

Improving household debt management with robo-advice

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Disclosures

- We thank the Financial Conduct Authority for funding this research
- The FCA reviewed the content of the research before it was published
- Ida Chak was an employee of the FCA while the research was conducted
- Karen Croxson is an employee of the FCA
- Francesco D'Acunto and Alberto Rossi are at Georgetown University while Jonathan Reuter is at Boston College and NBER. None have financial interests, direct or indirect, that relate to the research at hand
- Jonathan Shaw is an employee of the FCA and a Research Associate of the Institute for Fiscal Studies
- The views expressed in this paper are those of the authors and should not be attributed to the FCA. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research

Concern about consumer financial health is growing

Cost of living: Britons are borrowing more and saving less as crisis starts to hurt

Analysts say the figures are "just the tip of the iceberg" as richer households increasingly dip into savings and poorer households increasingly rely on credit.

Demand for debt services by Lloyds customers jumps 30%

Three-quarters of bank's 26m UK customers fear rising prices with 80% holding less than £500 in savings

Calls for more support for consumer decision making

Two-thirds of young people say a lack of financial education has led them into debt

Two-thirds of young people believe a lack of financial education has led them into debt, according to a report. Research has shown vital money habits and skills start to form between the ages of three and seven - yet only 38 percent of children and young people in the UK have some form of financial education in school.

Half of UK adults need 'urgent help' managing their money

As cost of living crisis bites, consumers say better financial education would reduce indebtedness

What approaches have been tried?

- Many countries have imposed **disclosure requirements** on lenders, but it is not clear whether borrowers with low levels of financial literacy can process it (Adams et al., 2021; Bertrand and Morse, 2011; Navarro-Martinez et al., 2011)
- **Financial literacy** programs can improve outcomes (Bu et al., 2020) but the ability to scale them up is limited by cognitive costs and resources

Can robo-advice help consumers better manage their money?

- We consider an alternative: robo-advice (D'Acunto et al., 2019)
- We implement a lab-based RCT to assess take-up and effectiveness
- Debt repayment is a natural setting for robo-advice:
 - Optimal choice doesn't depend on risk preferences or beliefs (unlike asset allocation)
 - It can be delivered and scaled cheaply
- But do vulnerable households display 'algorithmic aversion', limiting effectiveness for those who would benefit most?

Abbreviated preview of findings

- Robo-advice is **highly effective** at improving debt repayment decisions
- Impacts disproportionately benefit those with **low financial literacy**
- There are **no learning effects** from robo-advice – so in-the-moment support is required

Example task screenshot

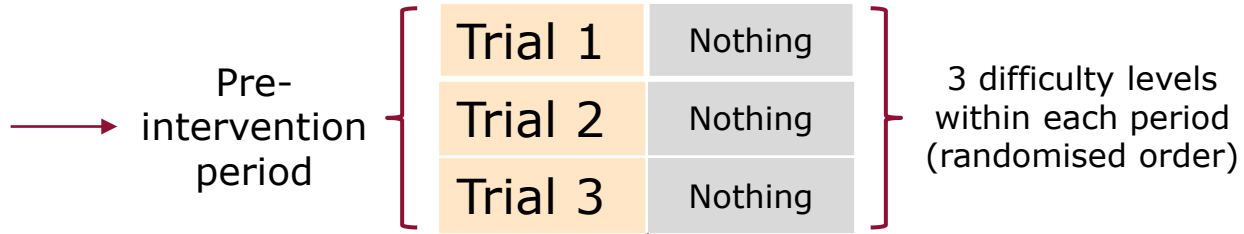
This month you have £500 set aside to pay off some of your debts. How will you split this payment across your debts to minimise interest and fees?

	Balance	Interest rate	Minimum payment	Fee for missed minimum payment	This month I will pay off...
Credit card	£329.06	25.6% APR	£7.40	£12	<input type="text" value="0.00"/>
Overdraft	£184.22	38.5% APR	£0.00	£0	<input type="text" value="0.00"/>
Credit card	£6.25	18.9% APR	£5.00	£12	<input type="text" value="0.00"/>
Revolving loan	£452.50	5.0% per month (79.5% APR)	£75.00	£50	<input type="text" value="0.00"/>
Amount still to allocate: £500					Total: £0.00

- Tasks differed in terms of (i) total amount to allocate, (ii) number of debts, (iii) presence of minimum repayments, and (iv) presentation of interest rates

Experimental Design

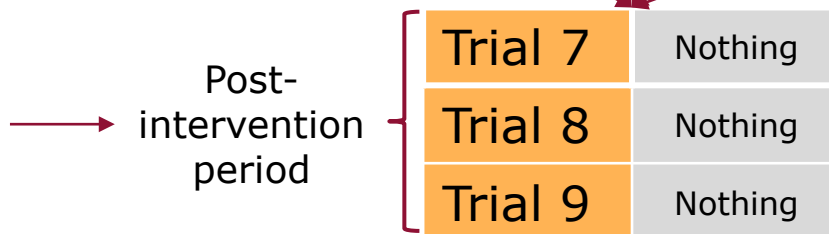
To understand how poor unaided decisions are



Intervention period

	Group 1	Group 2	Group 3	Group 4	Group 5
Trial 4	Nothing	Paid robo with educ	Free robo with educ	Free robo without educ	Paid robo without educ
Trial 5	Nothing	Paid robo with educ	Free robo with educ	Free robo without educ	Paid robo without educ
Trial 6	Nothing	Paid robo with educ	Free robo with educ	Free robo without educ	Paid robo without educ

Looks for persistence of impacts



Debt allocation task with robo-advice decision

Our automated assistant has calculated that you could save up to £74.68 this month by optimally allocating repayments across your debts. Would you like to use the automated assistant?

Accept

Reject

This month you have £500 set aside to pay off some of your debts. How will you split this payment across your debts to minimise interest and fees?

	Balance	Interest rate	Minimum payment	Fee for missed minimum payment	This month I will pay off...
Credit card	£329.06	25.6% APR	£7.40	£12	<input type="text" value="0.00"/>
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Amount still to allocate: £500					Total: £0.00

Willingness-to-pay for robo-advice

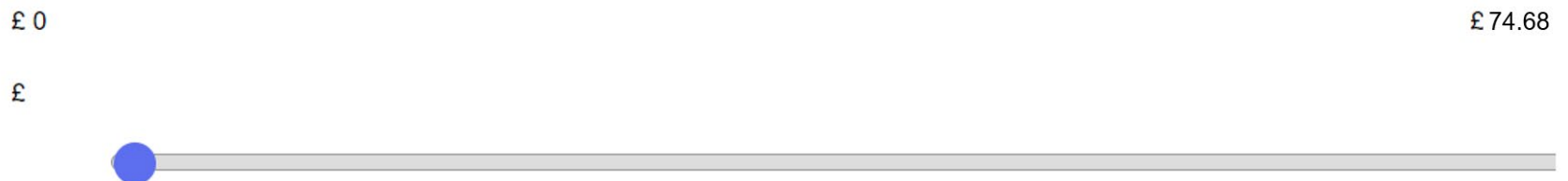
How much of the potential £74.68 you could save this month would you be willing to pay for the automated assistant?

You should respond truthfully -- after you say how much you are willing to pay, the actual price of the assistant is picked randomly.

If what you said you're willing to pay is higher than the random price, you'll buy the automated assistance at that price.

If what you said you're willing to pay is lower than the random price, you won't buy the automated assistance and will pay nothing.

How much of your potential savings are you willing to pay for the automated assistant?



Tips provided in robo-advice with education treatment

**Step 1: Pay off minimum payments.
The fee for a missed minimum payment is typically higher than the interest that could be saved elsewhere.**



Missing a minimum payment could affect your credit score.

Tips provided in robo-advice with education treatment

Step 2: Order by APR. APR stands for "annual percentage rate" and measures the interest rate over a year.



This is the only measure that helps you to compare the overall cost of different debts.

Tips provided in robo-advice with education treatment

Step 3: Pay off the debts with the highest APR first and work down



Debts with higher APRs incur more interest per pound borrowed.

Recommendation of robo-advisor

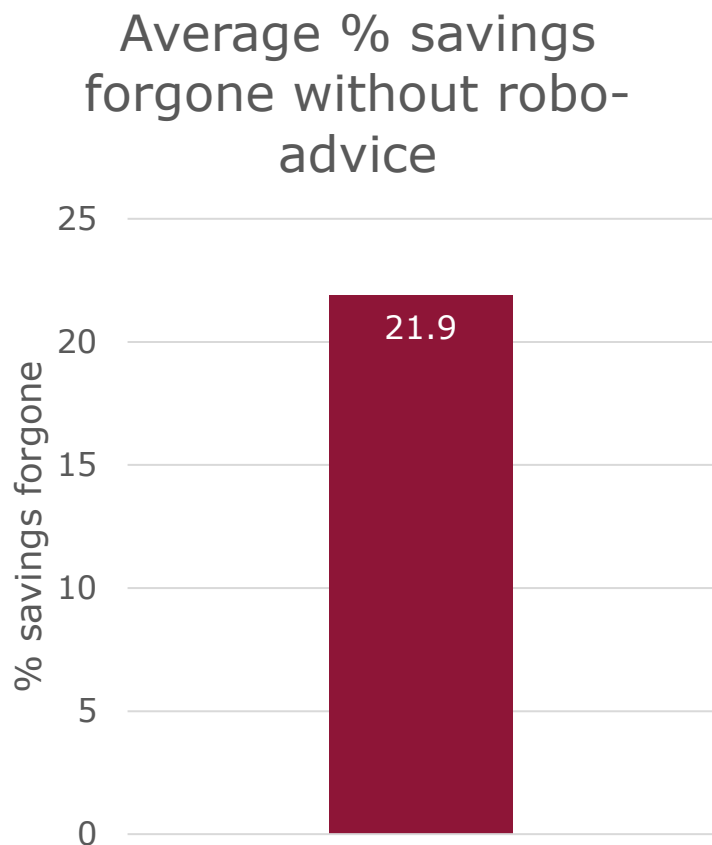
Calculation completed. Please make any changes you wish and then click confirm.

	Balance	Interest rate	Minimum payment	Fee for missed minimum payment	This month I will pay off...
Credit card	£329.06	25.6% APR	£7.40	£12	<input type="text" value="7.40"/>
Overdraft	£184.22	38.5% APR	£0.00	£0	<input type="text" value="35.10"/>
Credit card	£6.25	18.9% APR	£5.00	£12	<input type="text" value="5.00"/>
Revolving loan	£452.50	5.0% per month (79.5% APR)	£75.00	£50	<input type="text" value="452.50"/>
Amount still to allocate: £0					Total: £500.00

Data collection

- Data collected in summer 2020
- Survey administered through online platform Qualtrics
- Nationally representative sample of UK adults
- Achieved sample size of 3,423
- Incentivised: 10p paid for every £8 saved in the task (total capped at £2)
- Post-experiment survey collected measures such as financial literacy, numeracy, risk tolerance, patience, trust, algorithmic aversion, loans used over past 12 months

Absent advice, many consumers make poor repayment decisions



- Performance measured by distance from optimal choice (“% savings forgone”)
- Unaided decisions poor on average
 - Over two in three make errors
 - Equivalent to paying 3.55 ppt higher APR on average
 - For average US family with \$6,270 in credit card debt, equates roughly to paying an extra \$222 per year
- Those with low financial literacy perform worse on average

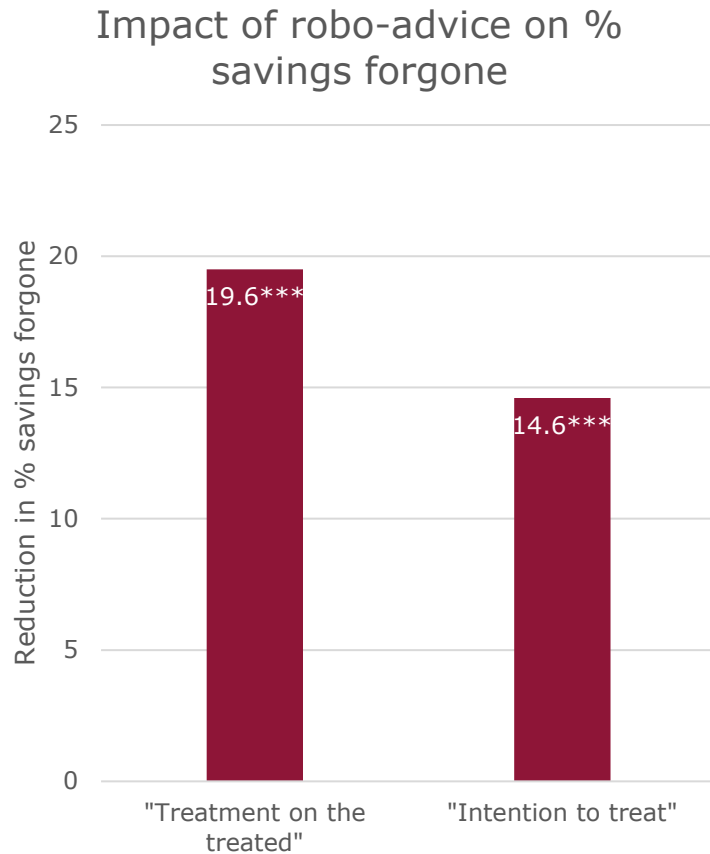
Regression specification (treatment-on-the-treated)

- Restrict to intervention phase (trials 4-6)
- Restrict to subjects in control group (group 1) and both free robo-advice groups (groups 3 and 4)
- Estimate following specification

$$pcsavingsforgone_{i,p} = \alpha_p + \beta_1 robo_{i,p} + \delta educ_i + X_i\gamma + \epsilon_{i,p}$$

- α_p are problem (task number) fixed effects
- $robo_{i,p}$ identifies whether individual i received robo-advice in problem p
- $educ_i$ identifies individuals in an education treatment
- X_i includes financial literacy, educational attainment and age
- Estimation is by OLS and standard errors are clustered by subject

Free robo-advice cuts losses by 19.6 ppt (14.6 ppt after non-take-up)



- Recall average pre-intervention losses were 21.9%
- Losses reduced by 19.6 ppt among those receiving robo-advice (some ignore robo recommendations)
- 25% reject offer of free robo-advice; allowing for this, effect falls to 14.6 ppt but still large
- Effects disproportionately benefit those with low financial literacy – levelling the playing field?

Consumers are willing to pay for robo-advice

- Willingness to pay is, on average, higher than the monetary benefits obtained from advice (£6.61 per trial vs £5.17 per trial)
- Could be due to
 - Experimental effect
 - Subjects being overly cautious
 - Wanting to avoid cognitive and psychological costs of solving repayment problems themselves

Consumers learn nothing from robo-advice

- Consumers do learn by doing: performance improves gradually across the nine trials
- The greatest improvement is for subjects in the control group who work through all the trials without help
- There is no evidence that bundled financial education or debt management tips improves performance
- Suggests robo-advising interventions can only improve borrower repayment decisions if provided repeatedly “in the moment”

Summary

- Consumers struggle to make good debt repayment decisions even when all the information is presented
- Robo-advice improves debt repayment decisions of those who receive, reducing losses by 19.6 ppt (relative to 21.9% baseline)
- Effects disproportionately benefit those with low financial literacy – levelling the playing field?
- Roughly 25% of consumers reject free robo-advice
- On average, consumers are willing to pay more for robo-advice than it saves them
- Consumers learn nothing from robo-advice even when provided with education/explanations

Why are there few real-world robo-advice implementations?

- Consumers' high valuations of robo-advice and the simplicity of execution are at odds with the lack of real-world implementations
- Market-based solutions may be limited because lenders' profits are non-monotonic in borrowers' debts
- Moreover, in the UK at least, "open finance" regulations do not yet enable loan balances to be brought together in a single interface
- Supply of robo-advice tools might require a combination of legislation, government intervention and entry by private providers unaffiliated with lenders (D'Acunto, Rossi, and Weber, 2019)