Pension scheme trustees as surrogate decision makers*

Leonardo Weiss-Cohen, Peter Ayton, Iain Clacher

University of Leeds

Volker Thoma

University of East London

Abstract

Pension trustees make surrogate decisions on behalf of scheme members. However, prior research has not explored how this might affect pension adequacy. Our survey shows that when choosing notional targets for pension replacement income, trustees project their own preferences instead of reflecting member preferences. Furthermore, projection is more pronounced for trustees with lower financial literacy. Trustees choose significantly higher pension replacement rates for members than members choose for themselves. The economic consequences are potentially considerable, due to high levels of pension contributions and incompatible risk-taking. Understanding the dynamics of decisions made by trustees is indispensable to ensure better member outcomes.

Keywords: behavioral finance, decision-making, pensions, trustees, surrogate decisions, financial literacy

JEL: D1, H3, L2

*The authors acknowledge funding from the Actuarial Research Centre of the Institute and Faculty of Actuaries. We thank Aon for providing access to pension scheme trustees. Corresponding author: Leonardo Weiss-Cohen (l.w.cohen@leeds.ac.uk)

1. Introduction

As governments struggle to finance state provision of pension schemes due to ageing populations, most individuals will need to rely on private pension savings to achieve an adequate income in retirement (OECD, 2019). Consequently, there has been a concerted policy effort by governments to significantly increase the number of employees saving into private workplace pension schemes, using policy tools such as automatic enrolment (Thaler and Benartzi, 2004).[1] As a result, private pension fund assets under management in many countries are now greater than 100% of their respective GDPs (OECD, 2019, p.211). In the UK, for example, private pension assets have doubled in the last decade, reaching US$2.8 trillion as of 2018, equivalent to 104.5% of the country's GDP.

Private pension schemes in the UK and elsewhere are often managed by boards of trustees who make decisions on behalf of members across many dimensions (Bunt et al., 1998; Clark, 2004). This can include the default level of contributions and how the funds are invested. However, while private pension schemes members often have the flexibility to change the investment parameters, most members accept the defaults as set by trustees (Byrne et al., 2007; Madrian and Shea, 2001). Pension scheme investment choices are therefore mostly made by trustees on behalf of members and, consequently, trustees act as surrogate decision-makers.

Several studies have shown that surrogates decide differently on behalf of others than for themselves (Polman and Wu, 2020; Tunney and Ziegler, 2015). Surrogates are more invested, thorough, rational, and analytic when choosing for others (Garcia-Retamero and Galesic, 2012; Liu et al., 2018; Polman and Vohs, 2016). As a result, decisions made by surrogates can be less susceptible to cognitive biases (Polman, 2010; Ubel et al., 2011; Ziegler and Tunney, 2012, 2015).

Such differences in decision-making processes can result in the choices made by surrogates on behalf of others diverging from the choices that others would make for themselves (Sulmasy et al., 1998; Uhlmann et al., 1988). For example, when making risky choices for

[1] According to the OECD (2019), Italy, Germany, Lithuania, New Zealand, Poland, Quebec (in Canada), Turkey, the United Kingdom, and some companies in the United States and other provinces of Canada have automatic enrolment in place.

others, surrogates are less sensitive to negative outcomes (Polman, 2012b) and show lower loss-aversion (Andersson et al., 2016; Polman, 2012a). Moreover, surrogates do not accurately predict other people's risk preferences (Faro and Rottenstreich, 2006; Hsee and Weber, 1997). Instead, surrogates project their own preferences onto others, and consequently, their decisions are closer to what the surrogate would do themselves than what the other would want (Fagerlin et al., 2001; Pruchno et al., 2005).

Behavioral finance research on pensions has studied individuals' decisions about their own pensions (e.g., Benartzi and Thaler, 2007), largely ignoring decisions made by institutional investors, such as trustees. Nevertheless, the limited research on trustees shows that pension scheme trustees are not immune from decision biases (e.g., Clark et al., 2007; Weiss-Cohen et al., 2020). Our research adds to this small but growing knowledge base on the impact of trustee decision-making biases on pension outcomes. Specifically, we investigate whether trustees project their own preferences when choosing on behalf of members. Given the scale of private pension fund assets, examining this issue is fundamentally important because decisions made by trustees can significantly affect financial markets, investment levels in the real economy, and the future retirement outcomes of millions of people.

2. Methods

We conducted an online survey which asked both pension scheme trustees and members in the UK what they believed were appropriate levels of private pension replacement rates for themselves and for an average scheme member. Pension replacement rates were defined as the post-retirement pension income as a percentage of the final salary before retirement.

The target replacement rate is an important choice in the design of a retirement pension scheme (OECD, 2013), as the rate targeted will set contributions levels required from employers and employees and the investment strategy for the scheme. If targeted replacement rates are too high, the scheme might require excessive contributions today, or take on too much investment risk. If target replacement rates are too low, then contributions may not be adequate, or the asset allocation of the default fund too risk averse to provide sufficient income in retirement.

The UK Pensions Commission[2] considered the issue of pension adequacy, and recommended benchmark replacement rates, based on expenditure patterns in retirement, survey evidence of people's preferences, and international comparisons (Pensions Commission, 2004). According to their figures, the private pension replacement rate should be around 35% for individuals at median income or higher (in addition to the state pension, see Appendix A).

2.1. Participants

Access to trustees was provided by Aon UK, an investment consulting firm. We collected a total of 132 responses. Data was collected on-line using mailing lists (N=102), and in-person at pension conferences (N=30).[3] Twelve participants were excluded: Nine for answering "no" to the question "Are you a trustee of a pension fund?" and three for providing nonsensically high replacement rates above 10,000%.

Pension scheme members were accessed on-line using Prolific Academic. Only individuals employed and resident in the UK could participate. Due to the success of automatic enrolment, 76% of UK employees are currently members of a private pension scheme (Office for National Statistics, 2019), so we expected that most participants would be private pension scheme members, which proved to be the case. We collected 150 responses, of which 11 were excluded for answering "no" to the question "do you contribute (or have you contributed in the past) towards a workplace pension scheme?"

2.2. Design

The survey included a brief introductory explanation of private pensions, contributions, and replacement rates. Participants were then asked what they believed were appropriate levels of private pension replacement rates, as percentage of final pre-retirement income, for themselves, and for an average pension scheme member. Participants were told to exclude state pensions from their responses, and to assume no additional income from savings or inheritance. The ordering of the questions (self vs. other) was randomized and did not influence the responses. For trustees only, we asked separately for replacement rates for an

[2]The UK Pensions Commission (2002 and 2004) was an independent body set up by the UK government to review and make recommendations on the regime for UK private pensions and long-term savings.

[3]Our results and conclusions remain the same when excluding the data collected in-person.

average defined-benefit (DB) and an average defined-contribution (DC) scheme member. For members only, we asked for appropriate levels of pension contributions before retirement, and what they believed their final pre-retirement salary would be. All participants completed a 14-question financial literacy questionnaire, adapted from Fernandes et al. (2014).

2.3. Results

Table 1: Means of data captured (SE in brackets). Post-retirement replacement income rates and pre-retirement pension contributions as percentages of final salary.

	Trustees	Members
Replacement rates:		
Self	54.8% (1.3%)	31.6% (2.2%)
Other	55.0%† (1.2%)	27.5% (2.1%)
Other (DB)	58.7% (1.3%)	
Other (DC)	51.2% (1.3%)	
Contribution rates:		
Self		9.7% (0.6%)
Other		11.9% (0.8%)
Financial literacy (Max=14)	12.3 (0.1)	7.6 (0.2)
Age (years)	60.1 (0.9)	37.3 (0.8)
Final salary (£'000)		42.1 (1.9)
N	120	139
Gender (Female)	11.7%	51.1%

Note: All comparable values between trustees and members are significantly different at $p<.001$. †: The overall value for "Replacement rate: Other" for Trustees was calculated from the mean of DB and DC for each individual.

Variables captured are shown in Table 1.[4] If trustees are making surrogate decisions consistent with member wishes, then the replacement rates they choose for members should be similar to the ones members choose for themselves. This was not the case. Instead, the replacement rates chosen by trustees for members (average between DB and DC responses) were

[4]All materials, raw data and the R script for the analyses are available online at https://osf.io/xfvqr/.

significantly higher than those chosen by members for themselves (Trustee/Other: 55.0%; Member/Self: 31.6%; $t(206)=9.29$, $p<.001$).

Consistent with the notion that trustees project their own preferences, there was a significant positive correlation between the replacement rates trustees chose for members and the rates they chose for themselves (Trustees: $r(118)=0.52$, $p<.001$, see Figure 1). Trustees chose higher replacement rates for themselves than members chose for themselves (Trustee/Self: 54.8%; Member/Self: 31.6%; $t(221)=8.94$, $p<.001$). Because trustees projected their higher self-replacement rate into their judgment of what members would prefer, this led to differences between the trustee/other and the member/self-replacement rates.

Financial literacy moderated the strength of self-projection for trustees (see Appendix Table B.3).[5] The projection of self-preferences was stronger for trustees with financial literacy below the median ($r(61)=0.68$, $p<.001$) than for trustees with financial literacy above the median ($r(55)=0.32$, $p=.01$, see Figure 1). Trustees with higher financial literacy are more likely to have an objective view of replacement rates based on underlying fundamentals and do not need to anchor replacement rates on their own preferences. However, there was no difference in replacement rates for others between trustees with high or low financial literacy (Trustee/Other/High: 55.6%; Trustee/Other/Low: 54.5%; $t(108)=0.48$, $p=.63$). Despite the lower projection, trustees with higher financial literacy still chose higher replacement rates for average members.

There was a significant difference between the replacement rates that trustees chose for average DB and DC members (DB: 58.7%; DC: 51.3%; $t(119)=6.60$, $p<.001$). This is perhaps a reflection of trustees' own personal experience, as trustees are older on average (Clark et al., 2007) and have largely benefited from more generous DB pension plans with historically high replacement rates. In theory, there is no actuarial justification for setting different targets between DB and DC schemes, other than historical differences: if they are funded and invested correctly, both types should be able to generate the same level of retirement income (Samwick and Skinner, 2004).[6] Members were significantly younger, with the average age of members

[5] We thank an anonymous reviewer for pointing us towards this direction.

[6] It is worth noting that the trustees in our sample came from schemes with both DB and DC plans, and so should be experienced with both types of plans.

matching the most commonly represented age group of workplace pension contributors (Office for National Statistics, 2019). Trustees also had higher financial literacy than members, but the observed differences in replacement rates remained even after controlling for demographic differences in gender, age, and financial literacy (see Appendix Table B.4).

Replacement rates selected by trustees for the members were significantly higher than the level suggested by the Pensions Commission of 35% ($t(119)=17.16$, $p<.001$). In comparison, the replacement rates selected by members for themselves was not significantly different from the Pensions Commission figure ($t(138)=1.53$, $p=.13$). Instead, the levels of contributions chosen by the members were relatively well aligned to their pension replacement rate expectations, according to UK's The Money Advice Service (2020), which provides a pension prediction tool (see Appendix C). To reach the higher levels of replacement income chosen by the trustees, the total contribution required (across employers and employees) would be almost twice the members' preferences (and the benchmark, see Appendix C).

3. Discussion

Our results show that trustees project their own preferences instead of reflecting member preferences when choosing pension replacement rates for members. Trustees consistently chose higher replacement rates than members, and these replacement rates were much closer to what trustees would like for themselves compared to members' own personal choices. One possible explanation is that trustees incorrectly predict member preferences, believing members' preferences to be close to their own. That the correlation between trustees' self-replacement rates and their recommendation for members was higher for trustees with lower financial literacy suggests that at least some proportion of surrogate projection reflects 'heuristic' - rather than principled - judgment.

Alternatively, trustees might be able to correctly predict member preferences but choose to ignore them. Instead of deciding based on what members *would* do, trustees choose based on what members *should* do, a common strategy in surrogate decision making (Stone and Allgaier, 2008). Perhaps trustees believe that the lower rates that members choose for themselves will not be adequate for a comfortable retirement, and instead overrule member preferences with a higher target. Supporting this view, research has shown that surrogates

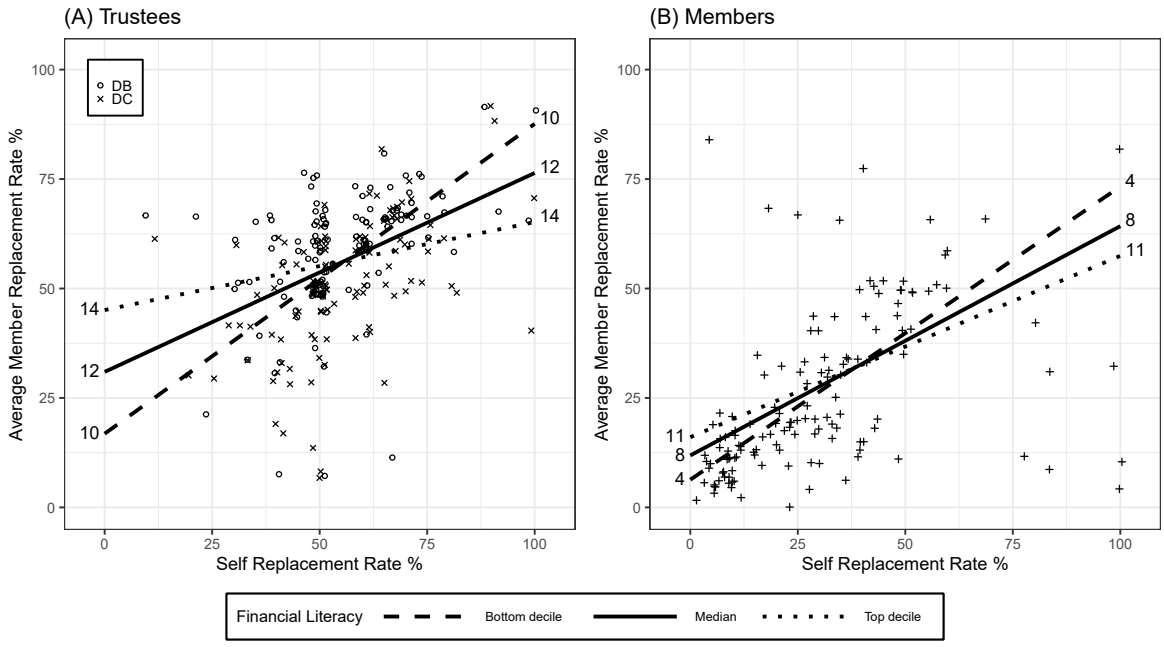

Figure 1: Responses to questions about pension replacement income rates for self vs. average member, when asking (A) pension scheme trustees and (B) pension scheme members. Trustees' responses for DB and DC schemes are shown separately. Members' responses were significantly lower than trustees'. The correlation between self and other is shown by the slope of the lines, indicating that participants projected their self-preferences. Each line shows the predicted responses for different levels of financial literacy. The figures next to the lines identify their respective financial literacy scores (bottom, median, and top deciles for each dataset). The strength of projection of self-preferences was higher for individuals with lower financial literacy.

believe that other people's money has lower purchasing power (Polman et al., 2018). Consequently, trustees might think that members need more money to afford an appropriate level of goods and services in retirement.

However, the replacement rates chosen by trustees of around 55% were not only significantly higher than members' preferred rates, they were also higher than the benchmarks suggested by the Pensions Commission (2004), of around 35%. In fact, the replacement rates of 32% chosen by the members for themselves were closer to the proposed benchmark. It is likely that some trustees are aware of the Pensions Commission benchmarks, and most trustees undertake training and continuing professional development courses (Myners, 2001). However, the recommendations of the Pensions Commission did not create a legal obligation on target replacement rates. As trustees struggle to process the large amount of information

they receive in discharging their duties (Ayton et al., 2021), it is possible that this figure is simply lost among myriad other figures. The question then is not why member replacement rates are low in comparison to trustees', but instead, why trustees' replacement rates are high in comparison to those of members.

A low degree of member representativeness on trustee boards might contribute to the observed differences in target replacement rates between trustees and members. As trustees are typically more often male, older, retired, richer, and better educated than members (Clark et al., 2007; Myners, 2001), they may lack a good understanding of the needs of members (Table 1). Intergenerational cohort differences might also come into play, with the older generations accustomed to the era of more generous DB pensions, while younger generations are aware that they will, in all likelihood, have a lower pension income in retirement in comparison to previous generations of retirees.

If trustees are targeting higher replacement rates than needed, they are likely to be demanding too much in contributions from members and/or employers, or taking too much investment risk. A review by Polman and Wu (2020) has shown how individuals can take more risk when deciding on behalf of others. Indeed, Byrne et al. (2007) observed that default funds for DC pension schemes were typically risky, with high exposures to equities. This is important for member outcomes, as higher risk-taking can jeopardize overall pension adequacy, by reducing the likelihood of successfully meeting retirement income targets, due to the increased volatility associated with riskier investment strategies (Park, 2009).

3.1. Conclusions

To provide good value for members, it is important for trustees to understand member preferences. However, our survey shows disparities between trustee and member preferences, consistent with research in surrogate decision-making. Trustees of DC schemes in the UK are legally required to act in accordance with the DC Code of Practice (The Pensions Regulator, 2016), which requires schemes to "understand the characteristics of their members and, where possible, their preferences and financial needs, and to take this into consideration when exercising their judgement" (§116, p.27). Worryingly, surveys have shown that 72% of schemes do not consult with members when defining crucial aspects of scheme management to comply with this requirement (The Pensions Regulator, 2019).

It is not obvious how this issue can best be addressed. More engagement and communication with members could help to mitigate the misalignment between trustees and members. However, Matheis-Kraft and Roberto (1997) and Ditto et al. (2001) have shown that even holding ex-ante discussions between surrogates and others did not help re-align preferences. Perhaps a better alternative, proposed by West (1996), is to use ex-post feedback-loops on past decisions, which can help surrogates learn the preferences of others over time.

Ensuring that surrogates (trustees) are similar to others (members) would allow for better matching of preferences (Hoch, 1987). The current UK regulatory framework attempts to make trustee boards more representative by requiring at least one third of trustees to be nominated by members (Myners, 2001). Despite this initiative, the composition of trustee boards both lack diversity and remain very different from the demographics of scheme members.

While our research relied on a self-reported scenario-based survey, further field research is needed to explore how these differences in preferences between trustees and members translate into actual long-term distortions to pension fund contributions, investment risk-taking, retirement income levels, and member satisfaction. It is likely that the surrogacy biases we have observed go beyond replacement rates and into other areas of pension scheme governance, which can detrimentally affect member outcomes.

References

Andersson, O., Holm, H.J., Tyran, J.R., Wengström, E., 2016. Deciding for others reduces loss aversion. Management Science 62, 29–36. doi:10.1287/mnsc.2014.2085.

Ayton, P., Clacher, I., Strong, C., Thoma, V., Weiss-Cohen, L., 2021. Pension trustee decision making. Actuarial Research Centre: Institute and Faculty of Actuaries, London, UK.

Benartzi, S., Thaler, R.H., 2007. Heuristics and biases in retirement savings behavior. Journal of Economic Perspectives 21, 81–104. doi:10.1257/jep.21.3.81.

Bunt, K., Winterbotham, M., Williams, R., 1998. The role of pension scheme trustees. Department of Social Security, Leeds, UK.

Byrne, A., Blake, D., Cairns, A., Dowd, K., 2007. Default funds in UK defined-contribution plans. Financial Analysts Journal 63, 40–51.

Clark, G.L., 2004. Pension fund governance expertise and organizational form. Journal of Pension Economics and Finance 3, 233–253. doi:10.1017/S1474747204001556.

Clark, G.L., Caerlewy-Smith, E., Marshall, J.C., 2007. The consistency of UK pension fund trustee decision-making. Journal of Pension Economics and Finance 6, 67–86. doi:10.1017/S1474747206002629.

Ditto, P.H., Danks, J.H., Smucker, W.D., Bookwala, J., Coppola, K.M., Dresser, R., Fagerlin, A., Gready, R.M., Houts, R.M., Lockhart, L.K., Zyzanski, S., 2001. Advance directives as acts of communication. Archives of Internal Medicine 161, 421–430. doi:10.1001/archinte.161.3.421.

Fagerlin, A., Ditto, P.H., Danks, J.H., Houts, R.M., 2001. Projection in surrogate decisions about life-sustaining medical treatments. Health Psychology 20, 166–175. doi:10.1037/0278-6133.20.3.166.

Faro, D., Rottenstreich, Y., 2006. Affect, empathy, and regressive mispredictions of others' preferences under risk. Management Science 52, 529–541. doi:10.1287/mnsc.1050.0490.

Fernandes, D., Lynch, J.G., Netemeyer, R.G., 2014. Financial literacy, financial education, and downstream financial behaviors. Management Science 60, 1861–1883. doi:10.1287/mnsc.2013.1849.

Garcia-Retamero, R., Galesic, M., 2012. Doc, what would you do if you were me? On self-other discrepancies in medical decision making. Journal of Experimental Psychology: Applied 18, 38–51. doi:10.1037/a0026018.

Hoch, S.J., 1987. Perceived consensus and predictive accuracy: The pros and cons of projection. Journal of Personality and Social Psychology 53, 221–234. doi:10.1037/0022-3514.53.2.221.

Hsee, C.K., Weber, E.U., 1997. A fundamental prediction error: Self-other discrepancies in risk preference. Journal of Experimental Psychology: General 126, 45–53. doi:10.1037//0096-3445.126.1.45.

Liu, Y., Polman, E., Liu, Y., Jiao, J., 2018. Choosing for others and its relation to information search. Organizational Behavior and Human Decision Processes 147, 65–75. doi:10.1016/j.obhdp.2018.05.005.

Madrian, B., Shea, D., 2001. The power of suggestion: Inertia in 401(k) participation and savings behavior. The Quarterly Journal of Economics 116, 1149–1187. doi:10.1162/003355302753399436.

Matheis-Kraft, C., Roberto, K.A., 1997. Influence of a values discussion on congruence between elderly women and their families on critical health care decisions. Journal of Women & Aging 9, 5–22. doi:10.1300/J074v09n04.02.

Myners, P., 2001. Institutional investment in the United Kingdom: A review. HM Treasury, London, UK.

OECD, 2013. Design and delivery of defined contribution (DC) pension schemes. URL: www.oecd.org/daf/fin/private-pensions/ designingfundedpensionplans.htm.

OECD, 2019. Pensions at a Glance 2019: OECD and G20 Indicators. OECD Publishing, Paris. doi:10.1787/b6d3dcfc-en.

Office for National Statistics, 2019. Employee workplace pensions in the UK: 2018 provisional and 2017 revised results. Office for National Statistics, London. URL: www.ons.gov.uk/employmentandlabourmarket/.

Park, Y., 2009. Plan demographics, participants' saving behavior, and target-date fund investments. EBRI issue brief , 1–41.

Pensions Commission, 2004. Pensions: Challenges and Choices. TSO (The Stationery Office), London, UK.

Polman, E., 2010. Information distortion in self-other decision making. Journal of Experimental Social Psychology 46, 432–435. doi:10.1016/j.jesp.2009.11.003.

Polman, E., 2012a. Effects of self-other decision making on regulatory focus and choice overload. Journal of Personality and Social Psychology 102, 980–993. doi:10.1037/a0026966.

Polman, E., 2012b. Self-other decision making and loss aversion. Organizational Behavior and Human Decision Processes 119, 141–150. doi:10.1016/j.obhdp.2012.06.005.

Polman, E., Effron, D.A., Thomas, M.R., 2018. Other people's money: Money's perceived purchasing power is smaller for others than for the self. Journal of Consumer Research 45, 109–125. doi:10.1093/jcr/ucx119.

Polman, E., Vohs, K.D., 2016. Decision fatigue, choosing for others, and self-construal. Social Psychological and Personality Science 7, 471–478. doi:10.1177/1948550616639648.

Polman, E., Wu, K., 2020. Decision making for others involving risk: A review and meta-analysis. Journal of Economic Psychology 77, 102184. doi:10.1016/j.joep.2019.06.007.

Pruchno, R.A., Lemay, E.P., Feild, L., Levinsky, N.G., 2005. Spouse as health care proxy for dialysis patients: Whose preferences matter? Gerontologist 45, 812–819. doi:10.1093/geront/45.6.812.

Samwick, A.A., Skinner, J., 2004. How will 401(k) pension plans affect retirement income? American Economic Review 94, 329–343. doi:10.1257/000282804322970832.

Stone, E.R., Allgaier, L., 2008. A social values analysis of self-other differences in decision making involving risk. Basic and Applied Social Psychology 30, 114–129. doi:10.1080/01973530802208832.

Sulmasy, D.P., Terry, P.B., Weisman, C.S., Miller, D.J., Stallings, R.Y., Vettese, M.A., Haller, K.B., 1998. The accuracy of substituted judgments in patients with terminal diagnoses. Annals of Internal Medicine 128, 621–629. doi:10.7326/0003-4819-128-8-199804150-00002.

Thaler, R.H., Benartzi, S., 2004. Save More Tomorrow: Using behavioral economics to increase employee saving. Journal of Political Economy 112, S164–S187. doi:10.1086/380085.

The Money Advice Service, 2020. Pension calculator. URL: `www.moneyadviceservice.org.uk/en/tools/pension-calculator`.

The Pensions Regulator, 2016. Code of practice no 13: Governance and administration of occupational trust-based schemes providing money purchase benefits. URL: `www.tpr.gov.uk/dccode`.

The Pensions Regulator, 2019. Defined Contribution trust-based pension schemes research. The Pensions Regulator, London.

Tunney, R.J., Ziegler, F.V., 2015. Toward a psychology of surrogate decision making. Perspectives on Psychological Science 10, 880–885. doi:10.1177/1745691615598508.

Ubel, P.A., Angott, A.M., Zikmund-Fisher, B.J., 2011. Physicians recommend different treatments for patients than they would choose for themselves. Archives of Internal Medicine 171, 630–634. doi:10.1001/archinternmed.2011.91.

Uhlmann, R.F., Pearlman, R.A., Cain, K.C., 1988. Physicians' and spouses' predictions of elderly patients' resuscitation preferences. Journal of Gerontology: Medical Sciences 43, M115–M121. doi:10.1093/geronj/43.5.M115.

Weiss-Cohen, L., Ayton, P., Clacher, I., 2020. Extraneous menu-effects influence financial decisions made by pension trustees. Economics Letters 187, 108895. doi:10.1016/j.econlet.2019.108895.

West, P.M., 1996. Predicting preferences: An examination of agent learning. Journal of Consumer Research 23, 68–80. doi:10.2307/256788.

Ziegler, F.V., Tunney, R.J., 2012. Decisions for others become less impulsive the further away they are on the family tree. PLoS ONE 7, e49479. doi:10.1371/journal.pone.0049479.

Ziegler, F.V., Tunney, R.J., 2015. Who's been framed? Framing effects are reduced in financial gambles made for others. BMC Psychology 3, 1–6. doi:10.1186/S40359-015-0067-2.

Appendix A. Benchmark replacement rates

We replicate the UK Pensions Commission original benchmarks for pension replacement rates (Figure 4.11 Pensions Commission, 2004, p.143), updated to 2019 according to wage inflation, in Table A.2. We split their benchmarks into two components, public and private pensions, based on the UK's public pension allowances in 2019. According to these figures, the state pension should provide most of the income for low earners, but for anyone at median income or higher (£29,400 in the UK in 2019), most of their pension income should come from private schemes, and the private replacement rate stays at around 35%.

Table A.2: Benchmark replacement rates from the Pensions Commission (2004) report, updated to 2019 income levels, and split by state and private pensions.

		Replacement rates		
2004 Gross income	2019 gross income	Total	State	Private
<£9,500	<£12,200	80%	60%	20%
£9,500 - 17,499	£12,200 - 22,399	70%	40%	30%
£17,500 - 24,999	£23,400 - 31,999	67%	30%	37%
£25,000 - 50,000	£32,000 - 51,300	60%	25%	35%
>£50,000	>£51,300	50%	15%	35%

Appendix B. Further correlation and regression analyses

We ran two regression analyses for the main dependent variable, replacement rates for other (i.e., for an average member), as predicted by replacement rates for self and demographics, one for each sample (trustees and members). For the trustees' regression, we used a mixed-effects model with a random intercept for each participant, to account for individual differences within their two responses (DC or DB). A dummy variable identifying the response as either DB or DB was also added to the model for trustees, and its coefficient was significant, indicating that trustees provided higher responses for DB replacement rates. For both regressions, there was a significant correlation between replacement rates for other and replacement rates for self, showing the projection of self preferences on surrogate decisions (Table B.3). For trustees only, there was an interaction between financial literacy

and the projection of self-preferences. The negative coefficient indicates that the strength of self-projection reduced as financial literacy increased. The coefficients for age, gender, or question ordering were not significant.

To ensure that the differences in replacement rates between members and trustees was not determined by differences in ages or financial literacy, we created subsets of the data in which the two groups were more closely matched (Table B.4). One subset included only members and trustees with financial literacy between 10 and 13, and the other subset only included those with age between 38 and 58. These ranges were chosen as they were the overlap of the 95% percentiles of each of the two groups' data.

In the subset of participants matched by financial literacy, trustees still chose higher replacement rates for members than members for themselves ($t(55.66)=6.56$, $p<.001$). In the age-matched group, there was a significantly lower self-replacement rate for trustees. This confirms that younger trustees have lower preferences than older trustees. However, matching the ages of trustees and members did not change the results. Even within the matched subset, trustees still choose higher replacement rates for members than members chose for themselves ($t(86)=6.22$, $p<.001$). This is because while younger trustees chose lower replacement rates than older trustees, these were still higher than similarly aged members. The average expected final salary of financial-literacy matched members was also higher than for the full sample, but there was no correlation between financial-literacy and the replacement rates for members (Table B.3).

Appendix C. Assumptions used for the pension calculator

Table C.5 shows a series of different scenarios of the relationship between levels of pension contribution and pension income, according to The Money Advice Service (2020) in the UK. According to their standard assumptions (reproduced below), an individual who contributes 9.7% of their income throughout their entire working career can expect to earn a pension replacement income of 31.7% at retirement (if we also include a 4.1% contribution from employers, while the minimum required in the UK is currently 3%; see Scenario C in Table C.5). To reach the UK Pensions Commission benchmark replacement rate of 35%, a contribution of 11.9% would be required, which is the same as that chosen by members for others (with

Table B.3: Linear regression coefficients for the replacement rates for others (i.e., average member) against the replacement rate for self and demographics for each sample (trustees and members). Age and Financial Literacy have been mean-centered.

DV: Other (avg. member) replacement rate	(1) Trustees	(2) Members
Age (mean-centered)	0.17	0.02
	(0.11)	(0.17)
Gender = Female	2.36	2.07
	(3.21)	(3.54)
Gender = Other		3.24
		(9.12)
DB or DC = DB	7.46***	
	(0.13)	
Self replacement rate	0.46***	0.62***
	(0.08)	(0.09)
Financial literacy (mean-centered)	7.86***	2.18
	(2.30)	(1.29)
Question order = Self-Other	7.04	6.43
	(8.63)	(5.53)
Self replacement rate : Fin. Lit. (centered)	−0.13**	−0.04
	(0.04)	(0.02)
Self replacement rate : Order=Self-Other	−0.10	−0.17
	(0.15)	(0.14)
Fin. Lit. (centered) : Order=Self-Other	−1.60	−1.58
	(1.42)	(1.28)
Constant	24.65***	6.41
	(4.81)	(4.60)
Observations	120	139
Adjusted R^2	0.655	0.417

Note: *p<0.05; **p<0.01; ***p<0.001

Table B.4: Means of subsets of data used for comparing the two groups (SE in brackets). The subsets were created to more closely match the two groups in terms of financial literacy and age. The significance levels indicate differences against their respective full samples (e.g., subset of age-matched trustees against full sample of trustees).

	Fin. Lit.-matched		Age-matched	
	Trustees	Members	Trustees	Members
Replacement rates:				
Self	55.6%	32.8%	49.0%**	32.3%
	(1.4%)	(3.0%)	(1.7%)	(2.9%)
Other		27.1%		30.1%
		(2.7%)		(3.0%)
Other (DB)	58.4%		56.6%	
	(1.5%)		(1.8%)	
Other (DC)	51.1%		49.1%	
	(1.6%)		(1.8%)	
Contribution rates:				
Self		9.6%		8.7%
		(0.8%)		(0.7%)
Other		10.9%		9.8%
		(1.5%)		(0.7%)
Financial literacy	11.9*	10.9***	12.4	8.5
	(0.1)	(0.2)	(0.3)	(0.3)
Age (years)	61.1	39.5	50.8***	45.2***
	(1.0)	(1.4)	(0.7)	(0.7)
Final salary (£'000)		52.3**		38.3
		(4.0)		(2.9)
N	91	39	45	57
Gender (Female)	9.9%	30.8%	22.2%	43.9%

Note: Significance levels in comparison with the full sample: *p<0.05; **p<0.01; ***p<0.001

the minimum employer contribution; see Scenario E). What is noteworthy is that members did not simply ask for unrealistically high pension incomes with low contributions. In contrast, to reach the levels of pension replacement income of 55% suggested by the trustees, the total contribution required (across employers and employees) would be almost twice of what members prefer (and the benchmark; see Scenarios F, G, and H). An equivalent tool provided by the Irish Pension Authority gave very similar results.

Table C.5: Estimated workplace pension income in relation to pension contributions, for an individual who is currently 37 years old and will retire at 68 and has an income of £42,100. All values are shown as percentages of salary. Figures in bold are closest matches to those from our survey.

	Contributions				Pension
Scenario	Employee	Employer	Tax relief	Total	income
(A)	8.9%	3.0%	2.2%	14.1%	**27.6%**
(B)	**9.7%**	3.0%	2.4%	15.1%	29.6%
(C)	**9.7%**	4.1%	2.4%	16.2%	**31.7%**
(D)	10.6%	3.0%	2.6%	16.2%	**31.7%**
(E)	**11.9%**	3.0%	3.0%	17.9%	35.0%
(F)	15.3%	9.0%	3.8%	28.1%	**55.0%**
(G)	17.7%	6.0%	4.4%	28.1%	**55.0%**
(H)	20.1%	3.0%	5.0%	28.1%	**55.0%**

To calculate the relationship between pension contributions during employment and pension income during retirement, we used an online tool provided by The Money Advice Service (2020). We inputted an age of 37 and income of £42,100 (to match that of members captured), and retirement age of 68 (the current required by law). The tool allowed us to manipulate the level of contribution, and calculates the estimated retirement income. We calculated the tax relief ourselves by using the UK's marginal tax bracket of 20%, which is the current level in which an individual with the assumed income would fall. The tool uses a series of assumptions which cannot be changed, and we reproduce them below, verbatim, from the website.

- Monthly payments into your pension pot: Increase by 2.5% a year to reflect annual pay

rises.

- Pension charges: Charges of 0.75% a year are taken from your pension pot.
- Investment growth: Your pension investments grow by 5% a year. Your actual investment growth may be higher or lower depending on the performance of the investments in your pension pot.
- Inflation: We show the value of your pension pot and your income at the start of retirement in today's money. We do this by taking off inflation at a rate of 2.5% a year.
- Retirement income: Paid monthly. We're showing income figures before tax is taken off. We've assumed you use your pension pot to purchase an annuity which pays a guaranteed level of income for life. This income stays the same throughout retirement which means it buys less over time if prices rise.
- Tax relief: Most people get tax relief on their pension contributions. We assume tax relief is already included in your contributions.