experiment and how we expect pension providers will frame this decision in the real world, led us to only test the change towards more sustainable investment.

For each respondent, one of the two choices will feature a preselected option (i.e., one of the two radio buttons is already selected). The other choice will not feature a preselected option (i.e., respondents make an active choice between the two options). When a choice is preselected, this will also be randomly in either the direction of no change (keep current status) or in the direction of a change. Half of the preselect-respondents also saw an extra sentence, stating that the preselected option was randomly allocated (denoted by ® in figure 1). This extra sentence will enable us to identify the Endorsement component of the default effect, because we have taken the Endorsement-part out of it by explicitly stating that the preselected option is not an advice.

Background variables like age, sex and education were available for all respondents. We also measured financial literacy using three standard questions (Lusardi & Mitchell, 2011). The sum of correct answers will be an index for financial literacy. The time respondents took in reading and answering questions is also recorded.

The research design and hypotheses were pre-registered prior to start of the data collection, at the Open Science Foundation, <https://osf.io/jnqrs/>.

Statistics

For the statistical analyses, we created dummy variables for whether the preselected option was in the direction of change or in the direction of the current status, and also whether or not it was explicitly stated that the preselected option was randomly allocated.

We used linear mixed-effects models. A linear model is preferred because results are easier to interpret and compare to descriptive statistics and figures (Gomila, 2020). This is also possible because we have very few aggregates near 0% or 100%. Furthermore, logistic models yield qualitatively similar results and do not lead to different conclusions. Appendix D contains the results of Logistic Mixed-Effects Models. In all mixed-effects models we treat the independent variable “respondent” as a random factor (Judd et al., 2012), thereby controlling for the possible association between choices that a single individuals makes. All other independent variables were treated as fixed factors. We chi-

square tested to compare if effects of certain experimental groups with preselecting were more or less pronounced than effects of other experimental groups.

Data

The online questionnaire was completed by 1,076 respondents (N=1,900 invited, 57% response rate). Respondents were part of the GfK consumer panel and field work was done by Ipsos. The average age of our sample was 48.9 ($SD=16.3$); 26% was between 18 and 34 years old, 26% between 35 and 49 years old, 28% between 50 and 64 years old, and 20% was 65 years old or older. Half our sample (51%) was female. Education levels: 17.8% low (lbo, vmbo, mavo or below), 39.4% intermediate (havo/vwo/mbo) and 42.8% high (college-educated; hbo+ in Dutch parlance).

Responses were collected between March 25th and April 8th, 2020. The questions were part of a larger survey. Average completion time for the full survey was around 10 minutes, and 59% used a desktop computer, 9% a tablet and 32% a mobile phone to complete the survey. Respondents were paid a fixed amount for their participation.

Patterns in response times suggest that respondents took the choices seriously and answered diligently, even though choices were hypothetical and not incentivized. We also do not observe a decline in the second round, which would imply no respondent fatigue or less faithful answers to the repeated, similar question in round 2 (see Appendix A for more information and analyses on response times).

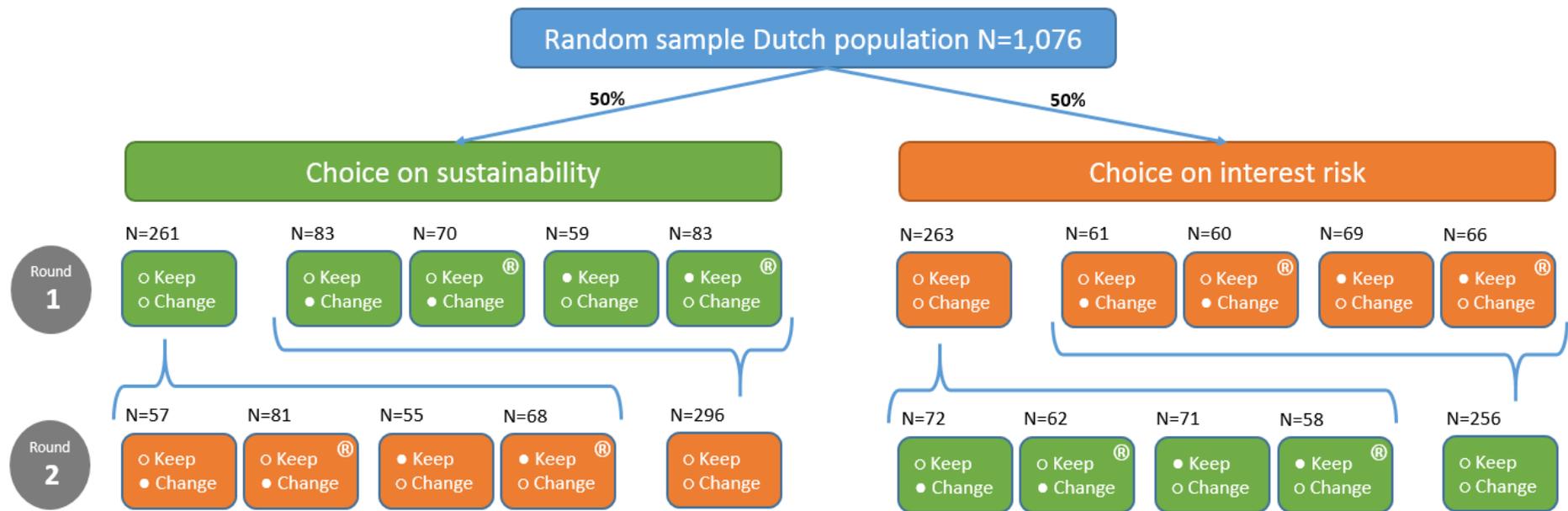


Figure 1: Set up of the experiment. ® denotes that it was explicitly stated that the preselected option was randomly allocated. N's are realized number of respondents per (sub)group. Respondents who answered the choice on sustainability in the first round, got a choice on interest risk in the second round, and vice versa (interest risk in round 1 is choice on sustainability in round 2). Respondents who had an active choice in round 1, got a preselected option in round 2, and vice versa (preselected option in round 1 is active choice in round 2). So the N=261 who received an active choice for the choice on sustainability in round 1, were distributed over 4 conditions with different nudges for the choice on interest risk (N=57, N=81, N=55, and N=68, which adds up to N=261) in round 2.

Results

Without a preselected option, half of the respondents chose to keep the current investment balance of sustainable investments, whilst half chose to increase investments in sustainable investments (“Change”). For the interest rate-choice, a small majority (56%) chose to keep the current level of protection against interest risks, and 44% chose “Change” and wants to increase protection against interest risk. The numbers are the average of two rounds taken together.

Nudging via preselecting has a strong effect in both conditions (see Figure 3). Preselecting “Change” leads to +19 percentage points more choice of Change in the sustainability-condition, and +26 percentage points in the interest rate-condition. The effects were not statistically different between the two conditions. When an additional sentence was added that the preselected option was randomly allocated and was not related to any personal information on the respondent, the nudge still had a sizeable, albeit less strong, effect: +11 percentage points in in the sustainability-condition, and +21 percentage points in the interest rate-condition.

Similarly, when the preselected options were in the direction of the current status, i.e. “Keep”, we see substantial effects. In the sustainability condition, the number of respondents choosing to Change, drops by 28 percentage points, in the interest risk-condition, this decrease is 19 percentage points.

When it is explicitly mentioned that the default option of Keep is randomly chosen, we still see a strong effect of the nudge. And on average, the experimental groups with the extra, explicit statement, take slightly longer to read the (slightly longer) text (see appendix A). Again, the effect of the nudge thus stated is slightly less: we note a decrease in the choice for Change of 22 percentage points in the sustainability-condition, and a decrease of 17 percentage points in the interest risk condition.

In short, we observe strong effects of a preselected default in both directions. When it is explicitly stated that the preselected option was randomly allocated, we still see large, but slightly diminished, effects in all cases. All results are qualitatively consistent across direction (Keep or Change) and condition (Sustainability or Interest Risk).

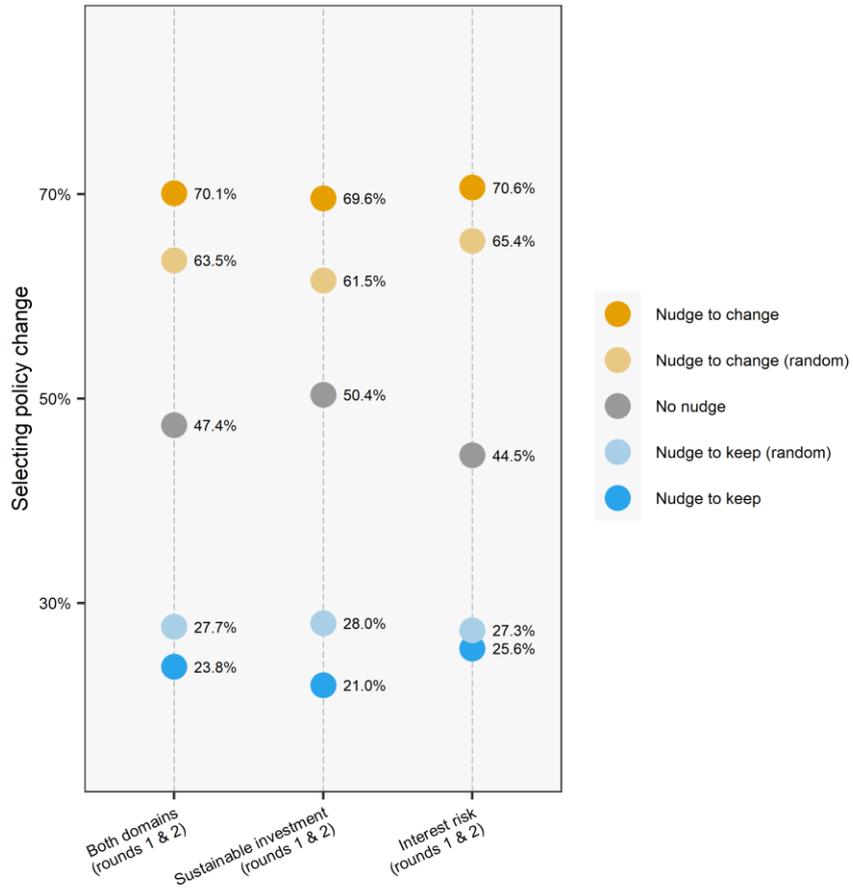


Figure 2: Percentage of respondents that selects to change the policy, for different experimental groups and conditions averaged across the two rounds.

Linear Mixed-Effects Models

Table 1 shows the results of Linear Mixed-Effects Models where we combine both domains (i.e. both types of choices, Sustainable investment and Interest risk). In describing these outcomes, we will focus on Model 2 that also controlled for effects of gender and age.

Both domains	Model 1		Model 2	
	<i>b</i> [95% CI]		<i>b</i> [95% CI]	
Nudge to change	0.23 [0.16, 0.29]	***	0.23 [0.16, 0.29]	***
Nudge to change—random	0.16 [0.10, 0.23]	***	0.17 [0.10, 0.23]	***
Nudge to keep	-0.24 [-0.30, -0.17]	***	-0.23 [-0.30, -0.17]	***
Nudge to keep —random	-0.20 [-0.26, -0.14]	***	-0.20 [-0.26, -0.14]	***
Domain (sustainable inv.)	0.02 [-0.02, 0.06]		0.02 [-0.02, 0.06]	
Round (2)	0.02 [-0.02, 0.05]		0.02 [-0.02, 0.05]	
Gender (female)			0.05 [0.01, 0.09]	*
Age			-0.00 [-0.00, 0.00]	
Fin. literacy			0.02 [-0.00, 0.04]	
Intercept	1.46 [1.42, 1.50]	***	1.42 [1.31, 1.53]	***
Observations	2152		2152	
Pseudo R^2 (fixed effects)	.09		.09	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval

Table 1: Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy, for both domains combined (Sustainable Investment and Interest Risk), Controlling for the Effect of Domain and Round in Model 1, and additionally for Gender, Age and Financial Literacy in Model 2.

The statistics in Table 1 confirm what can be clearly eyeballed from Figure 2: the preselection nudges are quite effective. Across choice domains, the share of respondents who chose a change in policy was 22.7 percentage point higher when this option was preselected (70.1%) than when no option was preselected (Active choice; 47.4%). The same holds for a nudge in the direction of the current status (“Keep”); Across choice domains, the share of respondents who chose to stick with the current policy was 23.6 percentage point lower when this option was preselected (23.8%) than when no option was preselected (47.4%).

These results confirm our main hypothesis 1a: The preselected option will be chosen significantly more often, compared to an identical choice where no option is preselected.

The effect of pre-selection nudges is of similar strength in both directions (change and keep). Across choice domains, the effect of pre-selecting a change in policy (22.7 percentage point) was not statistically different from the effect of pre-selecting the current policy (23.6 percentage point, $\chi^2 = 0.21$, $p = .649$). This refutes our hypothesis 2. The effect of preselecting does not seem stronger in the

direction of change (choice for more sustainable investing or more interest risk-hedging) than in the direction of the current policy (keep everything as is).

Model 2 in Table 1 includes Round, Age, Gender and Financial Literacy as additional factors to correct for these characteristics in the model. The fact that estimates of the effect of our interventions are nearly identical between Model 1 and Model 2 would suggest we achieved adequate randomization. We will describe how the experimental conditions affect different subgroups in a subsequent paragraph below.

Disentangling Endorsement

The effects of preselection nudges described above contained all three hypothesized drivers: Ease, Endorsement and Endowment. In our experimental design, we also had groups where we aimed to neutralize the Endorsement (advice) part of the nudge by adding a sentence that the default was selected randomly and without regard for personal characteristics of the respondent.

Even when this implicit advice is removed, the pre-selection nudges are still effective. Across choice domains, the share of respondents who chose a change in policy was 16.1 percentage point higher when the Change option was preselected at random (63.5%) than when no option was preselected (47.4%, $p < .001$). Conversely, the share of respondents who chose to change the current policy was 19.7 percentage point lower when the option to stick with current policy was preselected at random (27.7%) than when no option was preselected (47.4%, $p < .001$). In other words, even without the Endorsement component, preselected choices exert strong steering power in shaping what choices people make.

The effects of pre-selection nudges are less pronounced when we attempted to remove implicit advice, but differences are not significant: across choice domains, the effect of pre-selecting a change in policy was less pronounced when it was stated that pre-selection was done at random (16.1 percentage point) than when this was not stated (22.7 percentage point), but this difference was not statistically significant ($\chi^2 = 2.37$, $p = .124$). And across the two choice domains, the effect of pre-selecting the current policy was less pronounced when it was stated that pre-selection was done at random (19.7 percentage point) than when this was not stated (23.6 percentage point), but this difference was not statistically significant ($\chi^2 = 1.01$, $p = .312$).

Figure 3 depicts some calculations to quantify the relative contribution of different possible drivers for the effects of the nudge. Hypothesis 5 in our pre-registration stated: The difference between “no preselect” and “preselect, randomly allocated” is the part of the effect of the nudge attributable to Ease (and Endowment). The difference between “preselect, randomly allocated” and “preselect” is the part of the effect of the nudge attributable to (implicit) advice. The Endorsement (implicit advice) has a relative contribution ranging from 0.11 (Interest Risk, Keep) to 0.42 (Sustainable, Change).

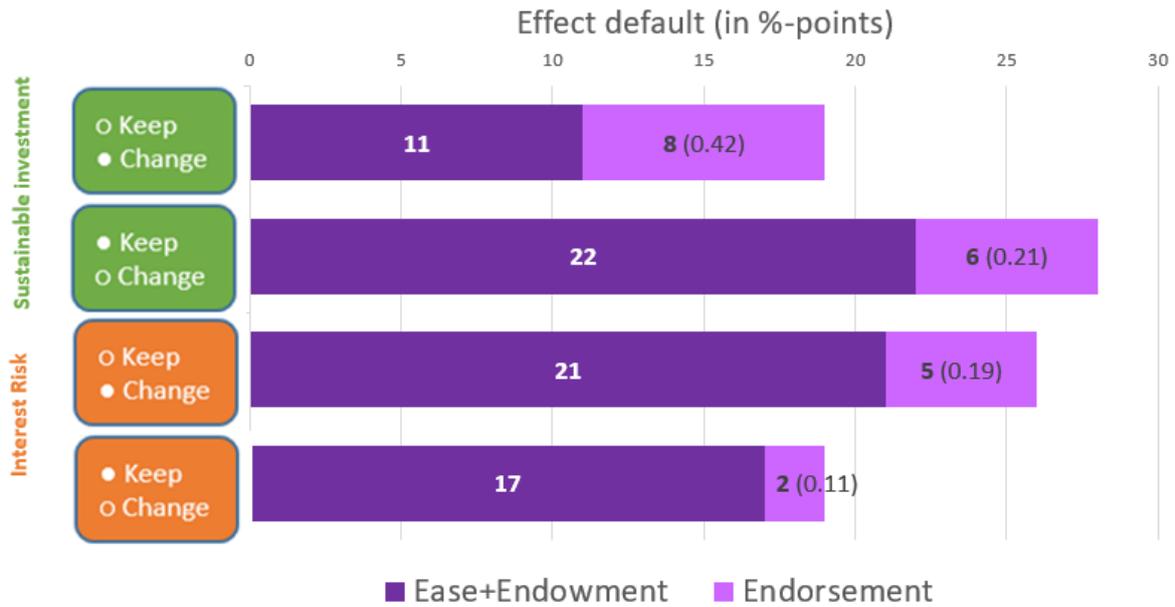


Figure 3: Teasing out the (relative) effects of Endorsement from the total effect of a preselected choice. The lighter purple bars denote the effect of the default that can be attributed to Endorsement in percentage points, followed by –in parenthesis– the relative contribution to the total effect.

Although the effects of preselection nudges without the implicit advice component are always smaller than pre-selection with implicit advice, we did not see significant differences between them. Even though we see in all conditions the pattern predicted by hypothesis 1b, we don't find statistical proof for this hypothesis: The effects of preselecting were not more pronounced for the experimental groups without the added phrase "the preselected option was randomly allocated" compared to the groups with this statement.

Different domains: Sustainability and Interest Risk

We find similar results across the two domains we employed in our research design as we see for the full model. Table 2 shows results for a Linear Mixed-Effects Model for the domain where the policy choice was on interest risk (first column) and on sustainable investment (second column). For both domains, all nudges significantly influenced the policy choice. The third column in Table 2 compares effects across the two domains and there are no significant differences in effects of a nudge between the policy choice on interest risk and sustainable investment. Hence, Hypothesis 3 does not seem to hold: The effects of preselecting are similar for the interest risk-example and the sustainability example.

Groups: Domain	Interest risk	Sustainable investment	Difference (interaction)
Effect	<i>b</i> [95% <i>CI</i>]	<i>b</i> [95% <i>CI</i>]	<i>b</i> [95% <i>CI</i>]
Nudge to change	0.26 [0.17, 0.36] ***	0.19 [0.11, 0.28] ***	-0.07 [-0.20, 0.06]
Nudge to change—random	0.21 [0.12, 0.30] ***	0.11 [0.02, 0.20] *	-0.10 [-0.23, 0.03]
Nudge to keep	-0.19 [-0.28, -0.10] ***	-0.29 [-0.38, -0.19] ***	-0.10 [-0.23, 0.03]
Nudge to keep—random	-0.17 [-0.26, -0.09] ***	-0.21 [-0.31, -0.12] ***	-0.04 [-0.17, 0.09]
Round (2)	0.02 [-0.04, 0.08]	0.01 [-0.05, 0.07]	-0.01 [-0.09, 0.07]
Gender (female)	0.06 [0.00, 0.12] *	0.04 [-0.02, 0.10]	-0.03 [-0.11, 0.06]
Age	-0.00 [-0.00, 0.00]	-0.00 [-0.00, -0.00] **	-0.00 [-0.01, -0.00] *
Fin. literacy	0.01 [-0.02, 0.05]	0.02 [-0.01, 0.06]	0.01
Intercept	1.34 [1.19, 1.48] ***	1.53 [1.38, 1.67] ***	
Observations	1076	1076	2152
Pseudo R^2 (fixed effects)	.09	.09	.09

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. *CI* = Confidence Interval

Table 2: *Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy for subgroups based on Domain (Sustainable Investment or Interest Risk), Controlling for the effect of Round, Gender, Age, and Financial Literacy. The final column contains the interaction between the effect of that row and the variable that was used to create subgroups (Domain). The estimate for this interaction-effect is the estimate for the difference between the two subgroups, with accompanying CI's and statistical significance.*

Financial literacy, Gender, Age, response time

We also ran our statistical models for subgroups based on respondent characteristics, such as financial literacy (Table 3 compares the 10% of sample with lowest financial literacy who answered zero questions correct to the 28% of sample who answered all three questions correct), Gender (Table 4, males versus females), Age (Table 5, sample split at 45 years of age).

Financial literacy was assessed using three standard multiple-choice questions, regarding inflation, compound interest, and shares versus investment funds (Lusardi & Mitchell, 2007). Of the whole sample of N=1,076, 10.0% did not answer any question correct, whilst 27.6% answered all three answers correct. Figure 4 shows the choices made in our experiment, split according to financial literacy.

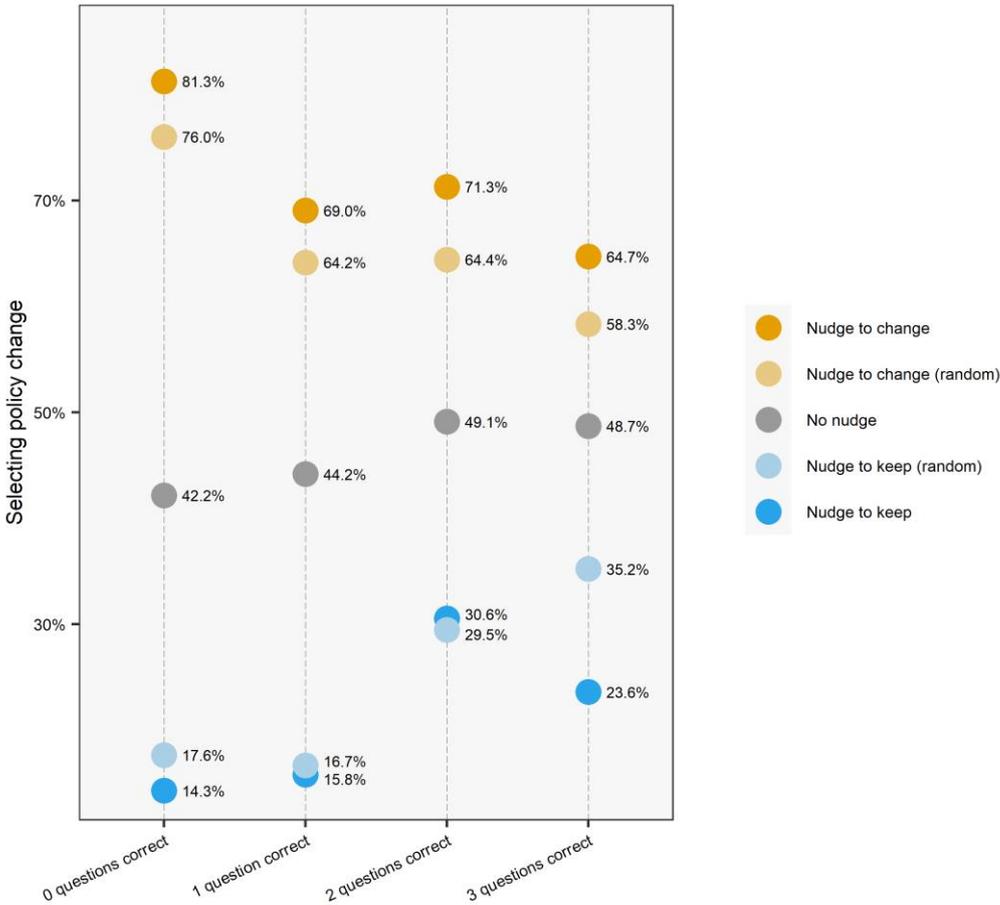


Figure 4: Percentage of respondents that chooses to change for different levels of financial literacy (as measured by number of questions answered correctly), shown for different experimental groups and conditions averaged across the two rounds. Inset shows averages for the two most extreme groups in financial literacy; those who answered no questions correct (10% of sample) and those respondents who answered all questions correctly (28% of sample).

The effect of preselecting is clearly stronger for the objectively less financial literate (difference between Change-default [81% chooses to Change] and Keep-default [14%] is 67 percentage points), compared to the most financial literate in this experiment (difference between Change-default [65%] and Keep-default [24%] is 41 percentage points), see Figure 4. Nearly one in five (19.9%) answered one question correct, 42.4% gave two correct answers. The differences between nudging with or without the Endorsement-component seem smaller for the least financial literate group, compared to the respondents who answered all financial literacy questions correctly.

In Table 3, we ran similar statistical models as before, but now for subgroups based on financial literacy. For the least knowledgeable group (no answers correct), all nudges have a significant effect on whether or not they want the policy change, except for the nudge to keep the policy with the random message. For the most financial knowledgeable group –who answered all 3 questions correct– all nudges have a significant effect on their choice for a change in policy, except for the nudge to change with the random message.

From Table 3, we can gather that the nudge to change had an effect of 0.38 percentage points in the model for the low financial knowledge group and 0.16 percentage points for the high financial knowledge group. To test whether these two estimates are significantly different from each other, we calculate the interaction effect nudge to change x financial literacy. This estimate of the difference between the two groups based on financial literacy is -0.22 and is significantly different from zero. In other words, the effect of a nudge to change is significantly larger for the low financial literacy group compared to the high financial literacy group.

Similarly, for the nudge to change with the extra sentence about random allocation. This nudge has a significant effect on the choice for the low financial literacy group of 0.36 percentage points. The effect on the high financial literacy group of nudge to change – random was 0.09, which is not significantly different from zero. The difference between the two groups based on the interaction effect nudge x financial literacy is -0.27 and this difference is statistically significantly different from zero.

The nudges in the direction of a choice to keep current policy did not result in significant different responses between the low financial literacy group and the high financial literacy group.

Subgroups: Financial Literacy	Low financial literacy: 0 questions correct	High financial literacy: 3 questions correct	Difference (interaction)
Effect	<i>b</i> [95% <i>CI</i>]	<i>b</i> [95% <i>CI</i>]	<i>b</i> [95% <i>CI</i>]
Nudge to change	0.38 [0.21, 0.56] ***	0.16 [0.04, 0.27] **	-0.22 [-0.44, -0.00] *
Nudge to change—random	0.36 [0.17, 0.55] ***	0.09 [-0.02, 0.21]	-0.27 [-0.51, -0.04] *
Nudge to keep	-0.25 [-0.43, -0.06] *	-0.24 [-0.36, -0.11] ***	0.01 [-0.22, 0.24]
Nudge to keep—random	-0.23 [-0.46, 0.00]	-0.14 [-0.26, -0.02] *	0.09 [-0.18, 0.36]
Domain (sustainable inv.)	0.06 [-0.06, 0.18]	0.08 [0.00, 0.15] *	0.02 [-0.13, 0.16]
Round (2)	0.17 [0.05, 0.29] **	0.01 [-0.06, 0.09]	-0.15 [-0.30, -0.01] *
Gender (female)	0.10 [-0.03, 0.23]	0.06 [-0.02, 0.15]	-0.04 [-0.21, 0.13]
Age	0.00 [-0.00, 0.01]	-0.00 [-0.00, 0.00]	-0.00 [-0.00, 0.00]
Intercept	1.17 [0.92, 1.41] ***	1.49 [1.32, 1.66] ***	
Observations	204	624	
Pseudo R^2 (fixed effects)	.24	.07	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. *CI* = Confidence Interval

Table 3: Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy for subgroups based on Financial Literacy, Controlling for the Effect of Domain, Round, Gender and Age. The final column contains the interaction between the effect of that row and the variable that was used to create subgroups (Financial Literacy). The estimate for this interaction-effect is the estimate for the difference between the two subgroups, with accompanying *CI*'s and statistical significance.

Table 4 shows that all nudges had significant effects on choices for a change in policy for both males and females. Furthermore, the estimates for both genders are quite similar, implying no differential effects between males and females in the impact of nudges. The estimates for the interaction terms that denote the difference in effect between the sexes confirm this; all these estimates for differences do not significantly differ from zero (final column in Table 4).

Groups: Gender	Male		Female		Difference (interaction)
	<i>b</i> [95% CI]		<i>b</i> [95% CI]		<i>b</i> [95% CI]
Nudge to change	0.17 [0.08, 0.26]	***	0.28 [0.19, 0.37]	***	0.11 [-0.02, 0.23]
Nudge to change—random	0.19 [0.10, 0.27]	***	0.14 [0.05, 0.23]	**	-0.05 [-0.17, 0.08]
Nudge to keep	-0.25 [-0.34, -0.16]	***	-0.22 [-0.31, -0.13]	***	0.03 [-0.09, 0.16]
Nudge to keep—random	-0.20 [-0.29, -0.11]	***	-0.20 [-0.28, -0.11]	***	-0.00 [-0.13, -0.12]
Domain (sustainable inv.)	0.02 [-0.03, 0.08]		0.02 [-0.04, 0.07]		-0.01 [-0.09, 0.07]
Round (2)	0.02 [-0.04, 0.07]		0.02 [-0.04, 0.07]		-0.00 [-0.08, 0.08]
Age	-0.00 [-0.00, 0.00]		-0.00 [-0.00, 0.00]		-0.00 [-0.00, 0.00]
Fin. literacy	0.02 [-0.02, 0.05]		0.03 [-0.01, 0.06]		0.01 [-0.04, 0.06]
Intercept	1.42 [1.27, 1.57]	***	1.46 [1.33, 1.60]	***	
Observations	1054		1098		
Pseudo R^2 (fixed effects)	.09		.10		

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval

Table 4: Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy for subgroups based on Gender, Controlling for the Effect of Domain, Round, Age and Financial Literacy. The final column contains the interaction between the effect of that row and the variable that was used to create subgroups (Gender). The estimate for this interaction-effect is the estimate for the difference between the two groups, with accompanying CI's and statistical significance.

In Table 5, we have split our sample in a young (45 years old or younger) and an old (older than 45 years) group. Similarly to gender, we observe significant effects of all nudges on policy change choices, and estimates for young and old respondents are similar enough to suggest that age does not alter or affect the strength of the default effects. The estimates for the interaction terms that denote the difference in effect between young and old respondents confirm this; all these estimates for differences between effects of nudges do not significantly differ from zero (final column in Table 5).

Groups: Age	Age ≤ 45		Age > 45		Difference (interaction)
	<i>b</i> [95% <i>CI</i>]		<i>b</i> [95% <i>CI</i>]		<i>b</i> [95% <i>CI</i>]
Nudge to change	0.17 [0.08, 0.27]	***	0.26 [0.18, 0.34]	***	0.09 [-0.03, 0.22]
Nudge to change—random	0.15 [0.05, 0.25]	**	0.18 [0.10, 0.26]	***	0.02 [-0.10, 0.15]
Nudge to keep	-0.24 [-0.34, -0.15]	***	-0.23 [-0.31, -0.14]	***	0.02 [-0.11, 0.14]
Nudge to keep—random	-0.18 [-0.28, -0.09]	***	-0.20 [-0.28, -0.12]	***	-0.02 [-0.14, 0.11]
Domain (sustainable inv.)	0.07 [0.01, 0.13]	*	-0.02 [-0.07, 0.03]		-0.09 [-0.17, -0.01] *
Round (2)	0.03 [-0.03, 0.09]		0.00 [-0.04, 0.05]		-0.03 [-0.10, 0.05]
Gender (female)	0.08 [0.01, 0.14]	*	0.03 [-0.03, 0.09]		-0.05 [-0.14, 0.04]
Fin. literacy	0.03 [0.00, 0.07]	*	0.01 [-0.02, 0.04]		-0.03 [-0.07, 0.02]
Intercept	1.31 [1.19, 1.44]	***	1.42 [1.30, 1.53]	***	
Observations	1054		1098		
Pseudo R^2 (fixed effects)	.09		.10		

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. *CI* = Confidence Interval

Table 5: Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy, for subgroups based on Age, Controlling for the Effect of Domain, Round, Gender and Financial Literacy. The final column contains the interaction between the effect of that row and the variable that was used to create subgroups (Age). The estimate for this interaction-effect is the estimate for the difference between the two groups, with accompanying *CI*'s and statistical significance.

Discussion

In an online survey experiment, we show that small changes in how choices are presented result in large effects on what people choose for their collective pension scheme. Mechanistically, the effects of preselecting choices seem at least partly driven by cognitive ease. We were unable to conclusively establish implicit advice of a preselected choice as a significant driver.

Previously, large effects of preselecting choice options were shown for hypothetical pension decisions by Dutch respondents in the accrual phase (De Bresser & Knoef, 2019; Zijlstra et al., 2020). Here, we corroborate the effects of preselection nudges for choices about what a pension fund should do according to participants regarding sustainable investments or interest risks for the collective assets. In an online environment, small changes in how choice options are presented can steer people in a specific direction.

To put the effects of preselection nudges in the current study in perspective, we can compare them to Jachimowicz et al.'s (2019) meta-study on default effects, which finds an average effect size of Cohen's $d=0.68$ [95% CI: 0.53-0.83]. For the 38 out of 58 studies they assessed that had a binary outcome (similar to this study, where the two choices were Change or Keep), they also calculated the more apt Cramér's V : 0.29 [95% CI 0.21-0.37]. Cramér's V in our study –combining both rounds– is 0.41 [95% CI 0.36-0.47] for both domains, 0.41 [95% CI 0.33-0.49] for the Sustainable Investment choice, and 0.42 [95% CI 0.34-0.49] for the Interest Risk choice. Most of these effect sizes are close to the upper bound of the meta-analysis by Jachimowicz et al. (2019).

In Jachimowicz et al.'s meta-study the absolute average difference between opt-out and opt-in was 27.24%. In our study, we can consider the preselected default Change as opt-out (action is needed to not choose Change) and the preselected default Keep as opt-in (action is needed to choose Change). The absolute difference between the opt-out default (70% chose Change in that condition) and the opt-in default (24%) is 46% in our study, considerably larger than the average in Jachimowicz' meta-study. The absolute difference between opt-out and opt-in defaults for the sustainable condition was 48% (70% minus 22%) and 45% for the interest rate condition (71% minus 26%). The effect of these preselection nudges could be driven by all three default mechanisms: Endorsement, Ease, and Endowment. In the conditions where we explicitly excluded the Endorsement-mechanism, we see a smaller absolute effect between the opt-out default and the opt-in default of 36% (64% in opt-out default chooses Change, minus 28% that chooses Change in the opt-in default). Cramér's V for the nudges without the random conditions is 0.46 [0.38-0.54] and for the nudges with the random conditions 0.36 [0.28-0.44].

Effects of Endorsement, Ease and Endowment

Our results suggest that the large effects we observe for the preselection nudge are partly driven by the Ease and Endowment-components and might also be driven by the Endorsement-component. Estimates for the relative contribution of the Endorsement-mechanism of the preselection nudge effect range from 0.06 to 0.4. Conversely, the Ease and Endowment-component's relative contribution ranges from 0.6 to 0.94. It is noteworthy that in our experiment, opting-out of the default was very easy; it only required respondents to select another radio-button. The physical burden of choice consisted one additional mouse click. Even then, at least more than half of the strong effects we observe seem to be attributable to the Ease (and Endowment) of the default.

One explanation may be that the Ease component does not solely consist of the pure mechanical act of clicking a button, but also involves a psychological component; clicking another button and making a choice might be cognitively or emotionally burdensome.

In the real world, opting-out or making another choice than the default is more cumbersome. It might mean sending in a form or logging in to a website. With more steps to take to opt-out, opportunities to quit during that journey add up and may lead to more people experiencing thresholds they can't or don't overcome, thus ending up sticking to the default. Given the fact that opting-out in our experiment was as easy as possible, and yet Ease still exerts a strong effect, suggests that defaults in choice architecture and seamless choices are even more important in real settings.

Sustainability

We observe substantial interest by respondents in more sustainable investment by their pension fund. This is in line with previous research; Bauer et al. (2019) report that two thirds of respondents were in favor of expanding sustainable investments by their pension fund. In their study, some choices had real consequences as the pension fund that the researchers collaborated with had committed to implement the choice of the majority. However, they did not observe differences between hypothetical and real choices. Bauer and colleagues report that the majority of respondents chose to expand sustainable investing irrespective of return expectations and that a significant share even accepts lower financial returns in exchange.

Bonekamp and Van Soest (2019) also report substantial interest in sustainable investment by pension funds. In their survey on a representative sample of Dutch citizens between 50 and 65 years old, 65% says it is important that their pension fund invests sustainable and 68% want to be able to decide themselves if their pensions are invested in a sustainable manner. More than half is willing to forego 1 percentage point in returns to ensure sustainable investments. Borgers and Pownall (2014) also report that many pension plan participants prefer environmental and social pension investments, but that participants have difficulties incorporating these non-financial preferences into their financial choices.

Our experimental results suggest that the strong preferences on sustainable investments by pension funds reported in previous studies are strongly malleable with preselection nudges. This is in line with Gajewski et al. (2021) who show that making the sustainable investment the default option is the most efficient nudge to influence investors towards SRI (Socially Responsible Investment) in an online experiment with US investors.

Sustainable versus Interest Risk

The large effects we find of preselection nudges on choices in the domain of pensions are not too surprising when we consider that people generally do not have very strong opinions on the intricacies of their pension. In other words, we would expect nudges to be more powerful when people do not hold strong prior convictions. This is in line with the 'preference strength' hypothesis by Jachimowicz et al. (2019). With this experiment, we hoped to shed light on this hypothesis that defaults may be less likely to be less effective for decisions where people have stronger preferences.

We predicted that people would have stronger preferences regarding sustainable investing than regarding how a pension fund should deal with interest risk. However, we did not observe a stronger effect of preselection nudges on interest risk compared to choices on sustainability. We reject our Hypothesis 3: The effect of preselecting is not stronger for the interest risk decision than in the sustainability decision.

We see two possible explanations for this null effect. First, it is possible that, contrary to what we think and expect, people's preferences about sustainability are just as strong as their preferences about how a pension fund should deal with interest risk. Perhaps the prolonged low-interest rates with detrimental and very public effects on (pension reductions and absent indexation by) Dutch pension funds has made interest risk more salient and important to respondents than we had thought. Because we did not measure preference strength, we cannot confirm or reject this possibility. As a second explanation, it is possible that the overall context of pensions overshadows any differences between the two domains of choices we offered. In other words, malleability of choices might not only be influenced by preference strength of the specific choice at hand but also by knowledge or confidence about the general decision domain. For someone with strong convictions about sustainability, lack of knowledge or confidence about pension choices might override these convictions and make her more susceptible to the effects of nudges. Mrkva et al. (2021) have shown that consumers with lower socioeconomic status, domain knowledge, and numerical ability are impacted more by a wide variety of nudges. Our own exploratory analyses show that respondents with lower financial literacy scores are nudged more towards the preselected option (see Figure 4).

Limitations and directions for future research

With our experimental design, our focus was on isolating the Endorsement mechanism of the preselection effect from the Ease and Endowment mechanisms. Our design does not separate the Ease and Endowment mechanisms from each other. Future research could further examine the partial contribution of the Endowment mechanism on default effects, for instance by trying to manipulate the status quo and reference point. In our experiment, we described a certain level of sustainable investment or interest risk hedging, and asked if a respondent wanted to increase that. Follow-up research could also include experimental conditions where the policy choice would be to decrease sustainable investment or interest risk hedging (i.e. start at the position where you would end up if you chose increase in our experiment). We did not do this in our research because Bauer et al. (2019) found that direction of the alternative option, where some respondents could choose for more sustainable investment and some for less sustainable investment, did not affect the choice for more sustainable investments. In addition, practical consideration concerning sample size and power to detect effects precluded additional experimental conditions in our experiment.

We employed a non-incentivized, hypothetical choice design. Our analysis of response times shows that respondents took their time to complete the task and treated the choice seriously. Moreover, since the choices concerned preferences about sustainability or risk, there are no "correct" answers with which to reward or incentivize respondents. A robustness/attention check in future work might be to also include a choice with a clear correct answer, for instance a choice between identical investments that only differ in fees, similar to Choi et al. (2010).

In our experiment, all choices were hypothetical without real-world consequences. The effects on real, high-stakes decisions might be different. This does not mean effects of nudges and choice architecture in a real setting are necessarily smaller.

The choices were hypothetical, as surveying participants to guide pension fund policy is not yet standing practice in the Netherlands. However, Bauer et al. (2019) have shown that it is possible for pension funds to query their participants and have their choices have real life impact. The new pension reform in the Netherlands does not alter the ultimate responsibility of the pension fund board, but does urge them to take preferences of their participants into account and thus fulfill their fiduciary obligations. Recent work by Bauer and co-authors (2020) shows that trustees' characteristics influence investment decisions; older boards allocate less to equity. The composition and preferences of the participants should be leading in pension funds policies, not the composition of the board of trustees. Surveys among participants seem to be a good way to ensure the collective assets are allocated in a way that is congruent and aligned with the interests and wishes of the participants.

In the present experiment, the amount of information provided was concise because we did not want to make the task too complex. In one sense, that makes it harder for a respondent to make a well-founded choice. How to decide about the investment strategy or risk mitigation if you do not know about the current policies? Why is the upside of risk hedging not explained in more depth? On the other hand, we do not expect many people to fully immerse themselves in all documentation before making a choice (ASIC & AFM, 2019). Furthermore, it is possible that people would be affected by choice architecture more instead of less when the information becomes more detailed and complex, thus possibly inflating any effects of a nudge. Showing the large effects of a default-nudge that we do in this paper even when simplifying the choice as much as possible, is a testament to the impact. More information might have increased the cognitive load and thus function as a driver of effects for the default-nudge. Our experimental design minimizes such cognitive load effects as much as possible.

Similarly, in practice pension decisions are often not binary like in our experiment. But again the same argument holds here as for adding extra information: the increase in complexity might add to cognitive load and thus inflate any default effects. Future research could examine and compare the effects of nudges on choices in situations where people have more detailed information at hand, or where more options are available.

Implications for industry

We have shown that choice architecture can greatly influence the pension choices that people make regarding sustainable investment and interest-risk hedging. This confers a large responsibility on the choice architect, in this case the pension provider. For Dutch pension funds, it is important to tailor their (investment and risk) policies and strategies to their participants. Pension funds should be aware that seemingly unimportant details in the design of products, choice environment and information can affect the choices and pension outcomes of their participants. Offering the right default options or choice architecture to the right target group might require suitable customization and knowledge of the participants. If insufficient knowledge is available, it might be more prudent not to preselect or nudge a participant.

To better understand the effect of preselection nudges, we would encourage pension funds to conduct large-scale field experiments and examine the effects on responses to pension surveys with real consequences (AFM, 2021).

Furthermore, we have shown that (cognitive) Ease is at least in part driving the effect of a preselection nudge. In addition, we find preliminary evidence that the Endorsement mechanism also plays a role. Providers should incorporate these and other behavioral insights when designing choices in the reformed Dutch pension system.

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Appendix A – Response Times

Figure A1 summarizes response times for different experimental conditions and Table A1 contains the Linear Mixed effects models with total response time as the dependent variable. Generally, respondents were slightly faster in the active choice condition in comparison to a condition with a preselected choice; the difference was 3.25 seconds [95% CI: 0.11-6.39, $t=2.03$, $p=0.04$]. The extra sentence (an additional 13 words) for the group where we tried to disentangle the Endorsement effect translated to a slightly longer completion time compared to the preselected condition without the extra sentence; the difference was 4.82 seconds [95% CI: 1.10-8.55, $t=2.54$, $p=0.01$].

On average, respondents took more time to answer the interest rate question than the question on sustainable investment; the difference was 5.11 seconds [95% CI: 2.58-7.64, $t=3.96$, $p<0.001$]. This might be because the interest rate choice is more complex and/or unfamiliar. A more banal explanation is that the choice on interest rate contained 14 more words than the choice on the sustainable investment. Response times between round 1 and round 2 were not significantly different; on average 0.75 seconds [95% CI: -1.78-3.28, $t=0.58$, $p=0.56$].

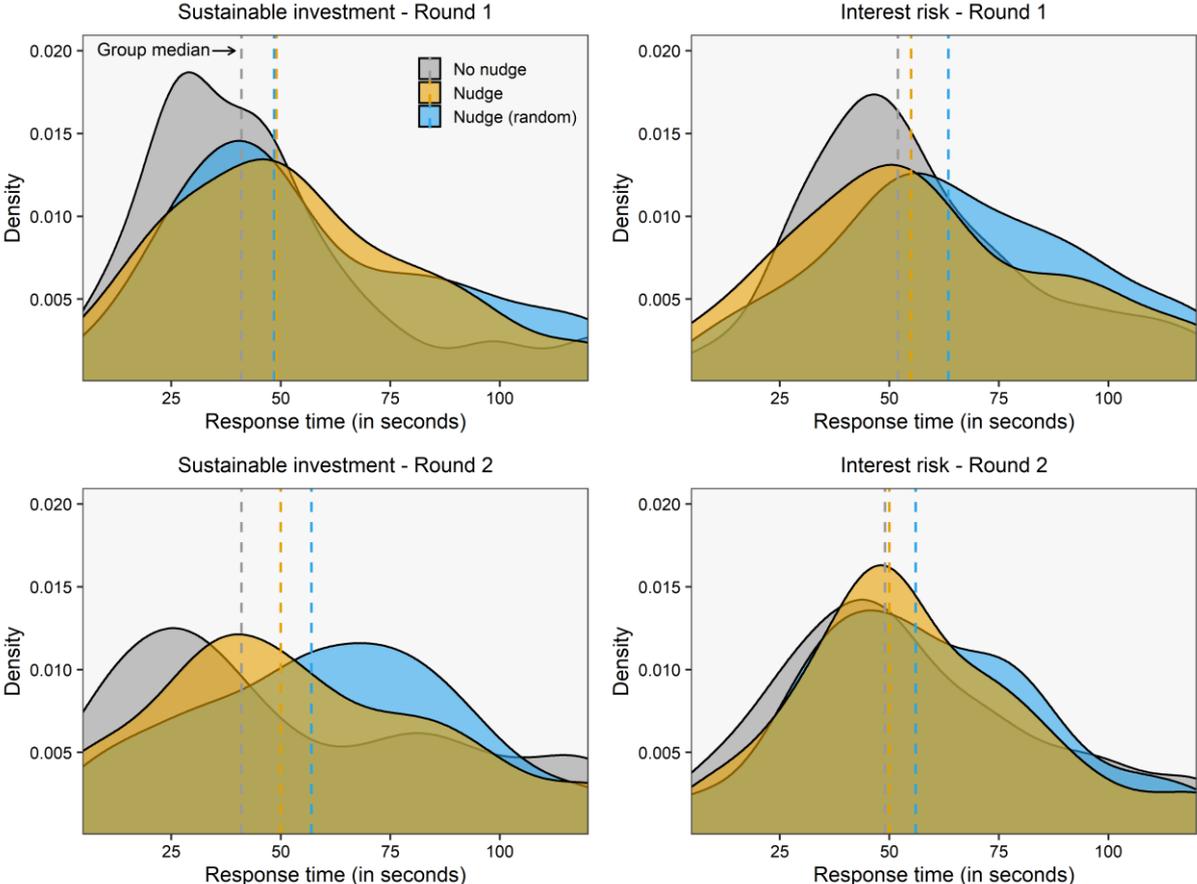


Figure A1: Density plots for response times for both choice conditions (left: sustainable investment, and right: interest risk) and experimental rounds (top: round 1, and bottom: round 2), Dotted lines depict medians for conditions active choice/no nudge (grey), preselection nudge (yellow), and preselection nudge with advice removed (blue).

These patterns in response times suggest that respondents took the choices seriously and answered diligently, even though choices were hypothetical and not incentivized. We also do not observe a decline in the second round, which would imply no respondent fatigue or less faithful answers to the repeated, similar question in round 2.

Response time	Model 1		Model 2	
Effect	<i>b</i> [95% <i>CI</i>]		<i>b</i> [95% <i>CI</i>]	
Nudge vs. active choice	3.25 [0.11, 6.39]	*	3.24 [0.10, 6.38]	*
Nudge—random vs. active choice	8.08 [4.94, 11.22]	***	8.10 [4.95, 11.24]	***
Nudge—random vs. nudge	4.28 [1.10, 8.55]	*	4.86 [1.13, 8.59]	*
Domain (sustainable inv.)	-5.11 [-7.64, -2.58]	***	-5.11 [-7.64, -2.58]	***
Round (2)	0.75 [-1.78, 3.28]		0.75 [-1.78, 3.28]	
Gender (female)			-0.25 [-3.13, 2.64]	
Age			0.01 [-0.08, 0.10]	
Fin. literacy			-0.82 [-2.34, 0.70]	
Intercept	55.07 [52.44, 57.70]	***	56.59 [49.92, 63.89]	***
Observations	2152		2152	
Pseudo R^2 (fixed effects)	.02		.02	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. *CI* = Confidence Interval

Table A1: Linear Mixed-Effects Model Results for Fixed Effects on total response time, for both domains combined (Sustainable Investment and Interest Risk), Controlling for the Effect of Domain and Round in Model 1, and additionally for Gender, Age and Financial Literacy in Model 2. The rows for “Nudge—random vs. active choice” and “Nudge—random vs. nudge” are separate models for the same variable, but with a different reference group (active choice and nudge, respectively).

As a robustness check, we split our sample according to response time and performed similar statistical tests as for other subgroups. Table A2 shows that all nudges had significant effects on choices for a change in policy for both respondents who took relatively short time to answer compared to respondents who took relatively long to answer. Furthermore, the estimates for both groups based on response time are quite similar, implying no differential effects between fast and slow responders in the impact of nudges. The estimates for the interaction terms that denote the difference in effect between the groups based on response time confirm this; all these estimates for differences do not significantly differ from zero (final column in Table A2).

Groups: Response time	Low response time		High response time		Difference (interaction)
Effect	<i>b</i> [95% <i>CI</i>]		<i>b</i> [95% <i>CI</i>]		<i>b</i> [95% <i>CI</i>]
Nudge to change	0.22 [0.13, 0.31]	***	0.24 [0.15, 0.32]	***	0.02[-0.11, 0.15]
Nudge to change—random	0.17 [0.07, 0.27]	***	0.16 [0.08, 0.24]	***	-0.03[-0.16, 0.10]
Nudge to keep	-0.25 [-0.34, -0.16]	***	-0.22 [-0.31, -0.14]	***	0.02[-0.10, 0.15]
Nudge to keep—random	-0.19 [-0.28, -0.09]	***	-0.20 [-0.29, -0.12]	***	-0.02[-0.14, 0.11]
Domain (sustainable inv.)	0.03 [-0.02, 0.09]		0.01 [-0.04, 0.07]		-0.03[-0.11, 0.05]
Round (2)	0.05 [-0.01, 0.11]		-0.02 [-0.07, 0.04]		-0.07[-0.15, 0.01]
Gender (female)	0.05 [-0.02, 0.11]		0.05 [-0.01, 0.12]		0.01[-0.07, 0.09]
Age	-0.00 [-0.00, 0.00]		-0.00 [-0.00, 0.00]		0.00[0.00, 0.00]
Fin. literacy	0.01 [-0.02, 0.05]		0.03 [-0.01, 0.06]		0.01[-0.03, 0.06]
Intercept	1.43 [1.28, 1.58]	***	1.41 [1.26, 1.55]	***	
Observations	1078		1074		
Pseudo R^2 (fixed effects)	.09		.10		

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. *CI* = Confidence Interval

Table A2: Linear Mixed-Effects Model Results for Fixed Effects on Selecting a Change in Policy for subgroups based on Response Time, Controlling for the Effect of Domain, Round, Gender, Age and Financial Literacy. The final column contains the interaction between the effect of that row and the variable that was used to create subgroups (Response Time). The estimate for this interaction-effect is the estimate for the difference between the two groups, with accompanying *CI*'s and statistical significance.

Appendix B – screenshots of survey as presented to respondents

- Keep
- Change

Active choice on sustainability. Graphically summarized as:

The screenshot shows a web browser window with the URL `staging2.ipsosinteractive.com/mr/Web/mr/Web.dll`. The current question is Q8a, a categorical survey question. The Ipsos logo is in the top left. The text of the question is: "Stel dat u pensioen opbouwt bij een pensioenfonds en die pensioenuitvoerder wil meer duurzaam gaan beleggen met het pensioengeld. Het pensioenfonds wil dus meer investeren in projecten die bijvoorbeeld goed zijn voor mens en milieu. Mogelijk leidt dat wel tot hogere kosten van de beleggingen of lagere rendementen. Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige beleggingsbeleid voortzetten of meer duurzaam gaan beleggen. Welke optie zou u kiezen?". There are two radio button options: "Huidige beleggingsbeleid voortzetten" and "Meer duurzaam beleggen". At the bottom, there are two buttons: "Vorige" and "Volgende".

Preselected choice on interest risk, where the option to Keep is preselected. Also, explicitly mentioned is that the preselected option was randomly allocated (denoted by ®).

- Keep ®
- Change

Graphically summarized as:

The screenshot shows a web browser window with the URL `staging2.ipsosinteractive.com/mr/Web/mr/Web.dll`. The current question is Q9a, a categorical survey question. The Ipsos logo is in the top left. The text of the question is: "Het pensioenfonds denkt ook na over het renterisico. Als de rente daalt, dan moet het fonds meer geld in kas hebben om in de toekomst pensioen te kunnen uitkeren. Een deel van dit renterisico heeft het pensioenfonds al afgedekt. Het pensioenfonds kan dit renterisico nog verder afdekken door een verzekering te sluiten, maar dat kost wel geld. Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige rentebeleid voortzetten of meer renterisico afdekken. Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt. Deze voorgevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken. Welke optie zou u kiezen?". There are two radio button options: "Huidige rentebeleid voortzetten" (which is pre-selected with a solid dot) and "Meer renterisico afdekken". At the bottom, there are two buttons: "Vorige" and "Volgende".

Appendix C – Questionnaire [in Dutch]

Doelgroep = 4 (Representatief NL)

Scripter: Randomly divide all respondents in one of 4 groups and create variable `Conditie_Q8_1` to indicate which condition was selected. Set quota n=250 per group.

- Group 1: Controle Duurzaam – Rest Risico
- Group 2: Controle Risico – Rest Duurzaam
- Group 3: Rest Duurzaam – Controle Risico
- Group 4: Rest Risico – Controle Duurzaam

IF: `Conditie_Q8_1 = 1` (Controle duurzaam – rest risico)

Q8a [S]

Stel dat u pensioen opbouwt bij een pensioenfonds en die pensioenuitvoerder wil meer duurzaam gaan beleggen met het pensioengeld. Het pensioenfonds wil dus meer investeren in projecten die bijvoorbeeld goed zijn voor mens en milieu. Mogelijk leidt dat wel tot hogere kosten van de beleggingen of lagere rendementen.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige beleggingsbeleid voortzetten of meer duurzaam gaan beleggen. Welke optie zou u kiezen?

1. Huidige beleggingsbeleid voortzetten
2. Meer duurzaam beleggen

SCRIPTER: Measure how many seconds the respondent spends on this page

IF: `Conditie_Q8_1 = 2` (Controle risico – rest duurzaam)

Q8b [S]

Stel dat u pensioen opbouwt bij een pensioenfonds dat nadenkt over het renterisico. Dit houdt in dat het fonds meer geld in kas moet hebben om in de toekomst pensioen te kunnen uitkeren als de rente daalt. Een deel van dit renterisico heeft het pensioenfonds al afgedekt. Het pensioenfonds kan dit renterisico nog verder afdekken door een verzekering te sluiten, maar dat kost wel geld.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige rentebeleid voortzetten of meer renterisico afdekken. Welke optie zou u kiezen?

1. Huidige rentebeleid voortzetten
2. Meer renterisico afdekken

SCRIPTER: Measure how many seconds the respondent spends on this page

IF: `Conditie_Q8_1 = 3` (Rest duurzaam – Controle Risico) OR : `Conditie_Q8_1 = 4` (Rest Risico – Controle duurzaam)

SCRIPTER: Divide the respondents in this condition in 4 groups: A, B, C and D and add variable `Conditie_Q8_2` to the SPSS file.

IF: `Conditie_Q8_1 = 3` (Rest duurzaam – Controle Risico)

Q8c [S]

Stel dat u pensioen opbouwt bij een pensioenfonds en die pensioenuitvoerder wil meer duurzaam gaan beleggen met het pensioengeld. Het pensioenfonds wil dus meer investeren in projecten die bijvoorbeeld goed zijn voor mens en milieu. Mogelijk leidt dat wel tot hogere kosten van de beleggingen of lagere rendementen.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige beleggingsbeleid voortzetten of meer duurzaam gaan beleggen.

<IF Conditie_Q8_2 = A: Voor u is alvast 'meer duurzaam beleggen' aangevinkt.>

<IF Conditie_Q8_2 = B: Voor u is alvast 'meer duurzaam beleggen' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.>

<IF Conditie_Q8_2 = C: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt>

< IF Conditie_Q8_2 = D: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.>

Welke optie zou u kiezen?

1. Huidige beleggingsbeleid voortzetten
2. Meer duurzaam beleggen

SCRIPTER: Measure how many seconds the respondent spends on this page.

SCRIPTER: The idea of this question is to see what respondents do if one of the two answer options has already been selected for them. Will they then just follow the 'advised' option or will they actively change the selected answer? Therefore, when the respondents open this page one of the answer options should already be selected. The answer that should be selected depends on the condition.

IF Conditie_Q8_2 = A | B -> Q8c = 2 should be selected

IF Conditie_Q8_2 = C | D -> Q8c = 1 should be selected

IF: Conditie_Q8_1 = 4 (Rest risico – Controle duurzaam)

Q8d [S]

Stel dat u pensioen opbouwt bij een pensioenfonds dat nadenkt over het renterisico. Dit houdt in dat het fonds meer geld in kas moet hebben om in de toekomst pensioen te kunnen uitkeren als de rente daalt. Een deel van dit renterisico heeft het pensioenfonds al afgedekt. Het pensioenfonds kan dit renterisico nog verder afdekken door een verzekering te sluiten, maar dat kost wel geld.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige rentebeleid voortzetten of meer renterisico afdekken.

<IF Conditie_Q8_2 = A: Voor u is alvast 'meer renterisico afdekken' aangevinkt.>

<IF Conditie_Q8_2 = B: Voor u is alvast 'meer renterisico afdekken' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.>

<IF Conditie_Q8_2 = C: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt>

< IF Conditie_Q8_2 = D: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.>

Welke optie zou u kiezen?

1. Huidige rentebeleid voortzetten
2. Meer renterisico afdekken

SCRIPTER: Measure how many seconds the respondent spends on this page

SCRIPTER: The idea of this question is to see what respondents do if one of the two answer options has already been selected for them. Will they then just follow the 'advised' option or will they actively

*change the selected answer? Therefore, when the respondents open this page one of the answer options should already be selected. The answer that should be selected depends on the condition.
IF Conditie_Q8_2 = A | B -> Q8d = 2 should be selected
IF Conditie_Q8_2 = C | D -> Q8d = 1 should be selected*

IF: Conditie_Q8_1 = 1 (Controle Duurzaam – Rest Risico) OR : Conditie_Q8_1 = 2 (Controle Risico – Rest Duurzaam)

SCRIPTER: Divide the respondents in this condition in 4 groups: A, B, C and D and add variable Conditie_Q8_2 to the SPSS file.

IF: Conditie_Q8_1 = 1 (Controle duurzaam – rest risico)

Q9a [S]

Het pensioenfonds denkt ook na over het renterisico. Dit houdt in dat het fonds meer geld in kas moet hebben om in de toekomst pensioen te kunnen uitkeren als de rente daalt. Een deel van dit renterisico heeft het pensioenfonds al afgedekt. Het pensioenfonds kan dit renterisico nog verder afdekken door een verzekering te sluiten, maar dat kost wel geld.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige rentebeleid voortzetten of meer renterisico afdekken.

<IF Conditie_Q8_2 = A: Voor u is alvast 'meer renterisico afdekken' aangevinkt.> <IF Conditie_Q8_2 = B: Voor u is alvast 'meer renterisico afdekken' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.><IF Conditie_Q8_2 = C: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt>< IF Conditie_Q8_2 = D: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.> Welke optie zou u kiezen?

1. Huidige rentebeleid voortzetten
2. Meer renterisico afdekken

SCRIPTER: Measure how many seconds the respondent spends on this page

SCRIPTER: The idea of this question is to see what respondents do if one of the two answer options has already been selected for them. Will they then just follow the 'advised' option or will they actively change the selected answer? Therefore, when the respondents open this page one of the answer options should already be selected. The answer that should be selected depends on the condition.

IF Conditie_Q8_2 = A | B -> Q9a = 2 should be selected

IF Conditie_Q8_2 = C | D -> Q9a = 1 should be selected

IF: Conditie_Q8_1 = 2 (Controle Risico – Rest Duurzaam)

Q9b [S]

Het pensioenfonds denkt ook na over duurzaamheid en wil meer duurzaam gaan beleggen met het pensioengeld. Het pensioenfonds wil dus meer investeren in projecten die bijvoorbeeld goed zijn voor mens en milieu. Mogelijk leidt dat wel tot hogere kosten van de beleggingen of lagere rendementen.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige beleggingsbeleid voortzetten of meer duurzaam gaan beleggen. <IF Conditie_Q8_2 = A: Voor u is alvast 'meer duurzaam beleggen' aangevinkt.> <IF Conditie_Q8_2 = B: Voor u is alvast 'meer duurzaam beleggen' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.><IF Conditie_Q8_2 = C: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt>< IF Conditie_Q8_2 = D: Voor u is alvast 'Huidige beleggingsbeleid voortzetten' aangevinkt. Deze vooringevulde keuze is willekeurig bepaald, zonder rekening te houden met uw kenmerken.> Welke optie zou u kiezen?

1. Huidige beleggingsbeleid voortzetten
2. Meer duurzaam beleggen

SCRIPTER: Measure how many seconds the respondent spends on this page

SCRIPTER: The idea of this question is to see what respondents do if one of the two answer options has already been selected for them. Will they then just follow the 'advised' option or will they actively change the selected answer? Therefore, when the respondents open this page one of the answer options should already be selected. The answer that should be selected depends on the condition.

IF Conditie_Q8_2 = A | B -> Q9b = 2 should be selected

IF Conditie_Q8_2 = C | D -> Q9b = 1 should be selected

IF: Conditie_Q8_1 = 3 (Rest Duurzaam – Controle Risico)

Q9c [S]

Het pensioenfonds denkt ook na over het renterisico. Dit houdt in dat het fonds meer geld in kas moet hebben om in de toekomst pensioen te kunnen uitkeren als de rente daalt. Een deel van dit renterisico heeft het pensioenfonds al afgedekt. Het pensioenfonds kan dit renterisico nog verder afdekken door een verzekering te sluiten, maar dat kost wel geld.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige rentebeleid voortzetten of meer renterisico afdekken. Welke optie zou u kiezen?

1. Huidige rentebeleid voortzetten
2. Meer renterisico afdekken

SCRIPTER: Measure how many seconds the respondent spends on this page

IF: Conditie_Q8_1 = 4 (Rest risico – Controle duurzaam)

Q9d [S]

Het pensioenfonds denkt ook na over duurzaamheid en wil meer duurzaam gaan beleggen met het pensioengeld. Het pensioenfonds wil dus meer investeren in projecten die bijvoorbeeld goed zijn voor mens en milieu. Mogelijk leidt dat wel tot hogere kosten van de beleggingen of lagere rendementen.

Het pensioenfonds vraagt nu aan de deelnemers wat te doen: het huidige beleggingsbeleid voortzetten of meer duurzaam gaan beleggen. Welke optie zou u kiezen?

1. Huidige beleggingsbeleid voortzetten
2. Meer duurzaam beleggen

SCRIPTER: Measure how many seconds the respondent spends on this page

Financial Knowledge questions

IF Doelgroep = 4 (Alle respondenten)

Q57 [S]

Veronderstel dat u 100 Euro op een spaarrekening hebt. De rente is twee procent per jaar. Hoeveel denkt u dat u na vijf jaar op de spaarrekening hebt, ervan uitgaande dat u al het geld op deze rekening laat staan?

1. Meer dan 102 Euro [correct]
2. Precies 102 Euro
3. Minder dan 102 Euro
4. Weet ik niet

IF Doelgroep = 4 (Alle respondenten)

Q58 [S]

Veronderstel dat de rente op uw spaarrekening één procent per jaar is. De inflatie is gelijk aan twee procent per jaar. Zou u met het geld dat vandaag op uw rekening staat over één jaar meer, precies hetzelfde of minder kunnen kopen?

1. Meer
2. Precies hetzelfde
3. Minder [correct]
4. Weet ik niet

IF Doelgroep = 4 (Alle respondenten)

Q59 [S]

Is de volgende uitspraak volgens u waar of niet waar?: "Een aandeel van een bedrijf geeft normaal gesproken een zekerder rendement dan een beleggingsfonds dat alleen in aandelen belegt?"

1. Waar
2. Niet waar [correct]
3. Weet ik niet

Appendix D – Statistical model using Logistic Mixed-Effects Model

Both domains	Model 1		Model 2	
	<i>b</i>	OR [95% CI]	<i>b</i>	OR [95% CI]
Nudge to change	1.02	2.78 [2.05, 3.78] ***	1.03	2.79 [2.06, 3.79] ***
Nudge to change—random	0.72	2.05 [1.53, 2.76] ***	0.73	2.07 [1.54, 2.78] ***
Nudge to keep	-1.13	0.32 [0.23, 0.45] ***	-1.13	0.32 [0.23, 0.45] ***
Nudge to keep—random	-0.92	0.40 [0.29, 0.55] ***	-0.93	0.39 [0.29, 0.54] ***
Domain (sustainable inv.)	0.09	1.10 [0.91, 1.32]	0.09	1.10 [0.91, 1.32]
Round (2)	0.07	1.07 [0.89, 1.29]	0.07	1.07 [0.89, 1.29]
Gender (female)			0.24	1.27 [1.03, 1.56] *
Age			-0.00	1.00 [0.99, 1.00]
Fin. literacy			0.09	1.00 [0.99, 1.00]
Intercept	-0.20	0.82 [0.68, 0.99] *	-0.37	1.10 [0.99, 1.22]
Observations	2152		2152	
Pseudo R^2 (fixed effects)	.11		.12	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval

Table D1: Logistic Mixed-Effects Model Results for Fixed Effects on Likelihood of Selecting a Change in Policy, Controlling for the Effect of Round, and Gender and Age in Model 2.

Sustainable Investment	Model 1		Model 2	
	<i>b</i>	OR [95% CI]	<i>b</i>	OR [95% CI]
Nudge to change	0.81	2.26 [1.53, 3.33] ***	0.83	2.30 [1.56, 3.41] ***
Nudge to change—random	0.46	1.58 [1.07, 2.34] *	0.45	1.56 [1.05, 2.32] *
Nudge to keep	-1.28	0.28 [0.18, 0.43] ***	-1.30	0.27 [0.17, 0.43] ***
Nudge to keep—random	-0.95	0.39 [0.25, 0.58] ***	-0.93	0.40 [0.26, 0.60] ***
Round (2)	0.05	1.05 [0.81, 1.35]	0.04	1.05 [0.81, 1.35]
Gender (female)			0.16	1.17 [0.90, 1.53]
Age			-0.01	0.99 [0.98, 1.00] *
Fin. literacy			0.11	1.11 [0.97, 1.28]
Intercept	-0.01	0.99 [0.80, 1.23]	0.12	1.12 [0.59, 2.13]
Observations	1076		1076	
Pseudo R^2 (Cragg-Uhler)	.11		.13	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval

Table D2: Logistic Regression Model Results for Fixed Effects on Likelihood of Selecting a Change in Policy, Controlling for the Effect of Round, and Gender and Age in Model 2.

Interest Risk	Model 1		Model 2	
	<i>b</i>	OR [95% CI]	<i>b</i>	OR [95% CI]
Nudge to change	1.11	3.02 [1.99, 4.60] ***	1.12	3.05 [2.00, 4.65] ***
Nudge to change—random	0.86	2.37 [1.60, 3.50] ***	0.87	2.37 [1.60, 3.52] ***
Nudge to keep	-0.84	0.43 [0.28, 0.66] ***	-0.84	0.43 [0.28, 0.66] ***
Nudge to keep—random	-0.76	0.47 [0.31, 0.71] ***	-0.77	0.46 [0.31, 0.70] ***
Round (2)	0.09	1.10 [0.85, 1.41]	0.09	1.09 [0.85, 1.41]
Gender (female)			0.28	1.32 [1.02, 1.72] *
Age			0.00	1.00 [0.99, 1.01]
Fin. literacy			0.06	1.06 [0.92, 1.22]
Intercept	-0.27	0.76 [0.61, 0.95] *	-0.69	0.50 [0.27, 0.94] *
Observations	1076		1076	
Pseudo R^2 (Cragg-Uhler)	.12		.12	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. CI = Confidence Interval

Table D3: Logistic Regression Model Results for Fixed Effects on Likelihood of Selecting a Change in Policy, Controlling for the Effect of Round, and Gender and Age in Model 2.