NBER WORKING PAPER SERIES

AUTOMATING SHORT-TERM PAYROLL SAVINGS: EVIDENCE FROM FOUR LARGE U.K. EXPERIMENTS

Sarah Holmes Berk
James J. Choi
Jay Garg
John Beshears
David Laibson

Working Paper 32581
http://www.nber.org/papers/w32581

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2024, Revised April 2025

Contributions: conceptualized paper (SB, JC, JB, DL), wrote paper (SB, JC), edited paper (JB, DL), implemented empirical analysis (SB, JG), project leadership (SB, DL). These trials were convened by Nest Insight, a public-benefit research and innovation center, which is part of Nest Corporation, a U.K. public corporation. This research was reviewed by the Harvard and NBER Institutional Review Boards and determined to be exempt human subjects research. The views expressed here are those of the authors and do not reflect the views or position of Harvard, Yale, NBER, Nest, the implementing organizations, SUEZ, TransaveUK, Wagestream, or Wagestream's client employers. The authors are grateful to Arie Kapteyn and Richard Lombardo for helpful comments; to Emma Stockdale for excellent project management, research support, and meticulous data merging; to Jo Phillips for tireless project leadership; to the whole Nest Insight team for convening the trial; to Simon Ashton, Michael Beeson, Oliver Bethell, Yash Daga, Richard Loftus, Sophie Orr, Roger Shelton, Stacy Standen, Michelle Sutton, Lisa Thomas, Claire Townsend, and Emily Trant for implementing the experiment and sharing data; to Katie Duxbury, Helen Spurr, Alex Henley, and their colleagues at Bupa UK and the Co-operative Group Ltd. for their involvement in the trial; to the BlackRock Foundation and the Money and Pensions Service (UK) for their support of the Nest Insight program, which provided the funding for our research; and to the Pershing Square Fund for Research on the Foundations of Human Behavior for financial support.

At least one co-author has disclosed additional relationships of potential relevance for this research. Further information is available online at http://www.nber.org/papers/w32581

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Sarah Holmes Berk, James J. Choi, Jay Garg, John Beshears, and David Laibson
NBER Working Paper No. 32581
June 2024, Revised April 2025
JEL No. D14, G51

ABSTRACT

Automatic enrollment is often used to increase retirement savings. What are the effects of using it (or, alternatively, requiring an active enrollment choice) to increase short-term savings? We evaluate two experiments in the U.K. at employers that enable workers to set up payroll contributions to fund short-term savings accounts. In the first experiment (N = 7,404), employees at two firms were randomly assigned opt-in, opt-out, or active choice enrollment into the short-term savings program. Nine months later, participation was 48 percentage points higher under automatic enrollment than opt-in enrollment, and average balances were £114 higher. In the second experiment (N = 3,605), after years of offering opt-in payroll contributions to fund a short-term savings account, the employer changed to opt-out enrollment for new hires only. In tenure month 18, participation in the short-term savings program was 48 percentage points higher under automatic enrollment, and average balances were £193 higher.

Sarah Holmes Berk
National Bureau of Economic Research
sholmes@nber.org

James J. Choi
Yale School of Management
165 Whitney Avenue
P.O. Box 208200
New Haven, CT 06520-8200
and NBER
james.choi@yale.edu

Jay Garg
Harvard University
jgarg@college.harvard.edu

John Beshears
Harvard Business School
Baker Library 439
Soldiers Field
Boston, MA 02163
and NBER
jbeshears@hbs.edu

David Laibson
Department of Economics
Littauer M-12
Harvard University
Cambridge, MA 02138
and NBER
dlaibson@gmail.com

I. Introduction

Automatic enrollment has been studied extensively in the retirement savings context. Previous research has shown that automatic enrollment into 401(k) plans increases participation and balance accumulation, and that many plan participants remain at the default contribution rate when automatically enrolled (Madrian and Shea 2001; Choi et al. 2003, 2004; Beshears et al. 2009, 2022). The U.S. has encouraged employers to implement automatic enrollment in 401(k) and similar plans.[1] Thus, in 2019, 40% of U.S. private industry workers and 28% of U.S. state and local government workers participating in a savings and thrift plan did so in one with automatic enrollment (Zook 2023). Multiple other countries, including the U.K., require employers to automatically enroll eligible employees into a retirement savings plan.[2]

Can automatic enrollment also be used to encourage short-term savings? Many households in the U.S. and other countries lack funds to weather short-term negative financial shocks. Thirty-two percent of American adults say that they would not be able to cover an unanticipated $400 expense using cash, savings, or a credit card paid off at the next statement (Board of Governors 2022). Consequently, many households use costly sources of liquidity, such as revolving credit, overdrafts, or payday loans; others are unable to cover critical expenditures (e.g., out-of-pocket medical costs). Similarly, roughly 44% of U.K. adults would be unable to pay an unexpected £300 bill entirely with their own money, and 5% would be unable to cover it even through other channels, like borrowing (Berk et al. 2024; Kuipers et al. 2023; Phillips et al. 2021). Employer-

[1] The Pension Protection Act of 2006 encouraged the use of automatic enrollment in defined contribution savings plans. Starting in 2025, the SECURE 2.0 Act of 2022 requires most 401(k) and 403(b) plans established on or after year-end 2022 to automatically enroll new employees at a default contribution rate between 3% and 10% of income, and to subsequently auto-escalate their contribution rate by 1% of income per year up to at least 10% and no more than 15% of income.

[2] For the relevant U.K. legislation, see the Pensions Act 2008. Cribb and Emmerson (2020, 2021) study the effects of U.K. automatic enrollment on pension participation and contributions, and Beshears et al. (2024) study how it affected borrowing and creditworthiness.

sponsored payroll savings programs could potentially help individuals build meaningful balances in precautionary savings accounts, but take-up is very low under opt-in enrollment systems (Berk et al. 2024).

In this paper, we provide evidence that automatic enrollment can substantially increase participation and balance accumulation in short-term savings accounts funded by payroll contributions. We evaluate four large experiments.

Section II describes these experiments. The first experiment, a three-arm randomized controlled trial (RCT), was conducted by a large employee financial benefits provider in conjunction with two U.K. client employers. New users (called "members") of the finance company's services were randomly assigned to one of three arms: a control arm, in which payroll savings is available on an opt-in basis; a two-step active choice arm, in which new members are first prompted to explicitly choose whether or not to save in the short-term account and in a second stage choose how much to save; and an automatic enrollment arm.

The second experiment, a quasi-experiment, was conducted by a large U.K. employer and a credit union, in which employees hired from a certain date onward were automatically enrolled into a payroll savings scheme. The employer and credit union worked together to implement an identity and verification (ID&V) process with minimal burden on the saver.

The third experiment is an extension of our initial three-arm RCT. Eleven months after the three-arm RCT was launched, the provider was required to begin conducting Know-Your-Customer (KYC) checks on savers.

The fourth experiment is a separate RCT conducted by the same financial benefits provider that implemented the three-arm RCT and its extension. New members of the finance company's services were randomly assigned to a control arm, in which payroll savings is available on an opt-

in basis, or an optimized active choice arm. Unlike the two-step active choice arm used in the three-arm and post-KYC RCTs, the optimized active choice intervention in this experiment presented new users with a savings slider pre-set to £20. To decline to save, the user moved the slider all the way to £0; to save an amount other than the default, the user moved the slider left or right.

Section III presents results from these experiments. In the three-arm RCT, 12 months after randomization, participation was 44 percentage points higher under automatic enrollment than opt-in enrollment, and average balances were £113 higher. Active choice enrollment yielded very modest effects; 12 months after randomization, participation was 3 percentage points higher and average balances were £10 lower than under opt-in enrollment. The success of automatic enrollment was replicated in the quasi-experiment: at tenure month 24, participation in the short-term savings program was 40 percentage points higher under automatic enrollment, and average balances were £164 higher. On the other hand, having to go through a typical KYC process inhibits the effectiveness of automatic enrollment. In the post-KYC RCT, nine months after randomization, participation was only 26 percentage points higher under automatic enrollment than active choice enrollment, and average balances were £46 higher.[3] Finally, the details of how active choice is implemented matter, as optimized active choice achieved substantially more participation than the active choice treatment tested in the three-arm RCT; four months after randomization, participation was 22 percentage points higher under optimized active choice enrollment than opt-in enrollment, and average balances were £13 higher.

Section IV concludes and discusses limitations of our study and directions for future work.

[3] We compare outcomes between members randomly assigned to the active choice arm versus automatic enrollment arm, as these members were required to provide personal details for the KYC checks during their sign-up journey. Members assigned to the control arm were only required to provide these details if they decided to start saving, so we exclude them from this analysis.

II. Experiments and data

A. Three-arm RCT

We study a RCT implemented by Wagestream, which offers a financial benefits platform used by employers in Europe and the U.S., in conjunction with two of its U.K. client employers. Wagestream works with client employers to offer a mobile app to employees. This app allows employees to track their shifts and earnings, receive discounts on shopping and household bills, divert pay to a Wagestream savings account ("savings pot"), and receive "earned wage access." Earned wage access lets employees receive up to 40% of their accrued gross wages before their usual payday for a fixed £1.75 fee for each early access. During the trial, employees at one client employer (Bupa, described below) could not access more than £3,000 per pay period, and employees at the second client employer (the Co-op, described below) could not access more than £400 per pay period, regardless of their accrued gross wages.

Savers in the savings pot elect a savings goal of up to £1,000.[4] Savings pots are fully liquid; their balances can be transferred to another bank account at any time with no penalties, fees, or delays. Savings pots have maximum balances of £1,000. Contributions cease when the pot balance reaches £1,000 or the saver's goal (whichever is lower) and resume when the balance drops below

[4] Savers choose a savings goal (up to £1,000) and a per-paycheck contribution amount (between £5 and £100) to the savings pot. Savers may also choose to contribute a set amount (£1, £2, or £5) from each earned wage access to the savings pot. The app then calculates an achievement date for the savings goal based on the savings goal and savings amounts. In earlier versions of the app which were in operation during part of our study, savers could choose to enter only a savings goal and a date to achieve it, and the app would calculate the necessary per-paycheck contribution amount. If the user did not select a date to achieve their goal but did enter a contribution amount, the app would calculate a projected achievement date. After viewing information about their chosen savings goal, contribution amounts, and achievement date, the user could make edits to these fields. Changes to one field would cause the app to recalculate the other fields.

this threshold. Wagestream additionally offers financial coaching, micro-savings,[5] and monthly incentives to encourage financial wellbeing.

Two Wagestream clients, Bupa Care Services and The Co-operative Group Ltd. (which goes by "the Co-op"), participated in our study. Bupa Care Services, a division of Bupa UK, employs approximately 10,500 workers in the aged care home sector. The Co-op employs approximately 58,000 workers in the food retail, funeral, insurance, and legal services sectors. On October 24, 2022, Wagestream began randomly assigning newly registered users ("members") from Bupa Care Services to one of three arms. The Co-op began participating in the RCT on November 21, 2022, assigning new members to the same three arms. A soft launch, which involved enrolling 95 Co-op employees into the study, ran from November 21 to November 25, 2022. The full launch at the Co-op began on December 23, 2022.

In the control arm, new members experienced the business-as-usual opt-in enrollment process for the savings pot. They could learn about the savings pot by navigating to the relevant portion of the Wagestream app or by reviewing standard electronic marketing materials, and they could sign up directly in the app.

In the active choice arm, new members going through the sign-up journey for the Wagestream app were prompted to choose whether or not to contribute to the savings pot from each paycheck. Users could not proceed without making a selection; users who closed the app without making a choice would see the same prompt when they returned to the app. The active choice intervention required users who chose to save to select a contribution amount on the next screen by moving a slider whose initial level was £15 per paycheck. Users who chose to save on

[5] This feature allows members to round the pay for each shift they work down to the nearest pound and divert the remainder to the savings pot.

the first screen could elect to save nothing on the second screen. This two-step design allowed users to immediately undo an initial decision to save.

In the automatic enrollment arm, new members were by default enrolled to contribute £40 to the savings pot from each monthly paycheck, which is approximately 1.9% of the average Bupa participant's monthly salary, assuming 2,080 hours of work per year (see Table 1). Members could easily opt out within the app,[6] and they received multiple communications before their first affected paycheck to ensure they were fully aware of the contributions and able to adjust their contribution amount.

Members in all arms received pre-payday summary emails with information about their savings settings and options to view, cancel, or change their elections. Members were free to adjust their savings settings at any time, including to cease contributing to the savings pot altogether. Wagestream is not a depository institution and does not hold funds. During these trials it partnered with e-money providers[7] to facilitate saving for its members.

We highlight four aspects of the Wagestream experiment at Bupa and the Co-op. First, this experiment ran during a period of unusual macroeconomic instability. Second, Wagestream changed the name for its savings product in the middle of the experiment. At the beginning of the trial, the product was called "Save." In order to comply with the latest regulatory guidance, the company renamed the product "Build." This change was implemented on January 4, 2023, but some users may have first seen the change in later weeks, depending on when they updated the app on their device. Third, the company restructured its app so that information about the savings

[6] Upon account creation, the savings pot appeared as "pending." In this period, which lasted for up to one week depending on how far before their next payday the user registered, no edits were possible and no payroll contributions were made. Users were informed via email and app when they were able to opt out or make other edits to their savings pot.

[7] https://www.fca.org.uk/firms/electronic-money-payment-institutions

product ("Build") was moved from the main navigation bar to a hub page. (This hub page includes links to the savings product and other Wagestream features.) This change was implemented on February 6, 2023, but, again, some users may have first seen the change weeks later.

Finally, the company temporarily tested a new type of Know Your Customer (KYC) check for new members during the randomized controlled trial following a change in the technology partners for the savings pot. This KYC check process, which was separate from the process tested in the Post-KYC RCT described below, required new members who proactively signed up for savings pots from February 27 to March 21, 2023, to supply additional personal details (date of birth, home address) and personal identification documents. We exclude from our analyses participants who were randomized into any arm of the study during this period due to concerns that the opt-out participants were not subject to KYC while opt-in and active choice participants were. Additionally, all members who were already randomized in our trial at the time of the KYC introduction were prompted within the app to complete a KYC check; 796 members saw this prompt, and only four completed the check. There were no consequences for not completing the check; the temporary test was ended and Wagestream's approach to KYC was later revisited.

We use data collected by Wagestream between October 24, 2022, and November 30, 2023, on members who were randomized between October 24, 2022, and September 18, 2023.[8] We observe each individual's employer, current Wagestream membership status, treatment assignment, randomization date, employment start date, employment termination date (if applicable), paycheck amounts and dates, savings amounts and dates, savings contribution elections and election dates, savings goal elections and election dates, micro-savings settings and

[8] Beginning on September 19, 2023, new savers from Bupa and the Co-op were subject to KYC checks. Members randomized after this point are included in our post-KYC RCT (see Section II.C). Beginning in December 2023, Wagestream prompted existing savers to provide personal details for a KYC check; as a result, for the three-arm RCT, we analyze only data collected through November 30, 2023 to avoid contamination from this KYC migration.

settings dates, and (for Bupa only) shifts worked.[9] We drop 779 members who were assigned to an experimental arm during the period from February 27 to March 21, 2023, when the temporary KYC check process was in effect (and was not balanced across arms as explained above).

We compare the automatic enrollment and active choice arms to the opt-in (control) arm in order to estimate the effects of each treatment. There are 2,596 individuals in the opt-in arm, 2,677 individuals in the active choice arm, and 2,669 individuals in the automatic enrollment arm. We define month 0 as the month the individual joined Wagestream and was randomized into a study arm.[10]

Table 1 compares the characteristics of the three arms. There is no statistically significant difference in the average first-observed paycheck (net of tax withholding and other deductions), the average tenure at the time of Wagestream sign-up, or the share of individuals from the Co-op across experimental conditions. The differences in the average first-observed hourly wage at Bupa are jointly statistically significant but economically small; the statistical significance is driven by the active choice arm having an average hourly wage that is £0.39 – £0.41 higher than the other arms. Sample sizes decline with membership tenure both because of employee attrition and because our data end in November 2023, which means that more recently joining members are observed for a shorter period of time. Note that during the trial, Bupa—but not the Co-op—allowed employees to view their shift information in the app. Additionally, Co-op employees received a 5% "boost" to their savings (such that £1 in savings becomes £1.05, similar to interest earnings).

[9] Five individuals in our three-arm RCT appear to have positive savings pot balances at the time of their randomization. This may be because they worked for another Wagestream client employer in the past.

[10] Employees may join Wagestream at any time in their tenure. Sixty percent of individuals in our study joined within the first 30 days of their hire, and 81% joined within their first year. However, 11% of individuals joined more than three years into their employment.

Thus, individuals from the Co-op may have been more likely than Bupa employees to join Wagestream with the intention to save.

B. Quasi-experiment

The second experiment was created by a large multinational employer's decision to begin automatically enrolling its new U.K. hires into a payroll savings scheme. This employer, SUEZ recycling and recovery UK, operates in the recycling and waste management sector and has over 5,000 employees across the U.K. working in both field and office positions. On November 1, 2021, SUEZ implemented a form of automatic enrollment for newly hired benefits-eligible employees who were onboarded using an online journey. Before this change, employees had to opt into the payroll savings plan to start saving. After the change, new hires were automatically enrolled into the scheme at a default contribution rate of £40 per month if they did not opt out. This is 1.8% of the mean affected worker's monthly pay (see Table 2). Workers hired before November 1, 2021, were never subject to automatic enrollment.

For administrative reasons, contributions began with a new hire's second or third pay cycle. The initial contribution was set to £40 per month; in subsequent pay cycles, automatically enrolled workers were able to change their contribution amount.[11] The payroll savings accounts are housed at TransaveUK, a large U.K. credit union, and are fully liquid (available without penalties or fees within 1-2 business days from the withdrawal request). Savers initiate withdrawals (transfers to other bank accounts) and perform other account-related tasks by using the TransaveUK website or mobile app or by contacting customer service. Participation in the scheme gives the saver other

[11] Due to variation in hire and enrollment dates, some savers were enrolled early enough to adjust their initial contribution amount. In our current data, only eight automatically enrolled individuals adjusted their initial payroll contribution in this way. All others made an initial contribution of £40. Savers must contribute at least £5 per month.

benefits from the credit union. These include an annual dividend paid to members, a modest bereavement benefit, and access to unsecured personal loans up to £20,000.[12] The credit union also offers other savings vehicles, including a prize-linked savings account and a goal-based savings pot. The former has a £200 maximum balance. However, these savings vehicles cannot be funded via payroll contributions.

Due to the regulatory landscape, automatic enrollment was implemented with some guardrails and differed from traditional models seen in the U.S. and U.K. retirement savings domains.[13] The most significant difference was the need for the employer to gather consent from new hires to automatically enroll them into the payroll savings scheme. During the online onboarding journey, new hires were asked to read the employer's Payroll Auto-Saving Policy and agree to its terms; consent to saving £40 per pay period (if they do not opt out); read and agree to the credit union's Account Terms and Conditions; acknowledge that savings held with the credit union are insured (up to £85,000) by the Financial Services Compensation Scheme; and agree to data sharing between the employer and the credit union. This consent step was not compulsory; any new hires who did not complete it were not automatically enrolled but retained the usual opt-in access. However, the employer tells us that the vast majority of new hires completed the consent step during their onboarding journey, making automatic enrollment near-universal for the target

[12] Small loans up to £3,000 are available instantly to all credit union members. Larger personal loans up to £20,000 are available to members who regularly save at least £5 per month or £1 per week.
[13] For an overview of the U.K. regulatory environment, see Cooper et al. (2021).

population.[14] All new hires who completed the consent step were automatically enrolled unless they subsequently opted out.[15]

In addition, new hires received multiple communications from their employer about their automatic enrollment status before their first payroll contribution. Three reminders were sent in the weeks immediately after the employee started work. During this period, new hires wishing to opt out could do so by contacting the SUEZ compensation and reward team via email. Savings accounts were not created for employees who opted out in this period. Additional reminders were sent after the account was created but before the first payroll contribution. After the account was created, employees wishing to opt out did so by contacting the credit union. Employees also received a member information packet from the credit union, which could have prompted them to opt out or adjust their contribution amount because the packet reminded them of the account.

There were no other changes to the payroll savings scheme in the year preceding or following the implementation of automatic enrollment. However, three situations are potentially relevant. First, an acquisition of the employer by a competitor was announced in spring 2021 but ultimately disallowed by U.K. competition regulators. The employer was re-acquired by SUEZ Holdings in December 2022. Benefit offerings at the employer were not affected. Second, the entire experiment took place during the Covid-19 pandemic, which created employment,

[14] In February 2022, the employer modified the consent step to ensure that new hires were fully aware that they could choose to withhold their consent. We are missing consent data but detect no decline in participation after the modification of the consent step. Of employees hired between November 1, 2021, and January 31, 2022, 48.5% are participating in tenure month 4, compared to 53.2% of employees hired between March 1, 2022, and May 31, 2022.

[15] All SUEZ employees who join TransaveUK undergo an identity and verification (ID&V) process to ensure compliance with KYC regulations. SUEZ supplies information about the employee's identity to TransaveUK, and TransaveUK runs the required checks. Employees who fail an initial check may still become TransaveUK members if they supply additional documentation, such as a copy of their passport or other identification document. In the initial months of the quasi-experiment, SUEZ generally provided this additional documentation to TransaveUK on behalf of the employee; in later months, SUEZ contacted the employee and asked them to supply the materials to TransaveUK. TransaveUK reports that roughly 10 percent of automatically enrolled SUEZ employees fail the initial ID&V check, and not all provide the required documents. Although this ID&V process is less onerous on the employee than a more traditional KYC check, it may still hamper participation in the short-term savings program.

consumption, and income shocks to individuals and their households, as well as general macroeconomic turmoil. However, all employees in our analysis were hired during the pandemic (in November 2020 or later). Although we do not have complete data on furloughs, we note that furloughed employees at SUEZ continued to receive 100% of their compensation;[16] continued to be eligible for voluntary payroll contributions, including savings; and eventually returned to work. Finally, the employer began partnering with Wagestream (the workplace finance company that implemented the three-arm RCT described in Section II.A) in Fall 2022. Although this partnership did not originally include access to Wagestream savings pots for SUEZ employees, access to the Wagestream pots has been available on an opt-in basis since Summer 2023. No SUEZ employees have been automatically enrolled into saving at Wagestream.

We use a merged data set containing data collected by the employer and the credit union. The employer provided monthly snapshots of individual-level administrative data on employees hired between November 1, 2020, and December 31, 2023.[17] These data include gender, age, contracted hours of work per period, hire date, employment termination date (where applicable), current employment status, the date the current employment status became effective, gross pay amount, pay frequency, job category, pension membership, and pension contribution amount/percentage. About 16% (646 employees) of our current sample disappears from the employer-provided data after a certain date but has no employment termination date. Based on guidance from the employer, we treat these employees as having separated in the last month in which they appear in the employer data.

[16] While on furlough, 80% of wages were paid by the U.K. government as part of the Coronavirus Job Retention Scheme. The employer voluntarily paid the remaining 20%.

[17] The employer operates an anti-recidivism scheme that allows them to hire imprisoned individuals on release of temporary license (ROTL). Fewer than 10 imprisoned individuals were hired during the study period, all on or after November 1, 2021. Except for one individual who was automatically enrolled in the savings scheme, the ROTL employees have been excluded from our research data.

The credit union provided administrative data collected between December 1, 2021, and December 31, 2023. We observe individual-level payroll savings scheme choices for all employees hired on or after November 1, 2020. These data include joining date, current membership status, and the date the current membership status became effective. We also observe details about the member's utilization of the payroll savings scheme, including monthly contribution elections, monthly payroll savings scheme balances, transaction-level withdrawals (date- and time-stamped) from the payroll savings scheme, and additional (i.e., not via payroll) deposits to the payroll savings scheme. The credit union makes personal loans available to members, and we receive monthly data on loan principal, repayment history, and balances. The contribution elections variable contains the individual's selected payroll contribution amount; empirically, this variable tracks relatively closely but not perfectly with positive changes in balances. An individual who stops saving may continue to have a positive election recorded in the credit union data.

The employer and credit union transferred the relevant administrative data to Nest Insight for merging. A merged research dataset stripped of identifiers was then transferred to us for analysis. We take several steps to clean the data. First, we drop individuals who did not go through the online onboarding journey, because those in this group hired after the introduction of automatic enrollment did not view the trial-related consent step described in Section III.A. We thus drop 144 individuals from a U.K. region that does not participate in the online journey, and another 268 individuals hired under the Transfer of Undertakings (Protection of Employment) regulations (TUPE) who went through a different onboarding process. We also drop 30 individuals who were rehired one or more times during the study period.

To estimate the impact of automatic enrollment, we compare the behavior of SUEZ employees hired before versus after the introduction of automatic enrollment on November 1,

2021. The pre-automatic enrollment ("pre-AE") cohort includes employees hired in the year preceding the introduction of automatic enrollment—from November 1, 2020, through October 31, 2021. The post-automatic enrollment ("post-AE") cohort includes employees hired from November 1, 2021 (when automatic enrollment was introduced), to December 31, 2023 (the last date for which we have data). In our analyses, we drop individuals who leave the firm from the sample after their separation month.

There are 1,164 individuals in the pre-AE cohort and 2,853 individuals in the post-AE cohort. We define month 0 as the month of hire. In the post-AE cohort, the number of individuals we observe in both the employer and the credit union data declines as tenure at the company increases, which is partially due to employees separating from the firm over time but mostly a result of the lack of data after December 2023. For example, the only post-AE individuals who can be observed at tenure month 18 are those who were hired before June 2022. By contrast, since credit union administrative data were only collected after December 2021, the number of observations in the pre-AE cohort first increases with tenure and then begins to decrease.

Table 2 compares the characteristics of the two cohorts. Workers in the two cohorts have similar gender and age compositions. Workers in the pre-AE cohort are slightly more likely to work in a manual position and have lower annualized starting pay; these differences are statistically significant. When we adjust starting salaries for inflation using the Consumer Prices Index including owner occupiers' housing costs (CPIH), the difference in starting pay is no longer statistically significant.

C. Post-KYC RCT

The post-KYC RCT is an extension of our main three-arm RCT, discussed in Section II.A above. We use data collected by Wagestream between September 19, 2023, and August 31, 2024, on members who were randomized in this period. We observe each individual's employer, current Wagestream membership status, treatment assignment, randomization date, employment start date, employment termination date (if applicable), paycheck amounts and dates, savings amounts and dates, savings contribution elections and election dates, savings goal elections and election dates, micro-savings settings and settings dates, and (for Bupa only) shifts worked.

We compare the automatic enrollment arm to the active choice arm. There are 1,671 individuals in the automatic enrollment arm and 1,560 in the active choice arm. Members in these arms provided personal data during the sign-up journey that was used for a KYC check in the event they started saving. Members who failed an initial KYC check using the provided personal data had the opportunity to provide identification documents for a subsequent check. Some new members were randomly assigned to the control arm (again, see Section II.A). However, members in this arm were only prompted for personal data if they proactively chose to start saving. Due to this variation in the sign-up process, we exclude the control arm members from our post-KYC RCT analyses. As in the three-arm RCT, we define month 0 as the month the individual joined Wagestream and was randomized into a study arm.

Table 3 compares the characteristics of the two analyzed arms. There is no statistically significant difference in the mean first-observed hourly wage, average first-observed net paycheck, average tenure at the time of Wagestream sign-up, or the share of individuals from the Co-op across experimental conditions. As in the three-arm RCT, sample sizes decline with membership

tenure both because of employee attrition and because recently joining members are observed for a shorter period of time.

D. Optimized active choice RCT

The optimized active choice (OAC) RCT was conducted by Wagestream with new members from clients other than Bupa and Co-op. We use data collected by Wagestream between September 7, 2023, and November 16, 2023, on members who were randomized during this period. We observe each individual's employer, current Wagestream membership status, treatment assignment, randomization date, employment start date, employment termination date (if applicable), paycheck amounts and dates, savings amounts and dates, savings contribution elections and election dates, savings goal elections and election dates, and micro-savings settings and settings dates.

We compare the optimized active choice arm to the opt-in (control) arm. There are 22,375 individuals in the optimized active choice arm and 22,166 in the control arm. In the control arm, new members experienced the business-as-usual opt-in enrollment process for the savings pot. They could learn about the savings pot by navigating to the relevant portion of the Wagestream app or by reviewing standard electronic marketing materials, and they could sign up directly in the app. Members in the optimized active choice arm were shown during their sign-up journey a slider representing the amount they wished to save per paycheck. The slider was pre-set to £20. Individuals wishing not to save moved the slider to £0; individuals wishing to save an amount other than the default moved the slider to the left or right. Users could not proceed without making a selection; users who closed the app without making a choice would see the same prompt when they returned to the app. Members in all arms received pre-payday summary emails with

information about their savings settings and options to view, cancel, or change their elections. Members were free to adjust their savings settings at any time, including to cease contributing to the savings pot altogether. As in the three-arm RCT and post-KYC RCT, we define month 0 as the month the individual joined Wagestream and was randomized into a study arm.

Table 4 compares the characteristics of the two study arms. There is no statistically significant difference in the average tenure at the time of Wagestream sign-up or the average first-observed net paycheck. As in the three-arm RCT and post-KYC RCT, sample sizes decline with membership tenure both because of employee attrition and because recently joining members are observed for a shorter period of time.

III. Results

A. Short-term savings scheme participation

All the interventions we tested increased savings scheme participation rates among eligible employees, but with varying degrees of success. We define participation in a given month as having a non-zero account balance or a non-zero contribution in that month. In the RCTs, we define a contribution as a flow into the account from the paycheck. In the quasi-experiment, we define a contribution as an increasing balance in the short-term savings account.[18] The denominator for all participation rates is the number of individuals in the experimental arm or cohort who joined early enough to be observed in a given month and had not yet separated from

[18] We believe this proxy is more reliable than the presence of a positive contribution election in the quasi-experiment, because not every positive contribution election in our data appears to be accompanied by a positive flow into the account.

the participating employer.[19] In the RCTs, month 0 is the month the individual joined Wagestream. In the quasi-experiment, month 0 is the month of hire.

Automatic enrollment yielded the largest effects on participation rates, as well as the fraction of employees making a contribution each month. As shown in Figure 1, automatic enrollment in our three-arm RCT increased participation rates by between 43 and 56 percentage points over months 2-12. In membership month 6, 67% of the automatic enrollment arm was participating, compared to 16% of the control arm. The effects of automatic enrollment attenuate slightly with time. By membership month 12, 62% of the automatic enrollment arm was participating, compared to 19% of the control arm. Over the course of the study, most participants continued to contribute to their savings pots. In membership month 12, 60% of the automatic enrollment arm was contributing, compared to 17% of the control arm. Table 5 (columns 1-2) shows that these differences are persistently statistically significant.

We observe comparable automatic enrollment trends over a much longer time horizon in the quasi-experiment, even with the presence of an employer-managed ID&V process. Figure 2 shows that automatic enrollment in this company increased participation rates by between 40 and 49 percentage points over tenure months 3-24. In tenure month 24, 41% of the post-AE cohort was participating, compared to 1.0% of the pre-AE cohort. In tenure month 6, 36% of the post-AE cohort had an increasing short-term savings account balance, compared to 0.4% of the pre-AE cohort. In tenure month 24, 26% of the post-AE cohort had an increasing balance, compared to 0.6% of the pre-AE cohort. These differences are highly statistically significant (Table 6).

[19] Employees lose access to Wagestream when they separate from their employer or give notice, and any accrued savings are paid out. Accounts of separated employees are generally marked "disabled," but not always immediately. We include 447 employees in the denominator whose accounts are marked disabled by Wagestream but currently have no recorded separation date; this represents 5.6% of the total sample. These employees are also included in the samples in the relevant tables and figures. Of these 447 employees, only 16 (3.6%) have a positive terminal recorded balance and are therefore considered participants after their accounts are marked disabled. None of these 447 accounts receive contributions after they have been disabled.

Thus, automatic enrollment can increase short-term savings participation by at least 40 percentage points, and the increase persists for up to two years. Automatic enrollment has similar effects on participation and contribution rates in different contexts, including in settings with higher opt-in saving (the three-arm RCT) and lower opt-in saving (the quasi-experiment). The quasi-experiment's company is likely more representative of the typical employer, as the low levels of opt-in payroll saving observed in the pre-AE cohort are consistent with those seen at other large U.K. employers in Berk et al. (2024). The RCT setting is unique because it includes only employees who sign up for Wagestream and may thus differ from coworkers who choose not to enroll. Appendix Figures 1-6 show that qualitatively, the automatic enrollment treatment effect is similar across employers, genders, age groups, roles, and pay.

Active choice yielded much smaller results. In the three-arm RCT, active choice increased participation by no more than 5 percentage points in any given month, and the fraction contributing to savings increased by no more than 6 percentage points (Figure 1). As shown in Table 7 (columns 1-2), the difference between the active choice and control conditions is statistically significant in months 0-6, but thereafter insignificant. Active choice has similarly small effects in each employer and hourly wage tercile (Appendix Figures 1 and 2).

When Wagestream introduced KYC checks for savers in the RCT, the effects of automatic enrollment shrank, as documented in Figure 3 and Table 8. In membership months 1-9, automatic enrollment increased participation rates by between 19 and 28 percentage points relative to active choice. (Recall that the active choice arm in the three-arm RCT only modestly outperformed the control arm.) When we exclude from our analysis members who fail and never pass their KYC check, automatic enrollment increases participation rates by between 27 and 37 percentage points relative to active choice. Appendix Figure 7 plots participation rates in membership month 2 for

three-arm RCT members who joined in the 12 weeks before the regime change and post-KYC RCT members who joined in the 12 weeks after the change. The automatic enrollment treatment effects relative to active choice shrink immediately after the transition.

Introducing a KYC check after a member is already saving appears to modestly affect participation. Three-arm RCT savers were asked in late 2023 and early 2024 to undergo a KYC check to continue participating. Of those who saw the in-app prompt, 84% of automatically enrolled savers – compared to 90% of control arm savers and 86% of active choice savers – elected to undergo a KYC check. Of the automatically enrolled savers who initiated their KYC check, 90.4% passed an initial or subsequent check, 6.3% failed and never passed, and 3.3% were never checked, likely because they ultimately declined to provide all the required personal information. An analysis pooling all three-arm RCT and post-KYC RCT members who ever underwent a KYC check – whether through the 2023-2024 process described above or because they enrolled in the post-KYC regime – showed statistically insignificant differences on observable characteristics between people who pass and people who do not under opt-out conditions. Among members who passed an initial or subsequent check, the mean first-observed hourly wage was £12.22 (standard error 0.48), compared to £12.38 (0.15) among members who failed and never passed their checks (*p*-value: 0.774). Forty percent (0.015) of members who passed an initial or subsequent check were employed by Bupa, compared to 43% (0.060) of those who did not (*p*-value: 0.698). The mean tenure with the employer at the time of sign-up was 2.3 years (0.128) among those who passed an initial or subsequent check, compared to 2.1 (0.506) years among those who failed and never passed (*p*-value: 0.734).

Although two-step active choice was not very effective, Figure 4 and Table 9 show that active choice can be made much more effective by a small change in design. The optimized one-

step active choice generated increases of around 22 percentage points in months 1-4. Indeed, the optimized active choice intervention increases participation nearly as much as the post-KYC automatic enrollment intervention. Active choice is an effective, albeit less impactful, alternative to automatic enrollment, but careful optimization is necessary to achieve meaningful results.

B. Contributions

Figures 5-7 report the mean and median short-term savings contribution amounts for the three-arm RCT, quasi-experiment, and OAC RCT, respectively, conditional on contributing a positive amount. The results showcase the stickiness of defaults. In the three-arm RCT and the quasi-experiment, the median positive contribution amount under automatic enrollment is persistently equal to the £40 default; the mean is always higher. In the OAC RCT, the median in the optimized active choice arm is persistently equal to the £20 slider preset; the mean is again always higher.

In the three-arm RCT, the median and mean positive savings amounts are higher in the opt-in and active choice arms than in the automatic enrollment arm; a minority of two-step active choice savers retain the £15 preset. In the OAC RCT, the median and mean positive savings amounts are higher in the control arm than the optimized active choice arm. (The small number of savers in the quasi-experiment pre-AE cohort make it difficult to compare the cohorts in that setting.) When savers are induced to save, they tend to remain at the default; when savers are motivated enough to opt into saving, they tend to save more.

The £40 default in the three-arm RCT and quasi-experiment is equivalent to about 1.9% of pay for the average member on whom we have wage data. At this contribution level, a saver would accumulate enough to cover an unexpected £300 bill in eight months. This result is informative

when considering scaling up payroll-based short-term savings, which will likely require a default contribution that is specified as a percentage of income rather than an absolute amount to accommodate populations with a wide range of income levels.

C. Withdrawals

We turn next to a comparison of withdrawal behavior under the different treatments. Figures 8 and 9 plot the share of savings participants taking a withdrawal in each month within the three-arm RCT and quasi-experiment, respectively. In all arms of the RCT and in the post-AE cohort in the quasi-experiment, the withdrawal rate rises rapidly over the first 2-3 months of observation before plateauing or growing at a slower rate. In the three-arm RCT, all study arms have withdrawal rates between 42% and 46% in month 6, and between 42% and 44% in month 12. In the quasi-experiment, the post-AE cohort withdrawal rate is 17% in month 6 and 33% in month 24; the small sample size in the pre-AE cohort makes it difficult to discern a trend. As shown in Table 10 (column 1), the difference between the automatic enrollment and control arms is significant in months 0, 2, and 10, but otherwise insignificant. The difference between the active choice and control arms is weakly significant in month 0 and thereafter insignificant (see Table 10, column 4). Table 11 (column 1) shows that the difference between the pre- and post-AE cohorts in the quasi-experiment is never statistically significant.

Figures 10 and 11 show the share of savers who have taken one or more, three or more, or five or more withdrawals in each month. We include anyone participating or who had previously participated in the program, provided they were able to be observed in a given month. In the three-arm RCT, the patterns are almost identical across arms, rising initially and thereafter remaining relatively flat. By month 12, 74% of the automatic enrollment arm has taken at least one

withdrawal, compared to 71% in the control arm and 63% in the active choice arm. Twenty-eight percent of the automatic enrollment arm has taken at least five withdrawals, compared to 29% in the control arm and 27% in the active choice arm. In the quasi-experiment, the cumulative share of savers who have taken at least one withdrawal trends up over the entire study. In month 24, 68% of the post-AE cohort has taken at least one withdrawal; the small sample size in the pre-AE cohort makes it difficult to discern a trend. Twenty-six percent of the post-AE cohort has taken five or more withdrawals in month 24. In both experiments, about two-thirds of savers take at least one withdrawal, and a substantial minority take several.

Figures 12 and 13 display the size of the withdrawals taken in each experiment, both in pounds (GBP) and as a share of the available balance.[20] In both the three-arm RCT and the quasi-experiment, withdrawals in GBP trend upwards over time, while withdrawals as a share of balance trend downwards. In month 6, the average withdrawal in the three-arm RCT is £111 under automatic enrollment, £136 under opt-in, and £113 under active choice. Across all three arms, the average withdrawal represents between 76% and 78% of the available balance in month 6. In month 6 of the quasi-experiment, the average withdrawal is £121 in the post-AE cohort and £130 in the pre-AE cohort; the small sample size in the pre-AE cohort makes it difficult to discern a trend. This represents 72% of the available balance in the post-AE cohort and almost 100% of the available balance in the pre-AE cohort. In month 24, the average withdrawal is £263 (63% of the available balance) in the post-AE cohort, compared to £35 (70%) in the pre-AE cohort. As reported in Table 10 (columns 2-3 and 5-6), the differences between the treatment arms and the control arm in the three-arm RCT are usually not statistically significant. Table 11 (columns 2-3) shows that the differences in the quasi-experiment are never significant.

[20] Approximately 4% of withdrawals observed in the quasi-experiment appear to exceed the available balance due to accounting delays. In such cases, we set the share of balance equal to 100%.

D. Balance accumulation

Examining participation in short-term savings programs is a critical first step, but fully understanding the programs' impact requires us to measure the effect of the interventions on balance accumulation. We find that the effects on balances are generally consistent with the effects on participation.

In the three-arm RCT, average balances grow more rapidly under automatic enrollment than opt-in (Figure 14). In membership month 6, the mean balance in the automatic enrollment arm is £89, compared to £21 in the control arm. By month 12, the difference has expanded: the mean balance in the automatic enrollment arm is £146, compared to £33 in the control arm. These differences are driven by higher participation rates under automatic enrollment, since average balances conditional on having a positive balance usually does not significantly differ under automatic enrollment relative to opt-in (Figure 17 and Table 5, column 4).

In the quasi-experiment, on the other hand, automatic enrollment induces significant increases in both mean balances and mean balances conditional on having a positive balance, and these differences are statistically significant through month 21 (see Figures 15 and 18; Table 6, columns 3 and 4). In month 6, the mean and mean conditional balance in the post-AE cohort are £86 and £183, respectively, compared to £0 and £20 in the pre-AE cohort. In month 24, the gap has widened significantly: the mean and mean conditional balance in the post-AE cohort are £167 and £405, compared to £3 and £289 in the pre-AE cohort.

Figures 17 and 18 further show that the 75^{th} and 90^{th} percentile conditional balances in the cohorts subject to automatic enrollment—both in the three-arm RCT and quasi-experiment—grow

roughly linearly, at a rate close to £40 per month. Recall that the default contribution amount was £40.

The difference in balances between the active choice and control arms in the three-arm RCT is small and generally not significant (Table 7, column 3).

The effect of automatic enrollment on mean balances is smaller in the post-KYC regime. In month 6, the average balance in the opt-out arm is £61, compared to £28 in the two-step active choice arm. Through month 9, automatic enrollment never increases balances by more than £41 relative to two-step active choice. As shown in Table 8 (column 3), these differences are statistically significant.

Figure 16 reveals that the one-step active choice treatment tested in the OAC RCT had positive but economically small effects on mean balances. In month 4, the last month for which we have data, mean balances in the optimized active choice condition were £16, compared to £3 in the control condition. As shown in Table 9 (column 3), the small differences are nonetheless statistically significant. The fact that conditional mean balances are significantly lower under optimized active choice than control (Figure 19; Table 9, column 4) can most easily be explained by the slider's £20 preset value, which (as discussed in Section III.B) is significantly lower than the savings amount chosen on average under opt-in.

E. Earned wage access utilization

One important feature of Wagestream membership is the earned wage access benefit. Members can access up to 40% of their earned wages before their regular payday.[21] In the three-arm RCT, accessed wages must not exceed £3,000 for Bupa employees or £400 for Co-op

[21] Our calculated "wages accessed as a share of each paycheck" variable exceeds the 40% limit 7.6% of the time, likely because we only observe pay net of taxes and employer deductions.

employees. Earned wage access may be a substitute for borrowing, such as credit cards, payday loans, overdraft, and borrowing from friends and family. Wagestream (2023a, 2023b) suggests that people choose earned wage access for a broad range of reasons, including commuting expenses, smoothing income fluctuations, and avoiding the use of high-cost credit.

Figure 20 compares the usage rate of Wagestream's earned wage access benefit across the three study arms. The share of members using the benefit is similar across the study arms in all observed months. There is a slight peak in month 1, suggesting that some new Wagestream members may have joined specifically for access to this benefit, and thereafter around one-third of members use the benefit in each month. Automatic enrollment has a marginally statistically significant positive effect on earned wage access utilization in months 2 and 6, but otherwise is insignificant; active choice has no significant effect on utilization (see Table 12, columns 1 and 4). Figure 21 shows the share of members in each arm who have used the wage access benefit one or more times, three or more times, and five or more times to date. Multiple instances of wage access taken in a single month are counted as one instance. Differences between arms are modest. By month 12, 51% of the opt-out arm has used the benefit at least once, compared to 43% of the control arm and 47% of the active choice arm. Thirty-two percent of the opt-out arm has used the benefit at least five times, compared to 30% of the control arm and 31% of the active choice arm.

Figure 22 displays the average amount of the earned wages accessed in GBP and as a share of the next paycheck, respectively, conditional on using the benefit. Multiple wage access payments received in a single month are aggregated before computing these averages. The average amount accessed is similar across all study arms in all observed months. Automatic enrollment and active choice generally have no significant effects on amounts accessed, with the exception of

automatic enrollment in month 6 and active choice in month 4 (see table 12, columns 2-3 and 5-6).

In the OAC RCT (Table 13), we see that the one-step optimized active choice intervention slightly decreased the earned wage access rate, average positive amount accessed in GBP, and average positive amount accessed as a share of the next paycheck, but with the exception of positive amount accessed in month 0, these differences were not statistically significant.

Why does automatic enrollment not decrease the use of earned wage access despite significantly increasing savings pot participation and balances? Figure 23 shows the percentage of accessed wage payments in the three-arm RCT that are less than or equal to the available pot balance (i.e., the percentage of payments that could have been replaced in whole by a savings pot withdrawal). Across all arms, the percentage rises over time as balances grow, but nevertheless remains low. In the control and active choice arms, the percentage never surpasses 6%. In the opt-out arm, the percentage reaches 17% in month 6 and 11. Therefore, a pot withdrawal could not substitute for an earned wage access payment in most cases.

Figures 20-22 indicated that opt-out payroll savings, despite helping employees build up a liquidity buffer, does not change use of earned wage access. Figure 23 suggests that this may be because savings pot balances are generally not large enough to replace the typical amount accessed via the earned wage access benefit. Since the fee for accessed earned wages does not vary by the amount accessed, there is no incentive to split the financing of an expenditure between earned wage access and a savings pot withdrawal. It remains puzzling why employees who have enough money in their savings pot to completely cover their earned wage access amount still choose to use earned wage access.

F. Personal loan utilization

We turn next to an evaluation of the relationship between automatic enrollment into short-term savings and credit utilization in the quasi-experiment. As previously mentioned, credit union members gain access to a personal loan product. Small loans up to £3,000 are available instantly to all credit union members. Larger personal loans up to £20,000 are available to members who regularly save at least £5 per month or £1 per week.

Figure 24 displays the information about loan utilization in each cohort. The left panel shows the average amount borrowed from the credit union at tenure month 12, inclusive of individuals who borrow nothing; the right panel shows the average amount borrowed at tenure month 12, conditional on borrowing. Loans fully repaid before month 12 are excluded from both panels, as are loans originated after tenure month 12. 4.8% of the post-AE cohort and 0.5% of the pre-AE cohort members observed in both the credit union data and the employer data at tenure month 12 have a loan at tenure month 12.[22] At tenure month 12, the average post-AE cohort member has £134 more in active credit union debt than their pre-AE cohort peer, roughly the amount saved due to automatic enrollment by month 12. Conditional on having active debt with the credit union in tenure month 12, the average post-AE cohort member borrows £3,019, or £1,001 more than the average pre-AE cohort member. Differences between the cohorts must be interpreted with caution, as only three pre-AE cohort members have an active loan at month 12.

It may be the case that automatic enrollment into short-term savings increases loan utilization because it increases engagement with the credit union and awareness of the credit union's offering. Without complete information about each employee's balance sheet, we cannot determine whether use of the personal loan product is changing the use of other credit products.

[22] Recall, from Section II.B and Table 2, that the employer data begins in November 2020, while the credit union data begins in December 2021.

Finally, we note that the cohorts experienced different macroeconomic conditions at tenure month 12, although the entire experiment has been conducted in a period of macroeconomic instability.

G. Interaction with pension savings

A natural question is whether the increase in short-term savings generated by automatic enrollment crowds out long-term savings. The quasi-experiment allows us to shed light on this question. The U.K. began rolling out mandatory automatic enrollment into pensions in 2012, and all employers have automatically enrolled their eligible employees since 2018.[23] For our entire study period, minimum pension contribution rates have totaled 8% of salary, including a 3% employer contribution. Figure 25 suggests that there is no pension savings crowd-out in our experiment. In the pre-AE cohort, pension participation rates are 79% in month 3 and between 76% and 84% through month 18. In the post-AE cohort, pension participation is 83% in month 3 and between 76% and 85% through month 18. Table 11 (column 4) shows that the differences in pension participation between the two cohorts are generally not statistically significant. For these analyses, we exclude employees who would not have been subject to pension automatic enrollment at the time of hire: those under age 22, at or above age 66, or with annualized starting salaries less than £10,000. Table 11 (column 5) and Appendix Figure 8 additionally show the effect of automatic enrollment on the sum of short-term and pension savings rates as a share of salary for each cohort, restricting to employees with annualized salaries at or below £50,270 (because we do not observe exact salaries for employees with salaries above £50,270) who would have been

[23] https://www.gov.uk/government/publications/workplace-pensions-and-automatic-enrolment-employers-perspectives-2022/summary-workplace-pensions-and-automatic-enrolment-employers-perspectives-2022

subject to pension automatic enrollment at the time of hire.[24] We estimate that automatic enrollment increases the sum of gross savings flows to the two accounts by about 1% of income.

IV. Conclusion

Across four separate experiments, we find that automatic enrollment and active choice can increase participation and balances in short-term payroll savings schemes, but their performance is sensitive to design parameters.

In a three-arm RCT, the participation rate is 56 percentage points higher and mean balances £28 higher under automatic enrollment than opt-in enrollment two months after randomization. Twelve months after randomization, participation is 43 percentage points higher and mean balances £113 higher. A two-year quasi-experiment involving automatic enrollment yielded similar results, even with the presence of an employer-managed ID&V process. Three months after hire, participation is 46 percentage points higher and mean balances £44 higher under automatic enrollment than opt-in enrollment. Twenty-four months after hire, participation is 40 percentage points higher and mean balances £164 higher.

A two-step active choice intervention in the three-arm RCT produced single-digit increases in participation rates in early months, but by month 8 the difference relative to the control arm is no longer statistically significant.

[24] During our entire study, annual earnings below £6,240 and above £50,270 were excluded from the employer's pension contribution calculation. In these analyses, both the employee contribution and the employer match are calculated on qualifying earnings only, such that a 5% recorded employee contribution rate on a £30,000 annualized salary is counted here as a 3.96% pension contribution rate ([(30000 - 6240) × 0.05] ÷ 30000 = 0.0396). Because we already exclude individuals with an annualized salary above £50,270, only the lower limit (£6,240) is relevant to our analyses. (Learn more about qualifying earnings at https://www.thepensionsregulator.gov.uk/en/employers/new-employers/im-an-employer-who-has-to-provide-a-pension/declare-your-compliance/ongoing-duties-for-employers-/earnings-thresholds)

The introduction of KYC checks to the three-arm RCT had a significant chilling effect on the ability of automatic enrollment to generate short-term savings. In our post-KYC RCT, two months after randomization, participation is 20 percentage points higher and mean balances £4 higher under automatic enrollment than under two-step active choice conditions. Nine months after randomization, participation is 26 percentage points higher and mean balances £40 higher.

On the other hand, streamlining the active choice intervention significantly improved its performance in the optimized active choice RCT. Two months after randomization, participation was 22 percentage points higher and mean balances £4 higher under an optimized one-step active choice intervention than under opt-in enrollment.

Automatic enrollment and active choice generally did not change the frequency or size of withdrawals from short-term savings. Automatic enrollment also does not appear to meaningfully change use of the workplace finance company's earned wage access benefit, suggesting that the liquid savings created by automatic enrollment is not financing needs that were otherwise being covered by earned wage access. The lack of reduced earned wage access usage may be because the amount accessed is almost always much larger than the balances accumulated in the short-term savings scheme. Because the finance company charges a flat fee for wages accessed regardless of the amount accessed, there is no incentive to split the financing of a purchase between the short-term savings account and earned wage access. In the quasi-experiment, automatic enrollment appears to increase borrowing from the credit union, which makes personal loans available to savers. However, without household balance sheet data, we cannot say whether these loans represent net increases in total borrowing.

Finally, all four experiments show that default contribution amounts are highly sticky. In the three-arm RCT, quasi-experiment, and post-KYC RCT, the default contribution amount under

automatic enrollment is £40 per monthly paycheck. For the average employee at the participating employers, this is approximately 1.9% of gross pay. The median contribution amount is persistently £40, and the mean is always higher. This evidence suggests that a contribution amount close to 2% of pay is a level that a significant share of workers is willing to accept in a regime where savings are fully liquid. In the optimized active choice RCT, the £20 default is retained by more than half of workers, highlighting that an employer looking to boost employees' short-term savings may wish to choose a default that is both approachable (not too high) and large enough to generate meaningful savings in a reasonable period of time.

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Table 1. Summary Statistics, Three-Arm RCT

This table presents summary statistics for the Wagestream members who were randomized to our three-arm RCT between October 24, 2022, and September 18, 2023. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Standard errors are shown in parentheses. We are missing shift and wage data for many employees, including all Co-op employees. Some employees have multiple wages reported on their first observed day. These are likely to be situations where the employee worked overtime or took a shift that pays a higher wage. In such cases, we use the average wage on the first observed day.

	Opt-in (Control)	Active Choice	Opt-out	*F*-test of joint equality (*p*-value)
Mean first-observed hourly wage rate (Bupa only)	£12.35 (0.01)	£12.74 (0.14)	£12.33 (0.12)	0.032
Mean first-observed net paycheck	£1,199.85 (14.15)	£1,209.23 (13.58)	£1,203.84 (13.34)	0.889
Mean tenure with employer at point of Wagestream sign-up (in months)	15.1 (0.9)	15.1 (0.8)	14.3 (0.8)	0.731
Co-op employees	65.4% (0.9)	66.8% (0.9)	66.9% (0.9)	0.438
Sample size				
Month 0	2,596	2,677	2,669	
Month 1	2,525	2,603	2,607	
Month 2	2,382	2,463	2,452	
Month 3	2,091	2,162	2,165	
Month 4	1,791	1,802	1,836	
Month 5	1,483	1,503	1,508	
Month 6	1,171	1,201	1,222	
Month 7	943	984	986	
Month 8	667	709	704	
Month 9	548	598	579	
Month 10	364	414	409	
Month 11	176	205	193	
Month 12	101	123	111	

Table 2. Summary Statistics, Quasi-Experiment

This table presents summary statistics for the 3,605 SUEZ employees who are included in our analyses. The pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

	Pre-AE (Nov 2020 – Oct 2021 hires)	Post-AE (Nov 2021 – Dec 2023 hires)	*p*-value of difference
Mean nominal starting pay (annualized)[1,2]	£24,009 (213)	£26,343 (150)	0.000
Mean inflation-adjusted starting pay (annualized)[3]	£23,620 (210)	£23,468 (132)	0.525
Female	13.8% (1.0)	13.8% (0.6)	0.989
Age[4]			
30 or under	34.1% (1.4)	33.7% (0.9)	0.819
31-50	43.7% (1.5)	43.8% (0.9)	0.954
51 +	22.2% (1.2)	22.4% (0.8)	0.849
Manual position[5]	82.4% (1.1)	78.5% (0.8)	0.005
Total employees[6]	1,164	2,853	
Employees observed in credit union data in			
Tenure month 0	0	2,741	
Tenure month 1	0	2,758	
Tenure month 2	92	2,484	
Tenure month 3	227	2,215	
Tenure month 4	314	1,976	
Tenure month 5	395	1,767	
Tenure month 6	465	1,588	
Tenure month 7	507	1,439	
Tenure month 8	536	1,291	

Tenure month 9	575	1,175
Tenure month 10	593	1,066
Tenure month 11	615	962
Tenure month 12	618	861
Tenure month 13	654	792
Tenure month 14	636	699
Tenure month 15	608	628
Tenure month 16	587	542
Tenure month 17	573	478
Tenure month 18	561	411
Tenure month 19	551	354
Tenure month 20	539	287
Tenure month 21	524	236
Tenure month 22	516	181
Tenure month 23	505	126
Tenure month 24	495	80
Tenure month 25	489	50
Tenure month 26	486	0
Tenure month 27	441	0
Tenure month 28	360	0
Tenure month 29	307	0
Tenure month 30	259	0
Tenure month 31	212	0
Tenure month 32	169	0
Tenure month 33	141	0
Tenure month 34	111	0
Tenure month 35	77	0
Tenure month 36	49	0
Tenure month 37	34	0

[1]We observe annual pay for some workers and hourly pay for others. We also observe scheduled hours per week for most workers. We calculate annualized pay for hourly workers with observed schedules by computing their hourly rate × scheduled hours per week × 52. When calculating annualized pay, we drop hourly workers with zero or unobserved scheduled hours per week. [2]Our pay data are right-censored; employees with observed pay at or above £50,271 are binned together by Nest Insight. Employees with calculated annualized pay at or above this threshold are grouped into the same bin. As a result, the means reported here (which are computed assigning £50,271 to right-censored employees) are lower than the true means. [3]Values are adjusted to January 2021 GBP using the CPIH. [4]We receive age as a categorical variable, so we cannot calculate a mean. [5]A small number of individuals appear to change between manual and non-manual positions. We drop these individuals when calculating the share in manual positions. [6]We include counts of employees in each cohort for each tenure month. We have more months of data from the employer than from the credit union, and as a result we use only a subset of the available data for some analyses.

Table 3. Summary Statistics, Post-KYC RCT

This table presents summary statistics for the Wagestream members who were randomized to the post-KYC RCT between September 19, 2023, and August 31, 2024. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Standard errors are shown in parentheses. We are missing shift and wage data for many employees, including all Co-op employees. Some employees have multiple wages reported on their first observed day. These are likely to be situations where the employee worked overtime or took a shift that pays a higher wage. In such cases, we use the average wage on the first observed day.

	Active Choice	Opt-out	*F*-test of joint equality (*p*-value)
Mean first-observed hourly wage rate (Bupa only)	£13.24 (0.18)	£13.72 (0.21)	0.077
Mean first-observed net paycheck	£1,341.84 (19.13)	£1,320.76 (17.97)	0.421
Mean tenure with employer at point of Wagestream sign-up (in months)	13.8 (1.0)	12.3 (0.9)	0.266
Co-op employees	67.1% (1.2)	67.3% (1.1)	0.899
Sample size			
Month 0	1,560	1,671	
Month 1	1,519	1,639	
Month 2	1,428	1,545	
Month 3	1,355	1,447	
Month 4	1,303	1,379	
Month 5	1,154	1,227	
Month 6	940	1,019	
Month 7	785	844	
Month 8	620	660	
Month 9	441	453	

Table 4. Summary Statistics, Optimized Active Choice RCT

This table presents summary statistics for the Wagestream members who were randomized to the optimized active choice RCT between September 7, 2023, and November 16, 2023. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Standard errors are shown in parentheses. Some employees have multiple wages reported on their first observed day. These are likely to be situations where the employee worked overtime or took a shift that pays a higher wage. In such cases, we use the average wage on the first observed day.

	Control	Optimized Active Choice	*F*-test of joint equality (*p*-value)
Mean first-observed net paycheck	£909.61 (5.60)	£901.96 (5.56)	0.332
Mean tenure with employer at point of Wagestream sign-up (in months)	8.7 (0.2)	8.4 (0.2)	0.231
Sample size			
Month 0	22,166	22,375	
Month 1	21,328	21,434	
Month 2	19,836	20,028	
Month 3	14,302	14,499	
Month 4	5,602	5,629	

Table 5. Effect of Automatic Enrollment on Participation Rates, Fraction Contributing, and Mean Balances, Three-Arm RCT

This table presents how much higher the opt-out arm is relative to the opt-in arm in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. Participation rate is the fraction of Wagestream members with a positive balance in or contribution to their savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Column (4) limits the sample to members with a positive balance in the month. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Month	Participation Rate (1)	Fraction Contributing (2)	Mean Balance (3)	Mean Balance, Conditional on Positive Balance (4)
0	0.191***	0.191***	1.66***	-0.33
	(0.009)	(0.009)	(0.10)	(0.86)
2	0.561***	0.518***	27.49***	-2.38
	(0.012)	(0.012)	(0.97)	(2.67)
4	0.531***	0.480***	49.38***	-1.05
	(0.014)	(0.014)	(2.37)	(6.36)
6	0.515***	0.460***	68.06***	-1.39
	(0.017)	(0.017)	(4.57)	(12.33)
8	0.506***	0.464***	83.92***	9.78
	(0.023)	(0.023)	(7.68)	(20.81)
10	0.491***	0.464***	105.60***	73.65**
	(0.031)	(0.031)	(11.03)	(28.77)
12	0.434***	0.435***	112.64***	68.65
	(0.061)	(0.061)	(23.28)	(56.63)
Max *N* (Month)	5,265 (Month 0)	5,265 (Month 0)	5,265 (Month 0)	1,940 (Month 2)
Min *N* (Month)	212 (Month 12)	212 (Month 12)	212 (Month 12)	85 (Month 12)

Table 6. Effect of Automatic Enrollment on Participation Rates and Savings Accumulation, Quasi-Experiment

This table presents how much higher the post-AE cohort is relative to the pre-AE cohort in the variable shown in the column header at selected months after hire. Standard errors are shown in parentheses. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings, from November 1, 2020, to October 31, 2021. The Post-AE cohort contains employees hired between November 1, 2021, and December 31, 2023. The participation rate is the fraction of employees with a positive balance in or positive elected contribution to their payroll savings scheme. The fraction with increasing balance is the fraction of employees whose balance in a given month is larger than their balance in the previous month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Column (4) limits the sample to those with a positive balance in the month. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Month	Participation Rate (1)	Fraction with Increasing Balance (2)	Mean Balance (3)	Mean Balance, Conditional on Positive Balance (4)
3	0.463***	0.397***	43.77***	72.45*
	(0.033)	(0.033)	(4.87)	(41.25)
6	0.461***	0.357***	85.22***	163.68***
	(0.023)	(0.022)	(6.47)	(58.35)
9	0.457***	0.328***	107.95***	176.92***
	(0.021)	(0.020)	(6.76)	(55.12)
12	0.474***	0.335***	134.29***	248.38***
	(0.020)	(0.019)	(8.59)	(82.33)
15	0.476***	0.333***	165.88***	268.22**
	(0.021)	(0.019)	(11.15)	(108.93)
18	0.484***	0.327***	192.26***	343.91**
	(0.022)	(0.020)	(14.75)	(156.44)
21	0.461***	0.325***	174.73***	280.94**
	(0.023)	(0.022)	(13.66)	(138.77)
24	0.402***	0.256***	163.98***	115.81
	(0.025)	(0.022)	(15.57)	(195.60)
Max *N* (Month)	2,442 (Month 3)	2,442 (Month 3)	2,442 (Month 3)	1,053 (Month 3)
Min *N* (Month)	575 (Month 24)	575 (Month 24)	575 (Month 24)	38 (Month 24)

Table 7. Effect of Active Choice on Participation Rates, Fraction Contributing, and Mean Balances, Three-Arm RCT

This table presents how much higher the active choice arm is relative to the opt-in arm in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. Participation rate is the fraction of Wagestream members with a positive balance in or contribution to their savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Column (4) limits the sample to members with a positive balance in the month. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Month	Participation Rate (1)	Fraction Contributing (2)	Mean Balance (3)	Mean Balance, Conditional on Positive Balance (4)
0	0.017***	0.017***	0.11*	-1.36
	(0.005)	(0.005)	(0.06)	(1.43)
2	0.034***	0.034***	1.18	-4.15
	(0.010)	(0.010)	(0.79)	(4.38)
4	0.025**	0.029**	1.38	-4.83
	(0.012)	(0.012)	(1.91)	(9.93)
6	0.036**	0.040***	3.64	-6.56
	(0.016)	(0.015)	(3.71)	(18.07)
8	0.033	0.028	8.12	22.95
	(0.021)	(0.020)	(6.37)	(31.18)
10	0.046	0.056**	16.50*	51.67
	(0.029)	(0.028)	(9.03)	(41.15)
12	0.031	0.035	-10.31	-68.20
	(0.054)	(0.053)	(13.47)	(56.58)
Max *N* (Month)	5,273 (Month 0)	5,273 (Month 0)	5,273 (Month 0)	677 (Month 3)
Min *N* (Month)	224 (Month 12)	224 (Month 12)	224 (Month 12)	45 (Month 12)

Table 8. Effect of Automatic Enrollment relative to Active Choice on Participation Rates and Fraction Contributing, Post-KYC RCT

This table presents how much higher the opt-out arm is relative to the active choice arm in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. Participation rate is the fraction of Wagestream members with a positive balance in or contribution to their savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Column (4) limits the sample to members with a positive balance in the month. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

	Participation Rate	Fraction Contributing	Mean Balance	Mean Balance, Conditional on Positive Balance
Month	(1)	(2)	(3)	(4)
0	0.062***	0.062***	0.70***	-4.27**
	(0.008)	(0.008)	(0.15)	(2.03)
1	0.196***	0.190***	4.35***	-4.76**
	(0.015)	(0.015)	(0.65)	(2.18)
2	0.234***	0.208***	9.60***	-10.95***
	(0.016)	(0.016)	(1.35)	(3.67)
3	0.251***	0.226***	15.95***	-7.22
	(0.017)	(0.017)	(2.03)	(5.34)
4	0.270***	0.238***	23.09***	-4.81
	(0.018)	(0.017)	(2.82)	(7.33)
5	0.278***	0.246***	27.01***	-9.36
	(0.019)	(0.019)	(3.75)	(9.83)
6	0.278***	0.241***	32.90***	-8.22
	(0.021)	(0.020)	(5.08)	(13.51)
7	0.258***	0.217***	35.38***	-3.07
	(0.023)	(0.022)	(6.46)	(17.26)
8	0.262***	0.209***	39.05***	-4.57
	(0.026)	(0.025)	(7.87)	(22.35)
9	0.260***	0.194***	40.30***	-4.12
	(0.030)	(0.029)	(9.77)	(28.85)
Max *N* (Month)	3,231 (Month 0)	3,231 (Month 0)	3,231 (Month 0)	932 (Month 4)
Min *N* (Month)	894 (Month 9)	894 (Month 9)	894 (Month 9)	179 (Month 0)

Table 9. Effect of Optimized Active Choice on Participation Rates, Fraction Contributing, and Mean Balances, Optimized Active Choice RCT

This table presents how much higher the optimized active choice arm is relative to the control arm in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. Participation rate is the fraction of Wagestream members with a positive balance in or contribution to their savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Column (4) limits the sample to members with a positive balance in the month. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Month	Participation Rate (1)	Fraction Contributing (2)	Mean Balance (3)	Mean Balance, Conditional on Positive Balance (4)
0	0.110***	0.110***	0.67***	-6.80***
	(0.002)	(0.002)	(0.03)	(0.70)
1	0.220***	0.210***	3.88***	-15.31***
	(0.003)	(0.003)	(0.12)	(1.27)
2	0.217***	0.197***	7.61***	-22.39***
	(0.003)	(0.003)	(0.25)	(2.20)
3	0.222***	0.197***	10.75***	-18.07***
	(0.004)	(0.004)	(0.39)	(3.38)
4	0.219***	0.192***	12.80***	-13.64**
	(0.006)	(0.006)	(0.77)	(6.43)
Max *N* (Month)	44,541 (Month 0)	44,541 (Month 0)	44,541 (Month 0)	5,699 (Month 1)
Min *N* (Month)	11,231 (Month 4)	11,231 (Month 4)	11,231 (Month 4)	1,643 (Month 4)

Table 10. Effect of Automatic Enrollment and Active Choice on Withdrawal Rates and Amounts, Three-Arm RCT

This table presents how much higher the opt-out arm is relative to the opt-in arm, or the active choice arm relative to the opt-in arm, in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. The withdrawal rate is the number of members taking one or more withdrawals in a given month divided by the number of members with a positive balance in or payroll contribution to their short-term savings account in that month. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Due to diminishing sample sizes, we do not report the mean positive withdrawal amount or share of balance in month 12. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

	Opt-Out			Active Choice		
	Withdrawal Rate	Mean Positive Withdrawal Amount	Mean Positive Withdrawal Share of Balance	Withdrawal Rate	Mean Positive Withdrawal Amount	Mean Positive Withdrawal Share of Balance
Month	(1)	(2)	(3)	(4)	(5)	(6)
0	-0.102**	-12.95*	0.014	-0.104*	27.61*	0.049
	(0.045)	(6.80)	(0.043)	(0.057)	(15.46)	(0.051)
2	-0.049*	-14.69***	0.049*	-0.043	3.21	0.043
	(0.030)	(4.97)	(0.026)	(0.037)	(8.53)	(0.034)
4	-0.001	-17.12*	0.038	-0.018	-3.87	0.031
	(0.033)	(9.29)	(0.032)	(0.041)	(15.17)	(0.042)
6	-0.047	-21.74	0.002	-0.049	-19.32	-0.009
	(0.040)	(17.79)	(0.042)	(0.049)	(25.66)	(0.053)
8	-0.058	-17.34	0.014	-0.016	-5.48	0.007
	(0.052)	(25.73)	(0.055)	(0.064)	(36.07)	(0.065)
10	-0.139**	-24.22	-0.091	0.028	-60.61	-0.144
	(0.069)	(68.97)	(0.102)	(0.080)	(62.31)	(0.108)
12	-0.001			0.023		
	(0.129)			(0.152)		
Max *N* (Month)	1,978 (Month 2)	556 (Month 2)	556 (Month 2)	688 (Month 2)	208 (Month 2)	208 (Month 2)
Min *N* (Month)	88 (Month 12)	39 (Month 10)	39 (Month 10)	46 (Month 12)	24 (Month 10)	24 (Month 10)

Table 11. Effect of Automatic Enrollment on Withdrawal Rates, Withdrawal Amounts, and Total Savings Rate, Quasi-Experiment

This table presents how much higher the post-AE cohort is relative to the pre-AE cohort in the variable shown in the column header at selected months after hire. Standard errors are shown in parentheses. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings, from November 1, 2020, to October 31, 2021. The Post-AE cohort contains employees hired between November 1, 2021, and December 31, 2023. The withdrawal rate is the fraction of employees with a positive balance in or a positive elected contribution to their savings pot who took one or more withdrawals in a given month. The pension participation rate is the fraction of employees contributing to their pension. We exclude employees who, at hire, were younger than 22 or at least 66. We additionally exclude employees with annualized starting salaries less than £10,000 and employees with zero contracted hours per week. The total savings rate represents the combined short-term and pension savings rate as a share of salary, for employees with observed annual salaries below £50,271 (because we do not observe exact salaries for employees with salaries of £50,271 or more). Both the employee contribution and the employer match are calculated on qualifying earnings only (annualized earnings above £6,240). Tenure month 0 is the month of hire. Employee are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

	Withdrawal Rate	Mean Positive Withdrawal Amount	Mean Positive Withdrawal Share of Balance	Pension Participation Rate	Total Savings Share of Salary (%)
Month	(1)	(2)	(3)	(4)	(5)
3	-0.119	25.97	-0.260	0.022	1.500***
	(0.169)	(87.07)	(0.250)	(0.016)	(0.113)
6	-0.115	-9.25	-0.279	0.043**	1.258***
	(0.143)	(132.90)	(0.192)	(0.018)	(0.135)
9	-0.110	10.83	-0.065	0.014	1.266***
	(0.141)	(117.22)	(0.137)	(0.019)	(0.154)
12	-0.132	34.32	0.015	0.005	1.405***
	(0.154)	(100.51)	(0.146)	(0.021)	(0.164)
15	-0.137	154.18	-0.103	-0.030	1.167***
	(0.154)	(144.72)	(0.133)	(0.024)	(0.181)
18	-0.031	124.77	0.186	-0.069**	0.743***
	(0.169)	(200.92)	(0.192)	(0.027)	(0.207)
21	-0.000	75.84	0.057	-0.001	1.300***
	(0.177)	(308.56)	(0.161)	(0.030)	(0.229)
24	-0.067	228.05	-0.076	0.054	1.192***
	(0.234)	(239.79)	(0.0249)	(0.046)	(0.333)
Max *N* (Month)	1,069 (Month 3)	140 (Month 3)	140 (Month 3)	2,803 (Month 3)	2,510 (Month 3)
Min *N* (Month)	119 (Month 21)	13 (Month 24)	34 (Month 21)	518 (Month 24)	497 (Month 24)

Table 12. Effect of Automatic Enrollment and Active Choice on Earned Wage Access Rates and Amounts, Three-Arm RCT

This table presents how much higher the opt-out arm is relative to the opt-in arm, or the active choice arm relative to the opt-in arm, in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. The earned wage access usage rate is the fraction of members accessing their wages one or more times in a given month. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Sample sizes for amounts and shares differ slightly because wages may be accessed in a different month than the corresponding paycheck. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

	Opt-Out			Active Choice		
Month	Earned Wage Access Usage Rate (1)	Mean Positive Wage Access Amount (2)	Mean Positive Access Share of Next Paycheck (3)	Earned Wage Access Usage Rate (4)	Mean Positive Wage Access Amount (5)	Mean Positive Access Share of Next Paycheck (6)
0	0.012	0.69	-0.001	0.013	13.33	0.010
	(0.012)	(8.60)	(0.011)	(0.012)	(9.36)	(0.012)
2	0.031**	-4.18	-0.005	0.013	18.32	0.005
	(0.014)	(11.36)	(0.005)	(0.014)	(11.70)	(0.006)
4	0.031*	2.64	0.005	0.013	19.95	0.015**
	(0.016)	(13.46)	(0.007)	(0.016)	(13.98)	(0.007)
6	0.045**	-11.66	-0.017**	0.026	7.59	-0.003
	(0.020)	(16.47)	(0.009)	(0.020)	(17.12)	(0.009)
8	-0.017	-7.63	-0.015	-0.004	-6.39	-0.003
	(0.026)	(25.64)	(0.013)	(0.026)	(25.53)	(0.013)
10	-0.025	3.42	0.012	-0.022	33.50	0.023
	(0.034)	(37.91)	(0.018)	(0.034)	(38.18)	(0.019)
12	0.040	-42.85	-0.016	0.027	57.27	0.045
	(0.062)	(80.55)	(0.026)	(0.060)	(108.14)	(0.038)
Max *N* (Month)	5,265 (Month 0)	2,129 (Month 1)	2,230 (Month 1)	5,273 (Month 0)	2,096 (Month 1)	2,181 (Month 1)
Min *N* (Month)	212 (Month 12)	59 (Month 12)	54 (Month 12)	224 (Month 12)	61 (Month 12)	56 (Month 12)

Table 13. Effect of Optimized Active Choice on Earned Wage Access Rates and Amounts, Optimized Active Choice RCT

This table presents how much higher the optimized active choice arm is relative to the control arm in the variable shown in the column header, by month since joining Wagestream. Standard errors are shown in parentheses. The earned wage access usage rate is the fraction of members accessing their wages one or more times in a given month. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Sample sizes vary by month; the last two rows report the largest and smallest sample size observed in the column, along with the month in which those sample sizes were observed. Sample sizes for amounts and shares differ slightly because wages may be accessed in a different month than the corresponding paycheck. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Month	Earned Wage Access Usage Rate (1)	Mean Positive Wage Access Amount (2)	Mean Positive Access Share of Next Paycheck (3)
0	-0.004	-9.45**	-0.007
	(0.004)	(4.26)	(0.005)
1	-0.001	-0.52	0.001
	(0.005)	(4.74)	(0.003)
2	-0.008	-2.21	-0.004
	(0.005)	(5.28)	(0.003)
3	-0.005	-4.15	-0.005
	(0.006)	(6.45)	(0.003)
4	-0.002	-9.75	-0.002
	(0.009)	(10.19)	(0.006)
Max *N* (Month)	44,413 (Month 0)	16,102 (Month 1)	20,274 (Month 1)
Min *N* (Month)	11,230 (Month 4)	3,808 (Month 4)	4,309 (Month 4)

Figure 1. Participation Rate in and Fraction Contributing to Savings Pot, Three-Arm RCT
Within each trial arm and membership month, we display the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) and the fraction of Wagestream members who made a contribution to the savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

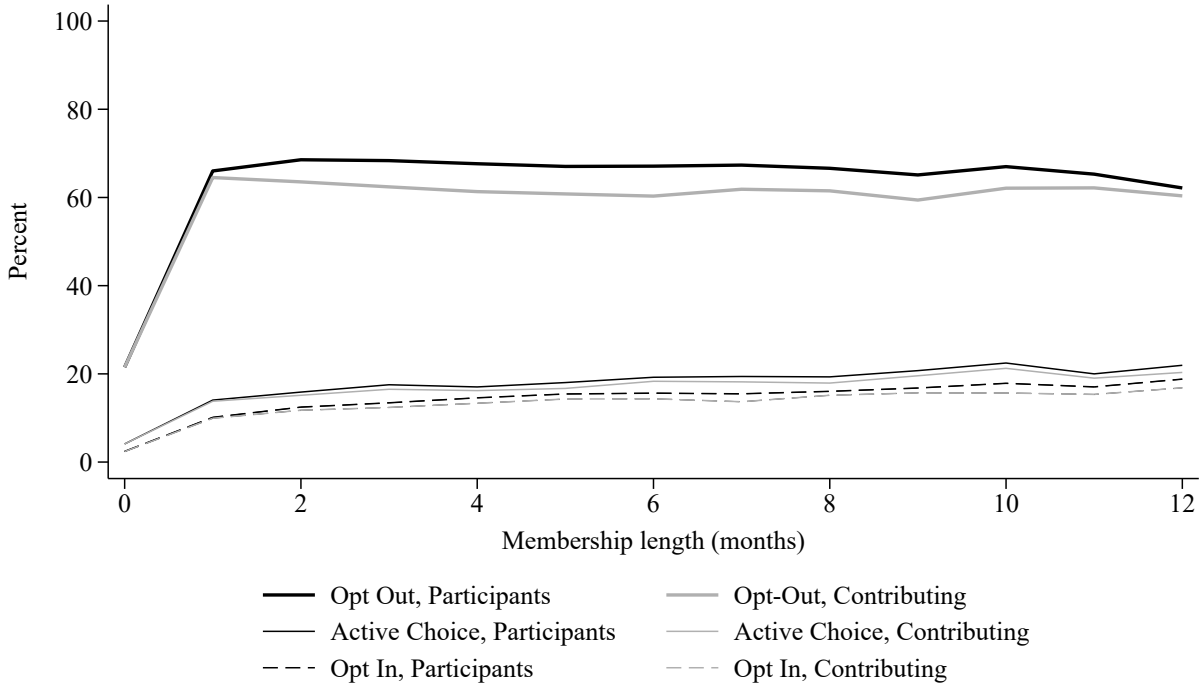


Figure 2. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account, Quasi-Experiment

For each hire cohort and tenure month, we calculate the participation rate by dividing the number of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account by the number of eligible employees. For the post-AE cohort, we compute the fraction with an increasing balance by dividing the number of employees whose short-term savings account balance this month is larger than in the prior month by the number of eligible employees. The pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings, from November 1, 2020, to October 31, 2021. The post-AE cohort contains employees hired between November 1, 2021, and December 31, 2023. Tenure month 0 is the month of hire. Employee are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

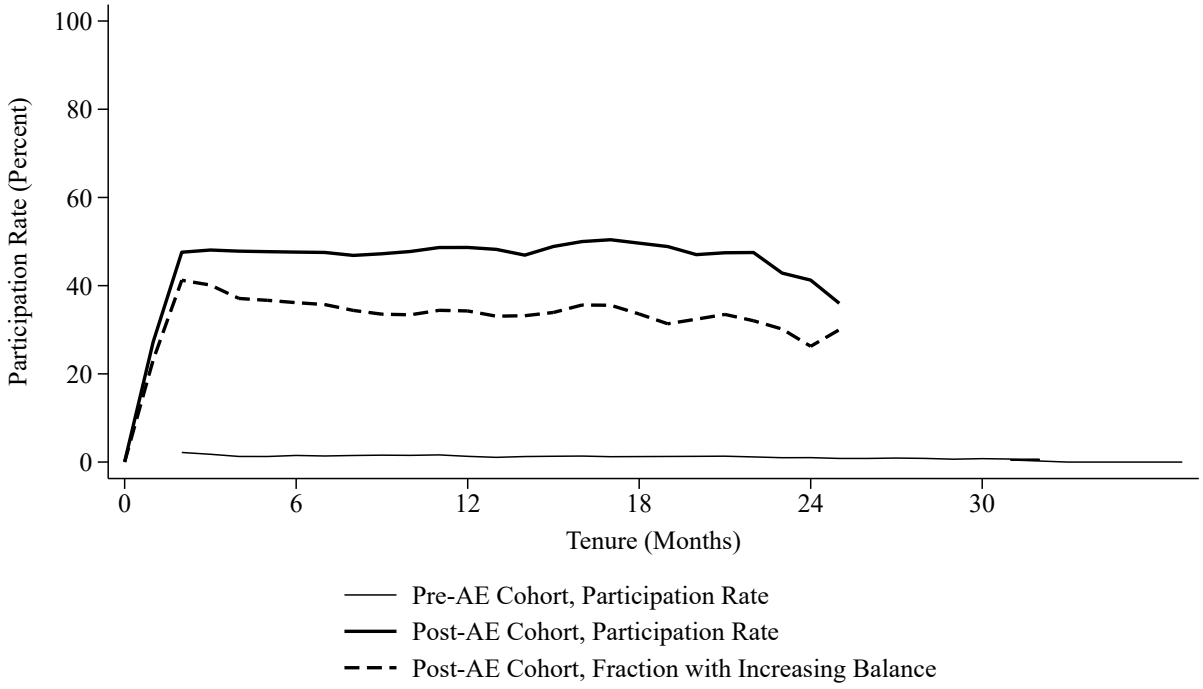


Figure 3. Participation Rate in and Fraction Contributing to Savings Pot, Post-KYC RCT
Within each trial arm and membership month, we display the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) and the fraction of Wagestream members who made a contribution to the savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. The "Subset" groups exclude members who failed and never passed their KYC checks.

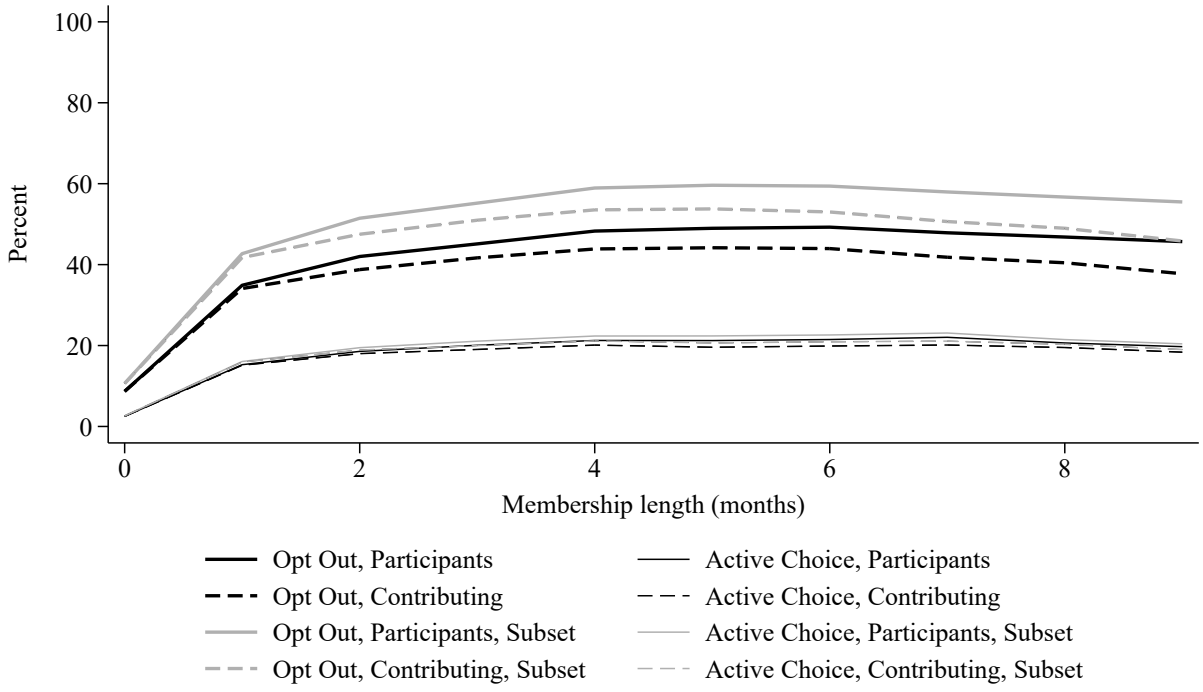


Figure 4. Participation Rate in and Fraction Contributing to Savings Pot, Optimized Active Choice RCT

Within each trial arm and membership month, we display the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) and the fraction of Wagestream members who made a contribution to the savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

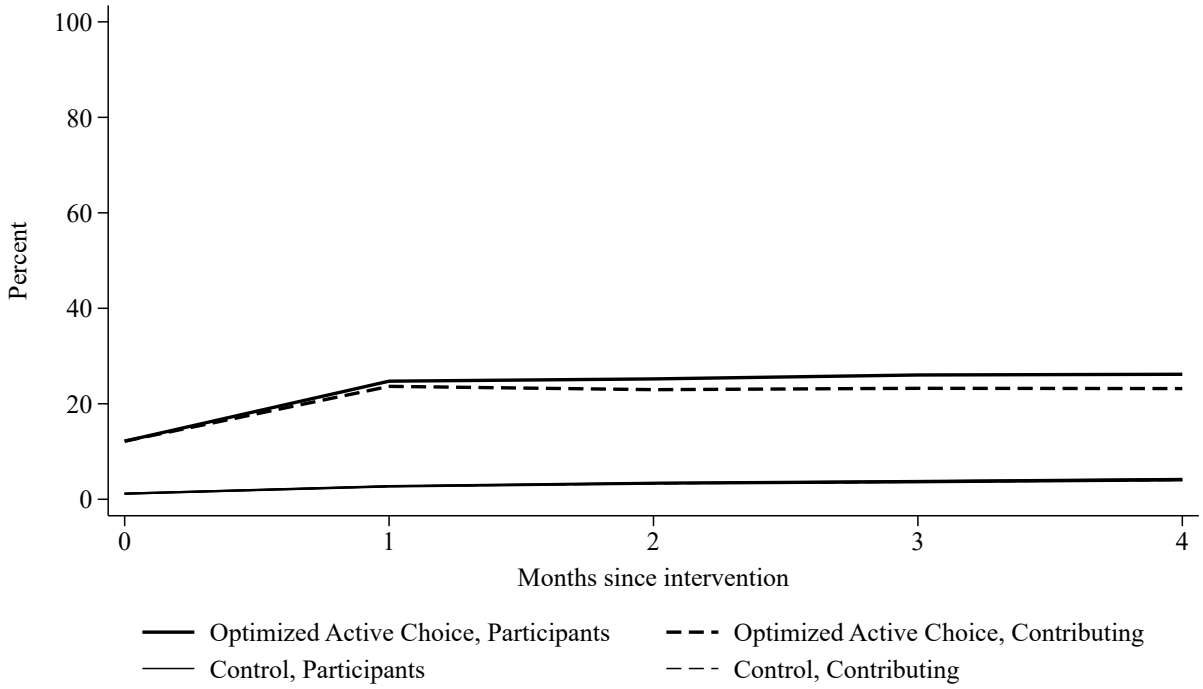


Figure 5. Contribution Amounts, Three-Arm RCT

For each trial arm and month of membership, we report mean and median short-term savings contribution amounts, conditional on having a positive contribution. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon.

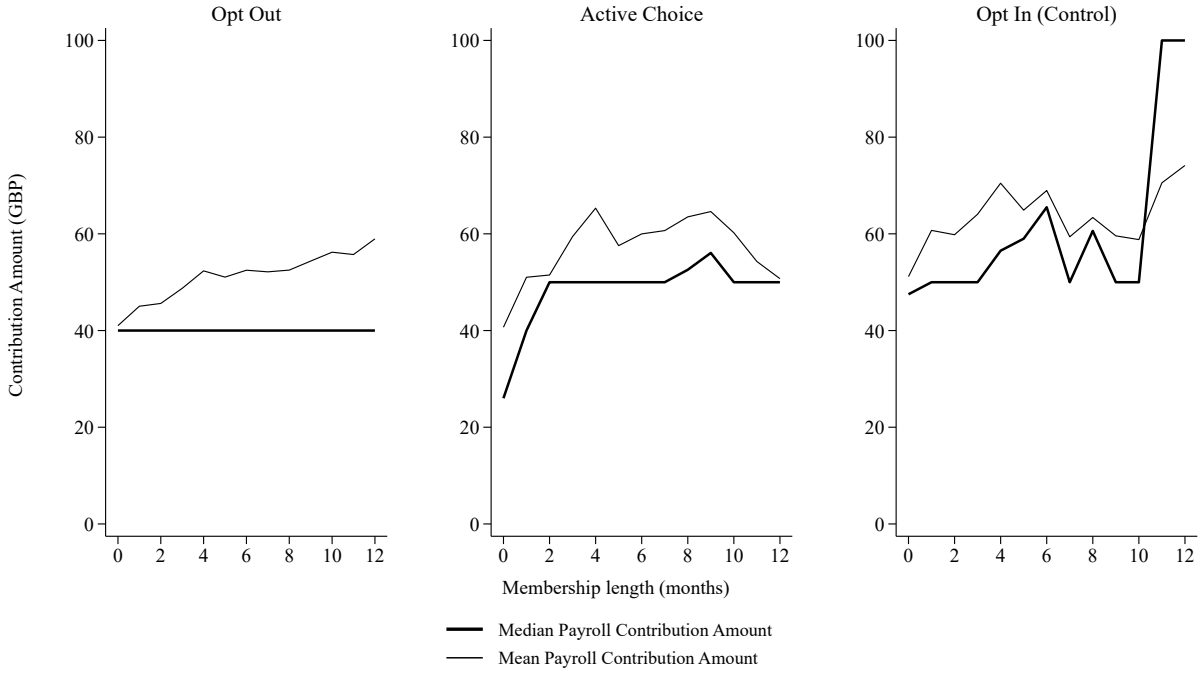


Figure 6. Elected Contribution Amounts, Quasi-Experiment

For each hire cohort and tenure month, we show mean and median elected short-term savings contribution amounts, conditional on having a positive contribution. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

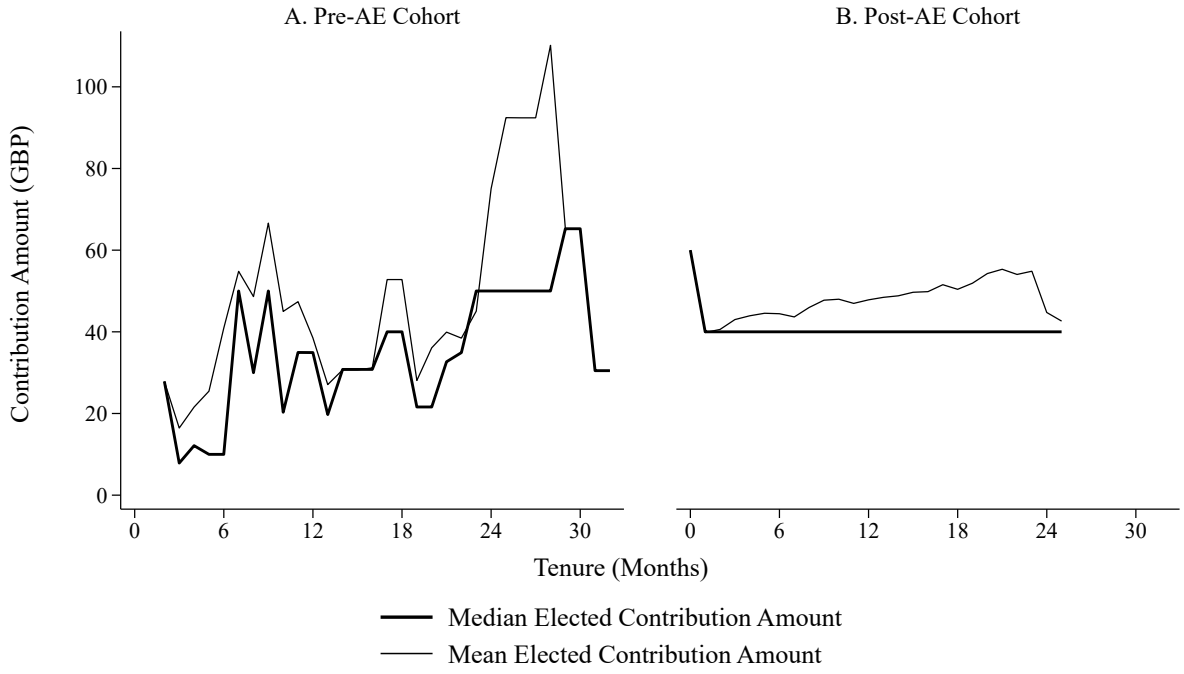


Figure 7. Contribution Amounts, Optimized Active Choice RCT

For each trial arm and month of membership, we report mean and median short-term savings contribution amounts, conditional on having a positive contribution. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon.

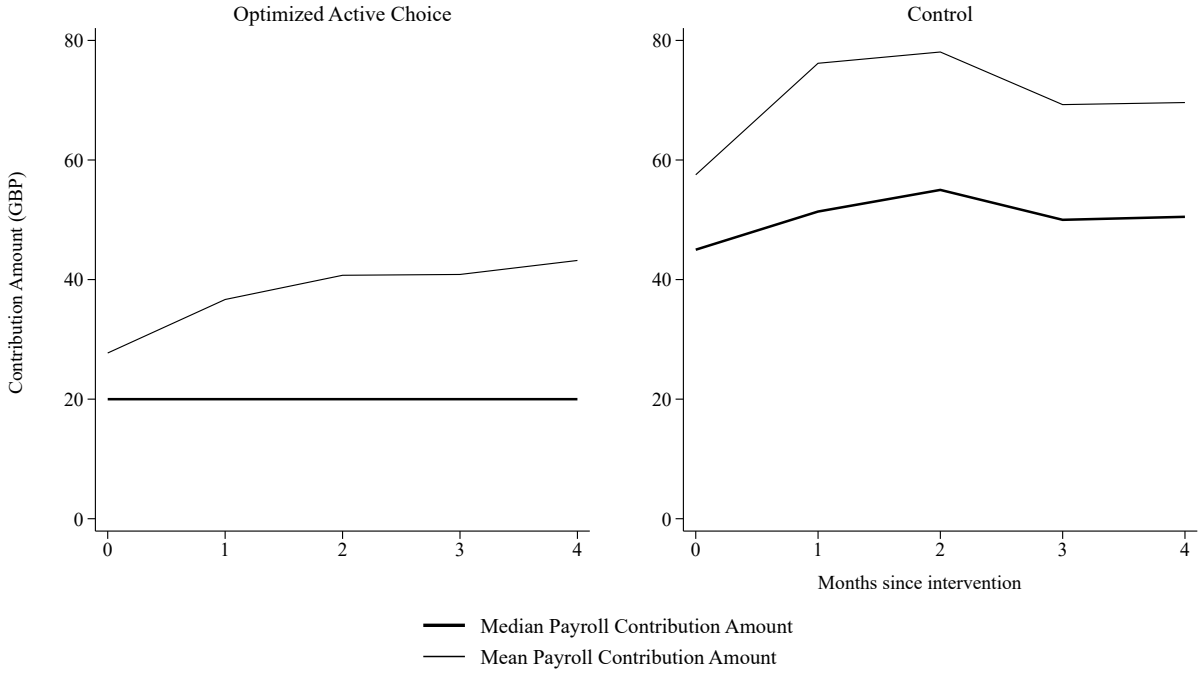


Figure 8. Withdrawal Rates, Three-Arm RCT

For each trial arm and month of membership, we divide the number of members taking one or more withdrawals in a given month by the number of members with a positive balance in and/or payroll contribution to their short-term savings account. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon.

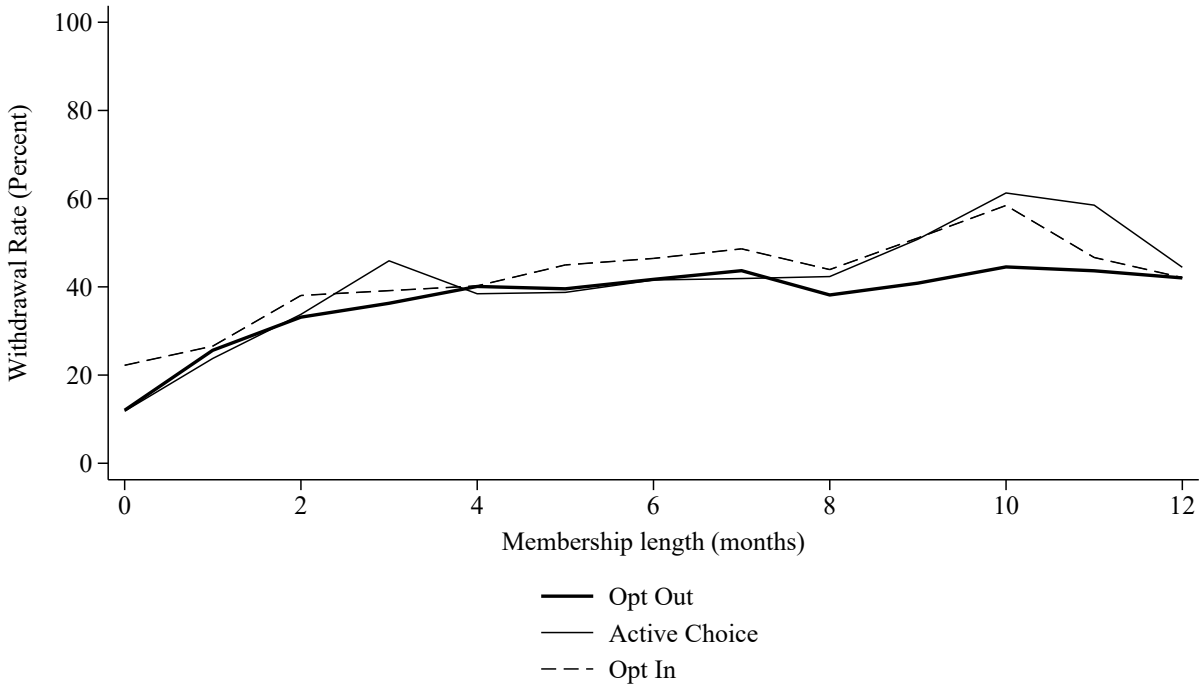


Figure 9. Withdrawal Rates, Quasi-Experiment

For each hire cohort and tenure month, we divide the number of employees taking one or more withdrawals in a given month by the number of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account in that month. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

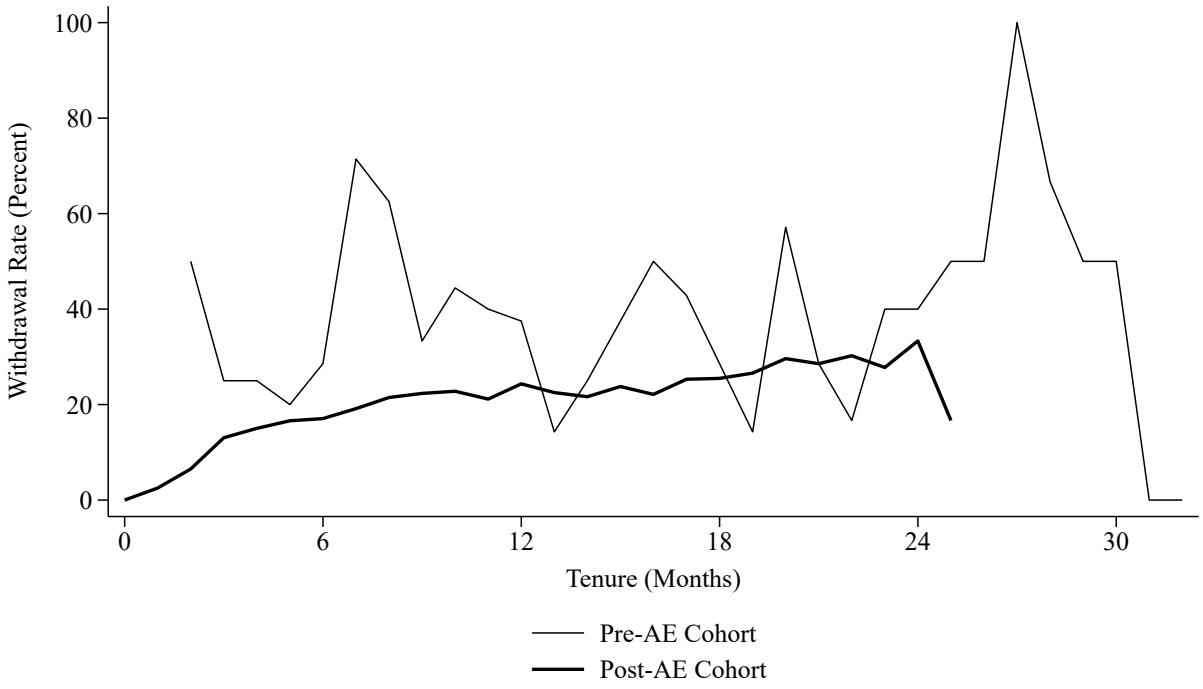


Figure 10. Cumulative Withdrawal Rates, Three-Arm RCT

For each trial arm and month of membership, we divide the number of members who have taken 1+, 3+, and 5+ withdrawals to date by the number of members who were either participating in the program or had participated in a previous month. Individuals are included at a given membership month if they joined early enough to be observed at that horizon. Multiple withdrawals taken in a single month are aggregated. Membership month 0 is the month the individual joined Wagestream.

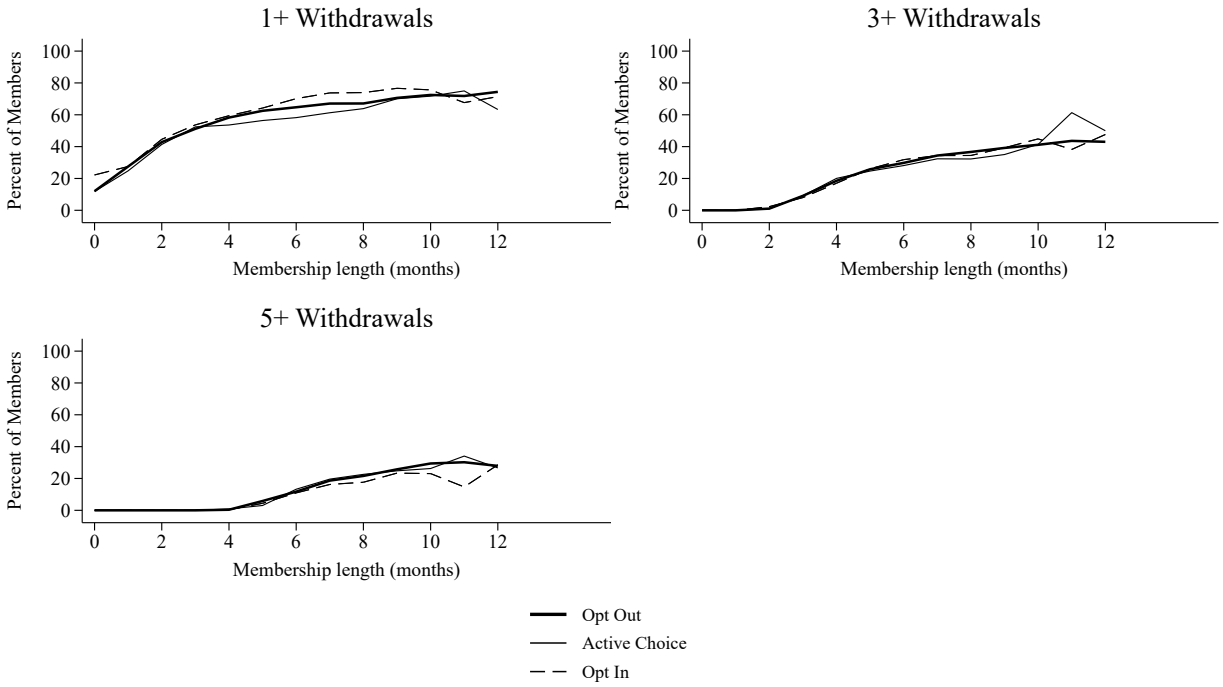


Figure 11. Cumulative Withdrawal Rates, Quasi-Experiment

For each hire cohort and tenure month, we divide the number of employees who have taken 1+, 3+, and 5+ withdrawals to date by the number of employees who were either participating in the program or had participated in a previous month. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. Multiple withdrawals taken in a single month are aggregated. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire.

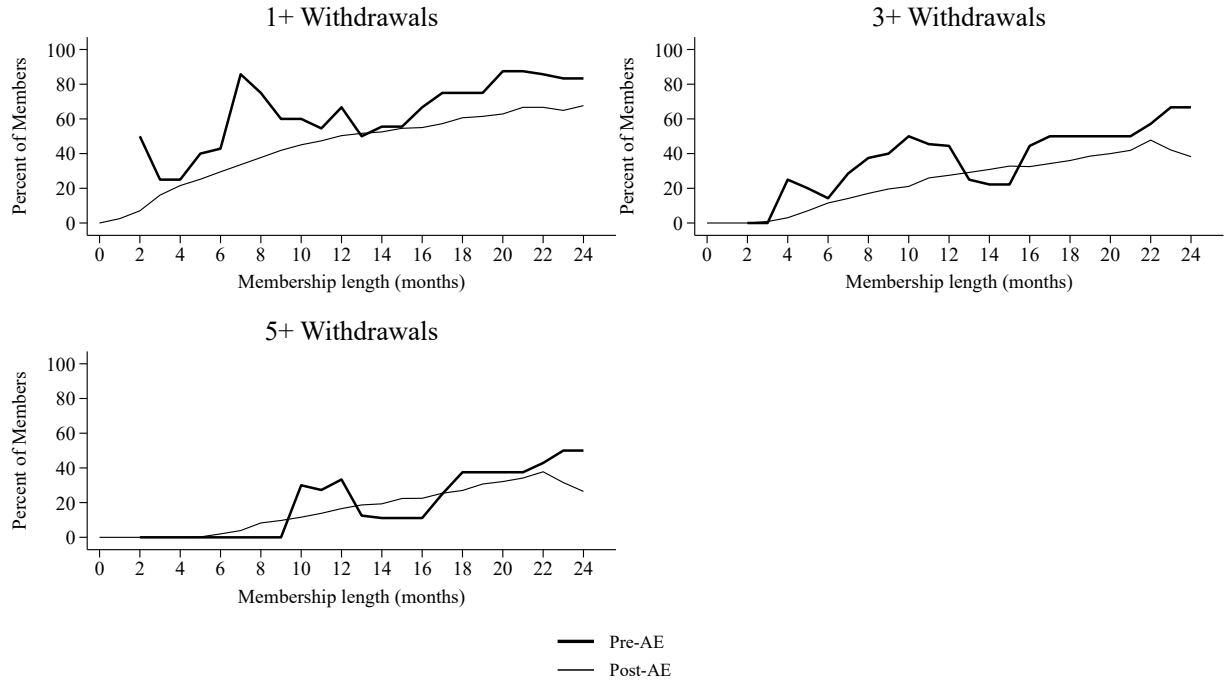


Figure 12. Withdrawal Size, Three-Arm RCT

For each trial arm and membership month, we report the mean withdrawal size in GBP and as a share of the account's balance, conditional on taking a withdrawal. Multiple withdrawals made by an individual in a single month are combined. When determining the account's balance in a month, we add all contributions made during the month to the starting balance. Membership month 0 is the month the individual joined Wagestream.

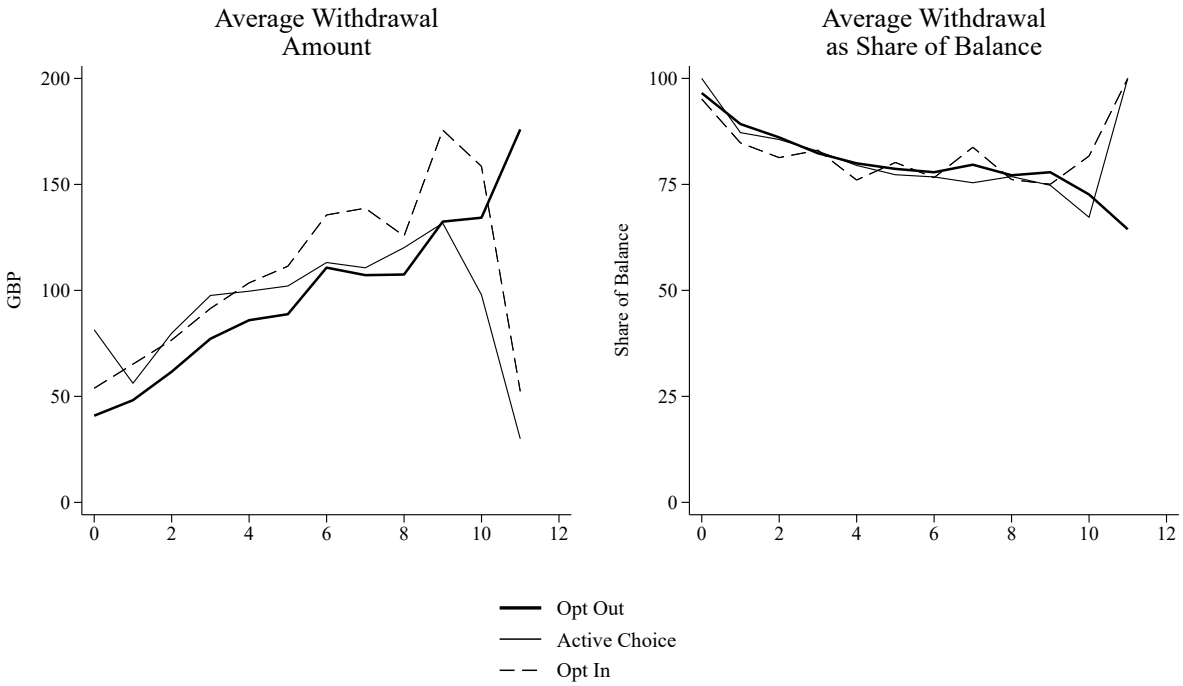


Figure 13. Withdrawal Size, Quasi-Experiment

For each hire cohort and tenure month, we report the mean positive withdrawal size in GBP and as a share of the account's balance. Multiple withdrawals made in a single month are aggregated. When determining the account's balance, we add to the starting balance all contributions made during the month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

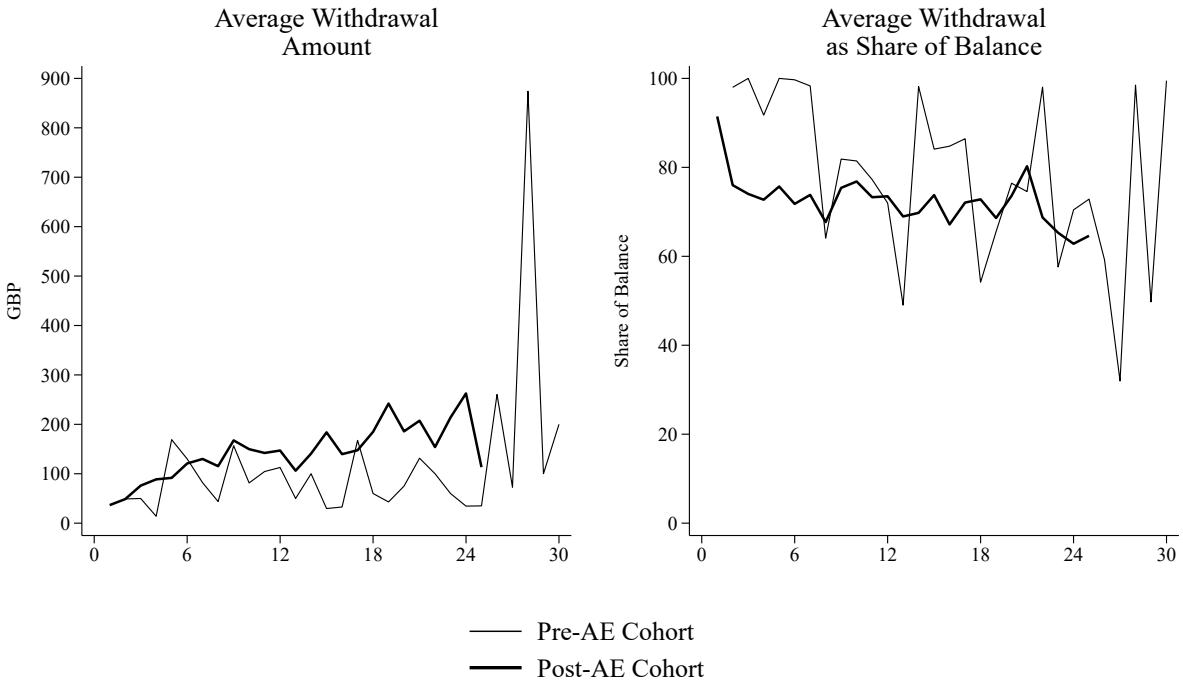


Figure 14. Savings Balances, Three-Arm RCT

For each trial arm and month of membership, we report mean savings pot balances for all members (including those who are not saving, whom we assign a balance of £0). Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

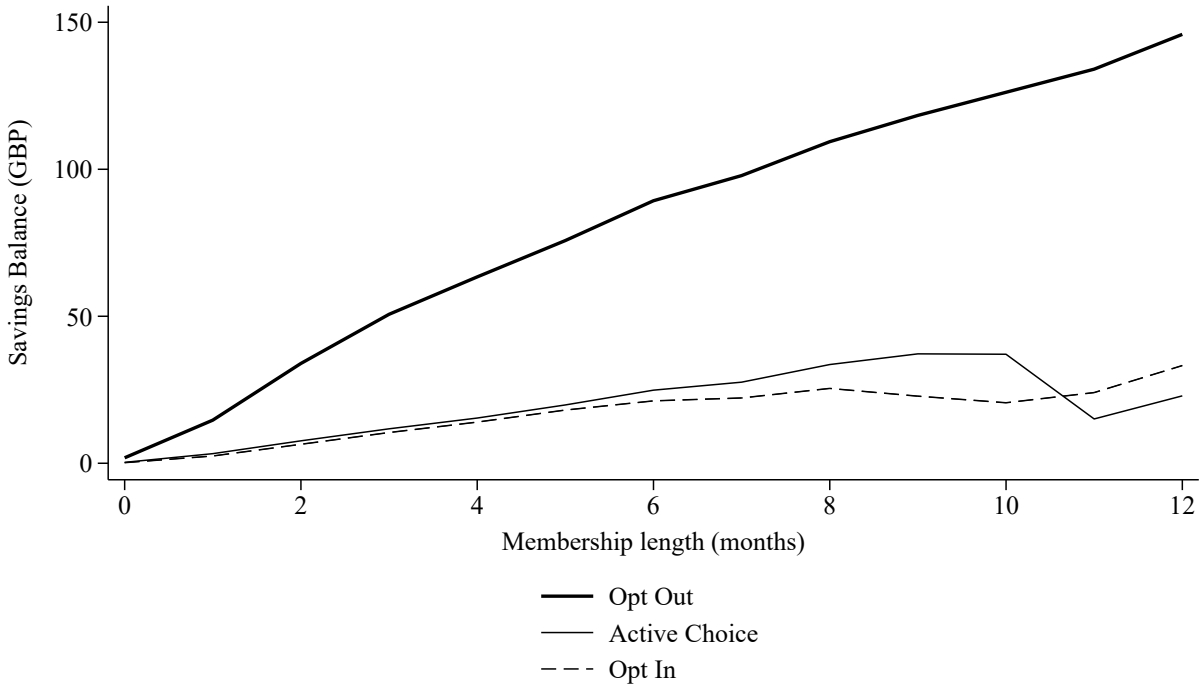


Figure 15. Savings Balances, Quasi-Experiment

For each hire cohort and tenure month, we show mean and median short-term savings balances across all employees (including those who are not saving). The pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

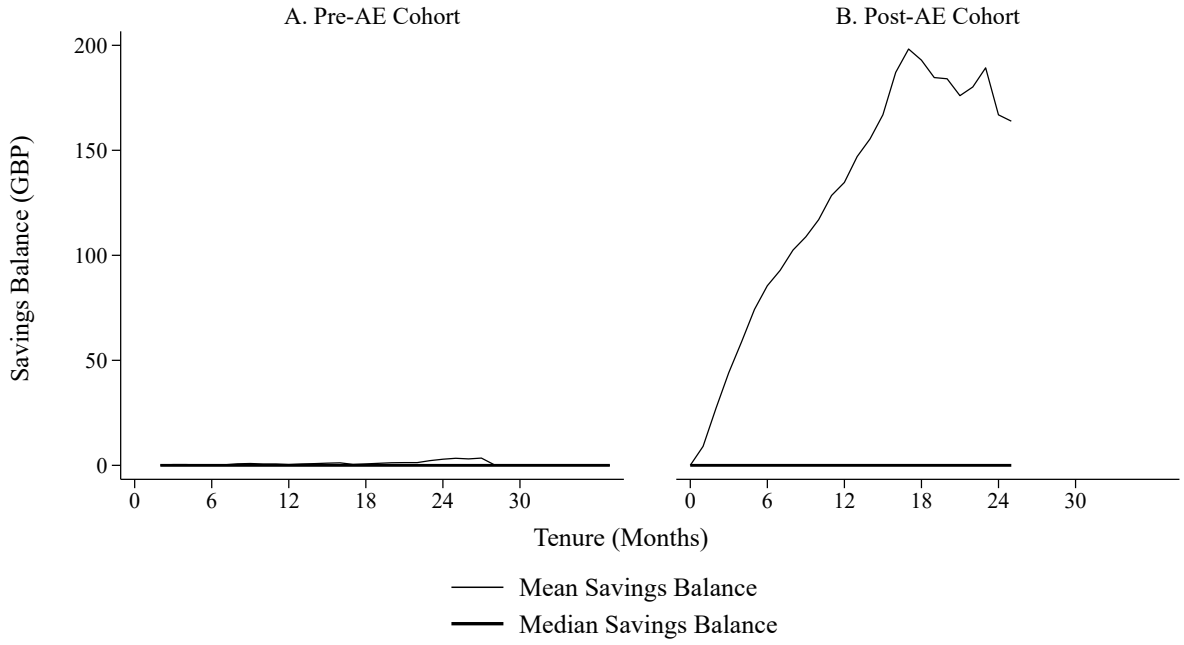


Figure 16. Savings Balances, Optimized Active Choice RCT

For each trial arm and month of membership, we report mean savings pot balances for all members (including those who are not saving, whom we assign a balance of £0). Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

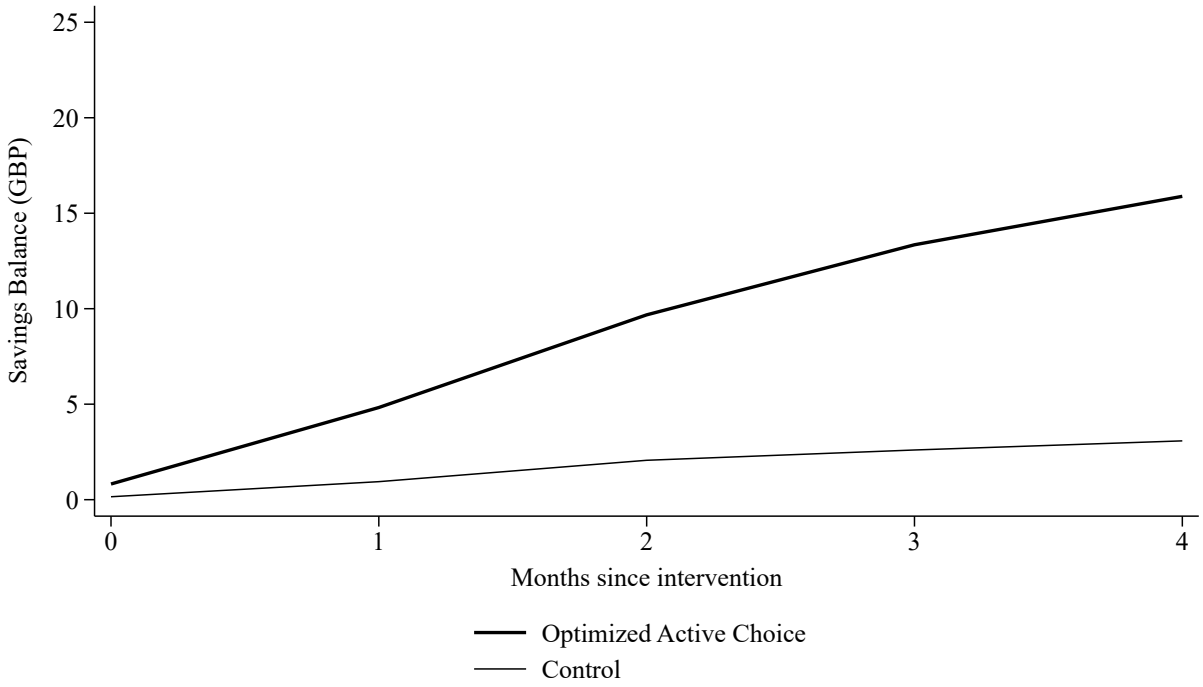


Figure 17. Savings Balances Conditional on Saving, Three-Arm RCT

For each trial arm and month of membership, we report the mean, 10th percentile, 25th percentile, median, 75th percentile, and 90th percentile of short-term savings balances for all members with a positive balance at a given month. Membership month 0 is the month the individual joined Wagestream. An individual is included at a given membership month if they joined early enough to be observed at that horizon.

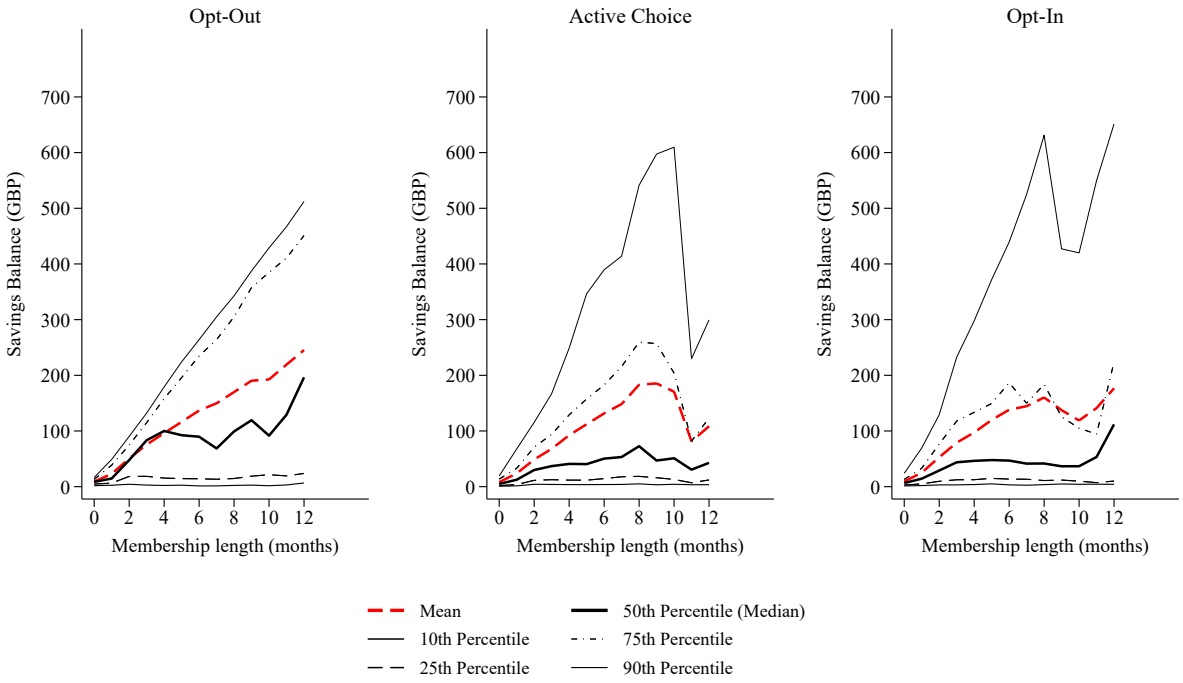


Figure 18. Savings Balances Conditional on Saving, Quasi-Experiment

For each hire cohort and tenure month, we report the mean, 10th percentile, 25th percentile, median, 75th percentile, and 90th percentile of short-term savings balances for all employees with a positive balance in the month. The pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

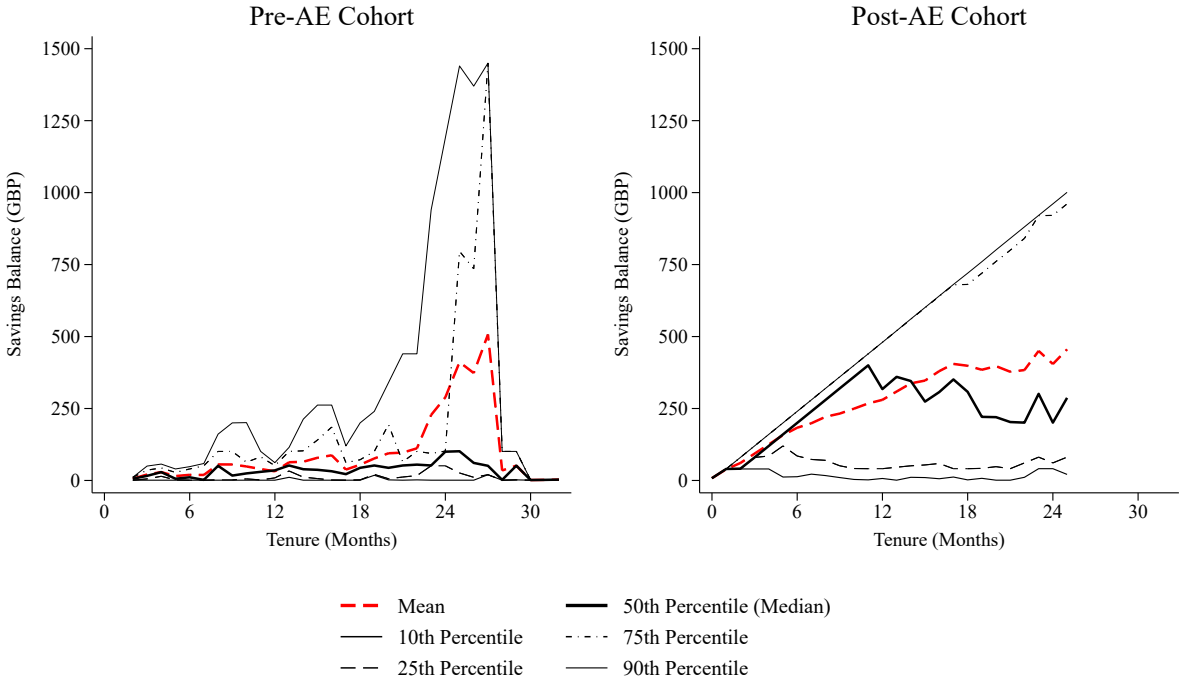


Figure 19. Savings Balances Conditional on Saving, Optimized Active Choice RCT
For each trial arm and month of membership, we report the mean, 10th percentile, 25th percentile, median, 75th percentile, and 90th percentile of short-term savings balances for all members with a positive balance at a given month. Membership month 0 is the month the individual joined Wagestream. An individual is included at a given membership month if they joined early enough to be observed at that horizon.

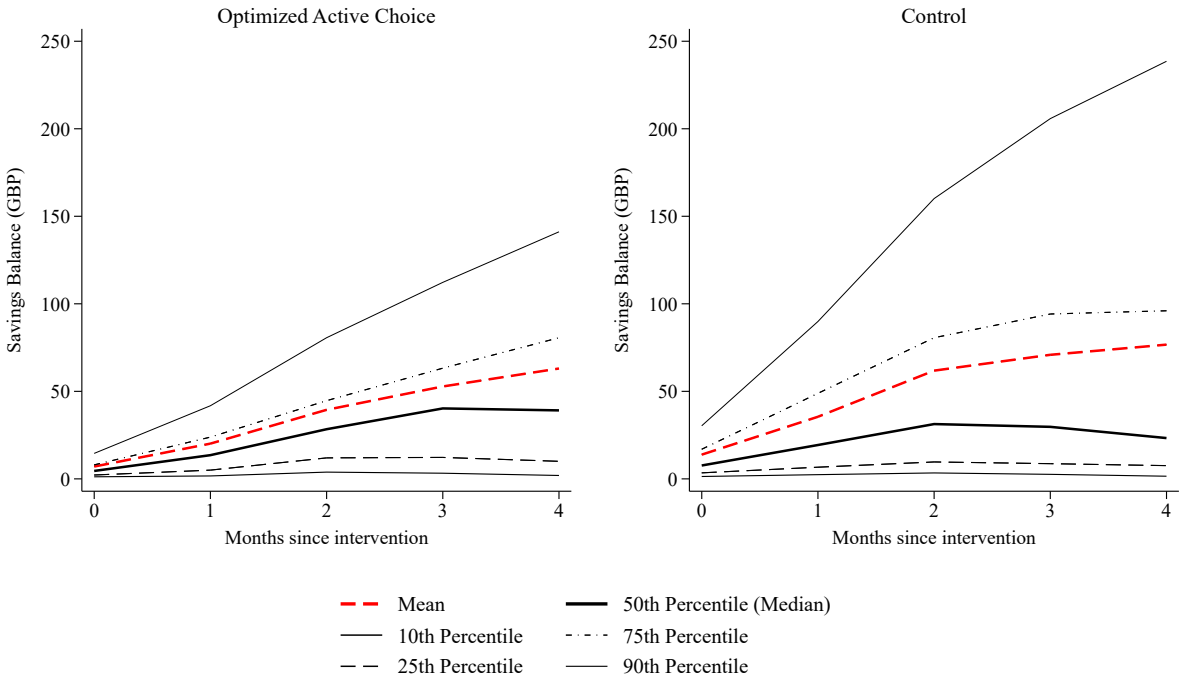


Figure 20. Earned Wage Access Utilization Rates, Three-Arm RCT

For each trial arm and month of membership, we divide the number of members using the earned wage access product in a given month by the number of members. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

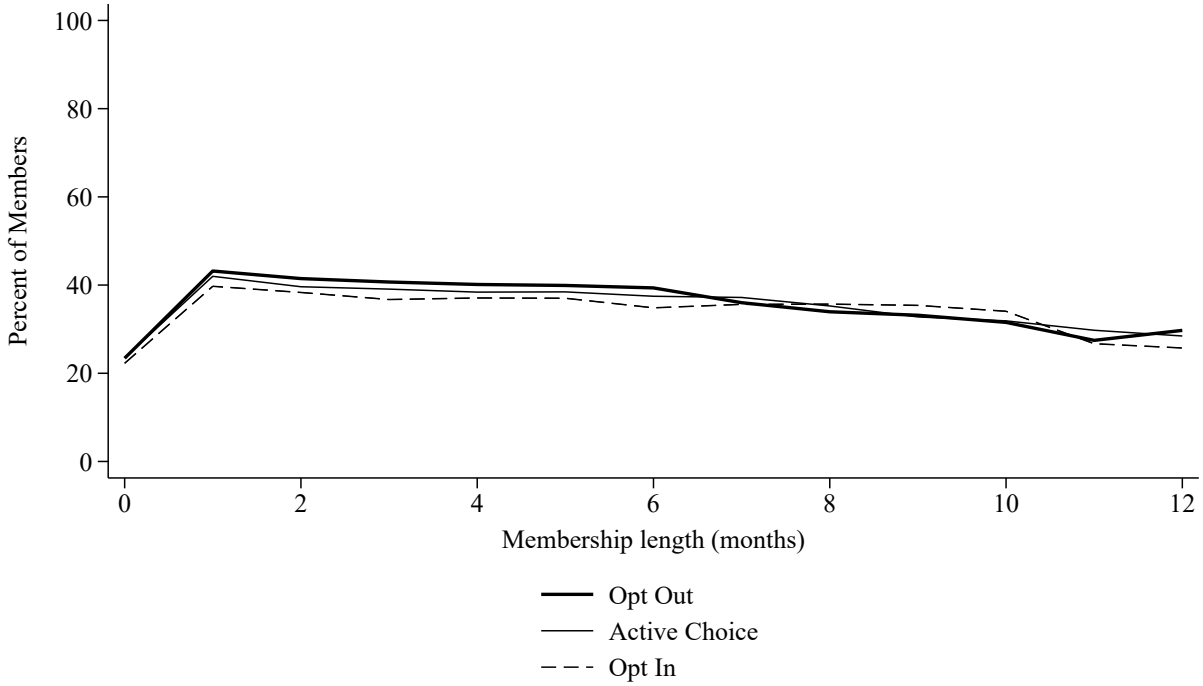


Figure 21. Cumulative Earned Wage Access Utilization Rates, Three-Arm RCT
For each trial arm and month of membership, we divide the number of members who have used the earned wage access benefit 1+, 3+, and 5+ times to date by the number of members. Multiple instances of wage access taken in a single month are aggregated. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.

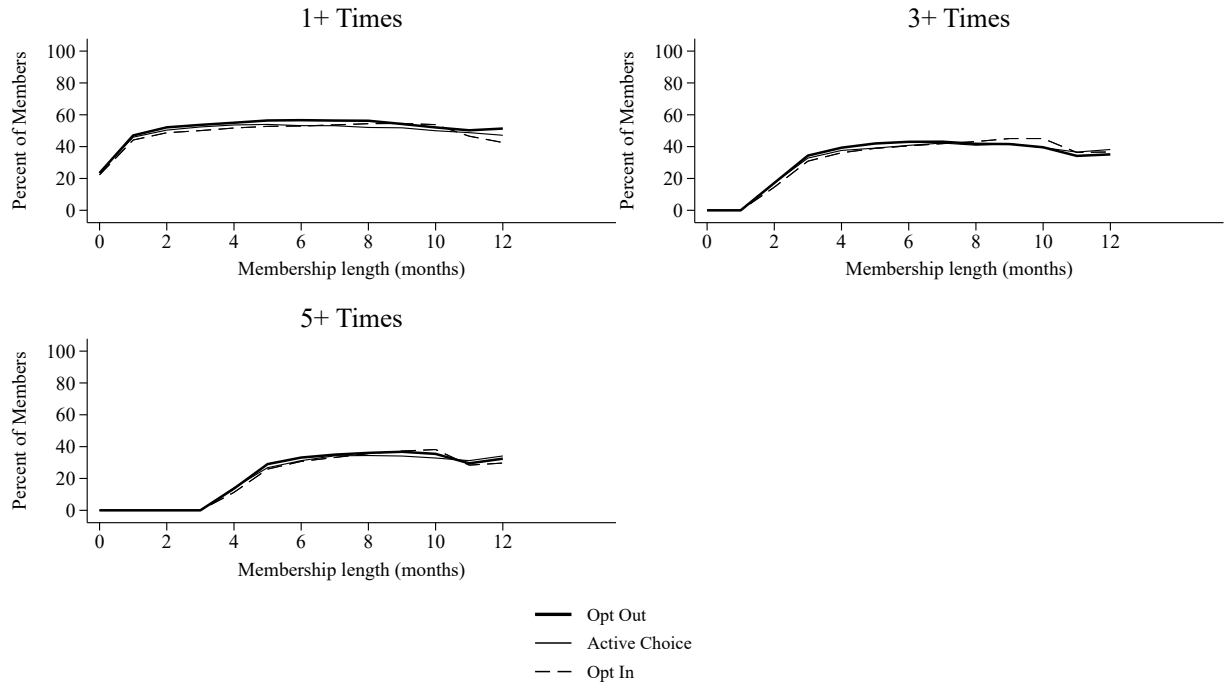


Figure 22. Earned Wage Access Behavior Conditional on Using, Three-Arm RCT
For each trial arm and month of membership, we report the average amount accessed (left panel) and the average share of the next paycheck accessed (right panel), conditional on using the earned wage access product. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon.

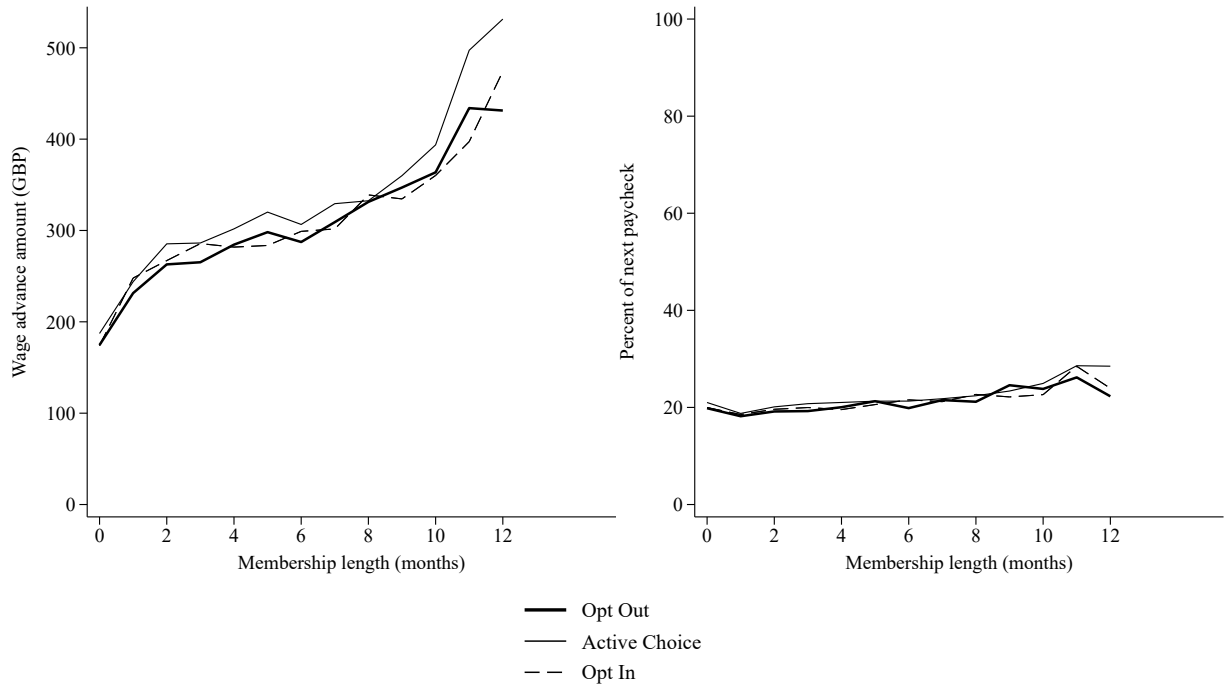


Figure 23. Percentage of Accessed Wage Payments Less than or Equal to Savings Pot Balance, Three-Arm RCT

For each trial arm and month of membership, we report the percent of accessed wage payments that are less than or equal to the member's maximum recorded pot balance in the same month. Multiple wage access payments received in a single month are aggregated. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon.

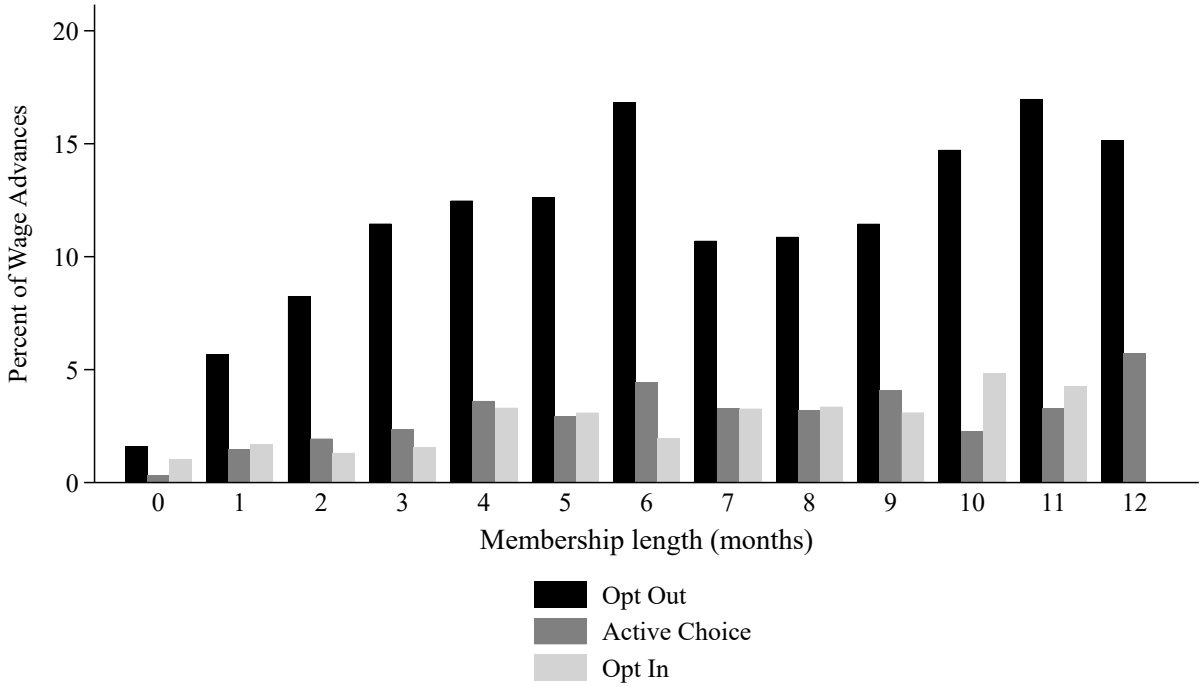


Figure 24. Loan Utilization at Tenure Month 12, Quasi-Experiment

For each hire cohort, we calculate the average amount borrowed from the credit union (left panel) and the average amount borrowed from the credit union, conditional on borrowing (right panel). We restrict our analyses to tenure month 12 because data limitations impede our ability to measure all incremental borrowing. The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired between November 1, 2021 and December 31, 2023. Tenure month 0 is the month of hire. An employee is included at tenure month 12 if they were hired early enough to be observed at that horizon and had not yet separated. Loans originated and repaid in full before tenure month 12 are not included. The whiskers represent 95% confidence intervals. We do not show a 95% confidence interval for the average amount borrowed conditional on borrowing for the Pre-AE cohort because the sample contains only three observations.

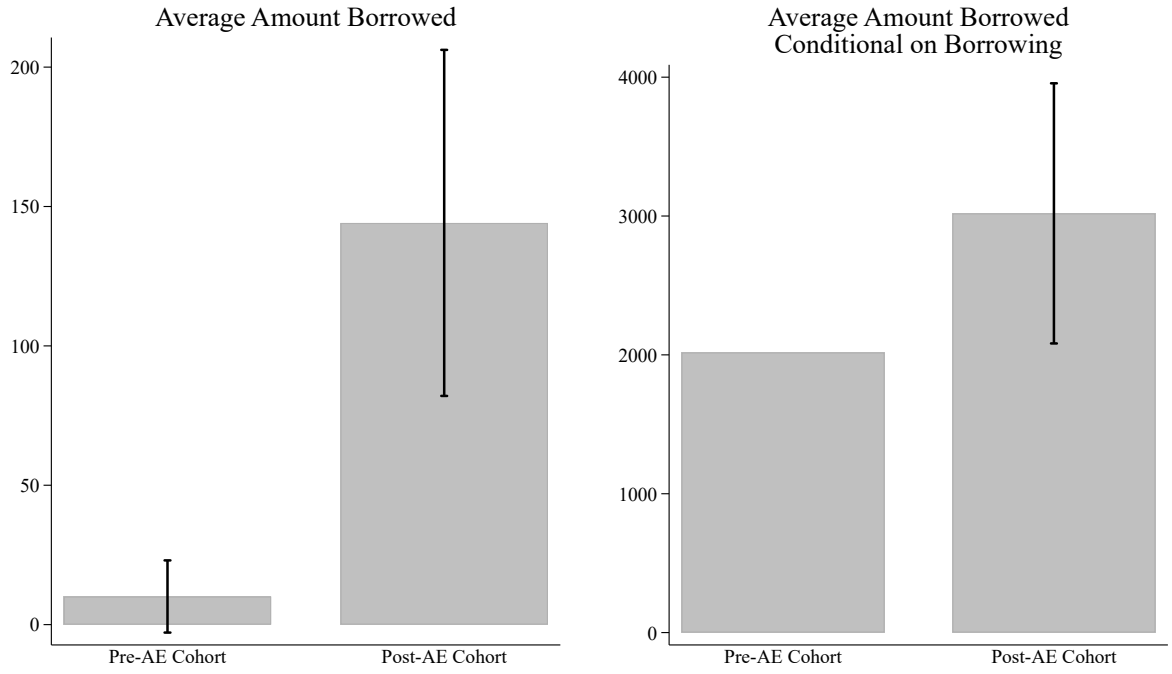
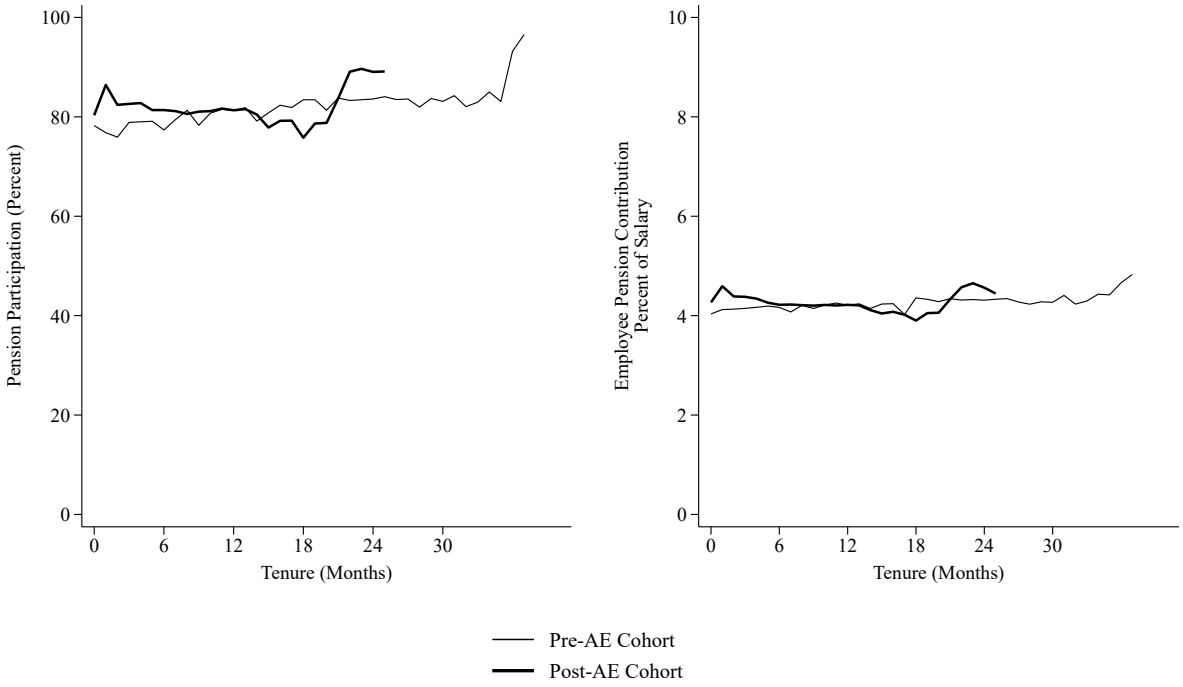


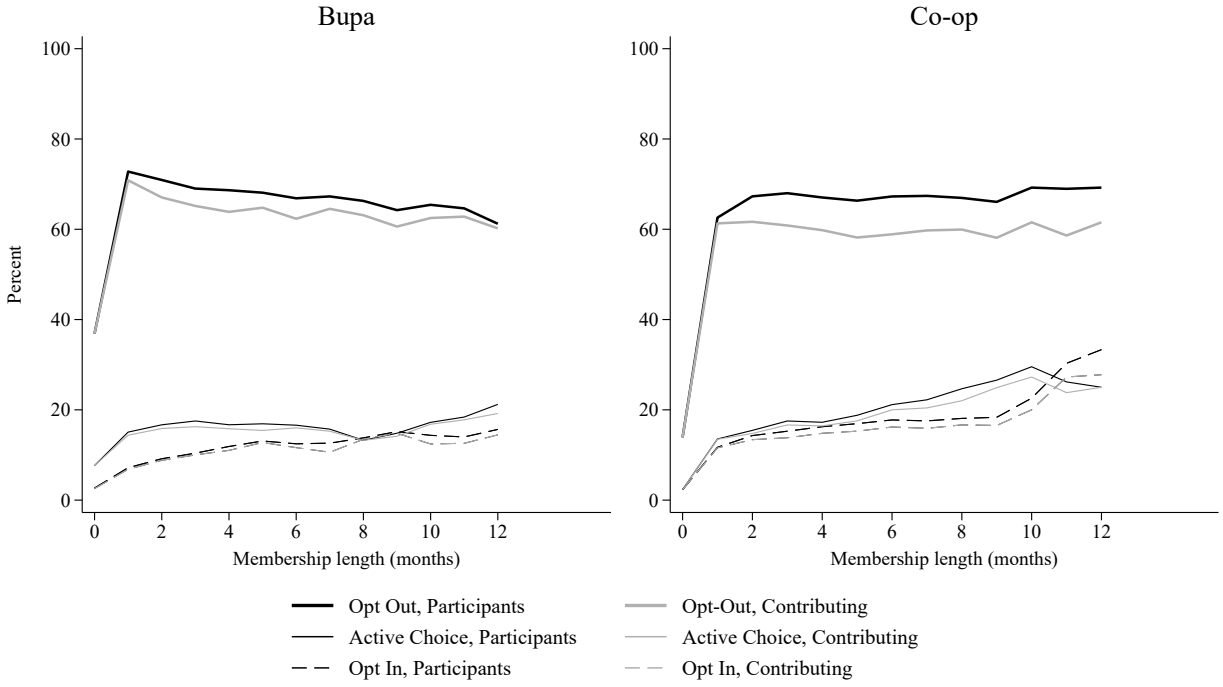
Figure 25. Pension Participation Rates, Quasi-Experiment

For each hire cohort and tenure month, we divide the number of employees with a positive pension contribution by the number of employees (left panel). We also calculate the average employee pension contribution election as a share of salary (right panel). In both panels, we exclude employees who, at hire, were younger than 22 or at least 66. We additionally exclude employees with annualized starting salaries less than £10,000 and employees with zero contracted hours per week. The omitted employees would not have been subject to pension automatic enrollment at hire. In the right panel, we omit employees with right-censored pay (those with annualized pay above £50,270). The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. July 2022 data are dropped due to data quality concerns.



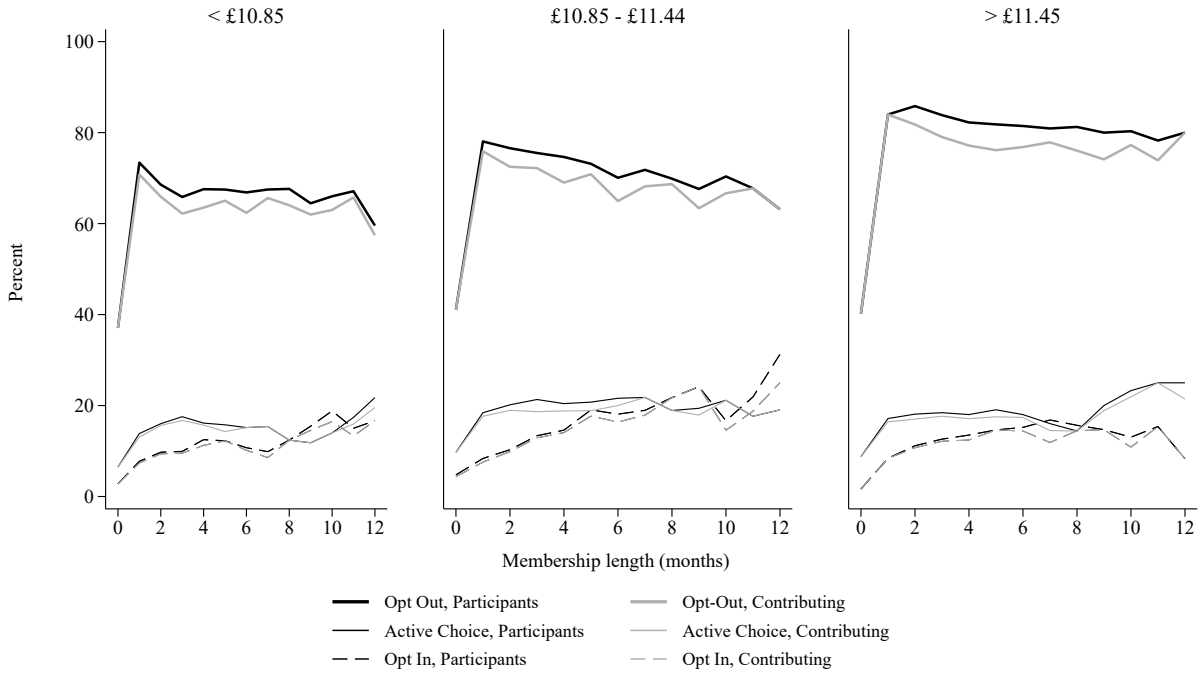
Appendix Figure 1. Participation Rate in and Fraction Contributing to Savings Pot by Employer, Three-Arm RCT

Within each trial arm, membership month, and employer, we display the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) and the fraction of Wagestream members who made a contribution to the savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment.



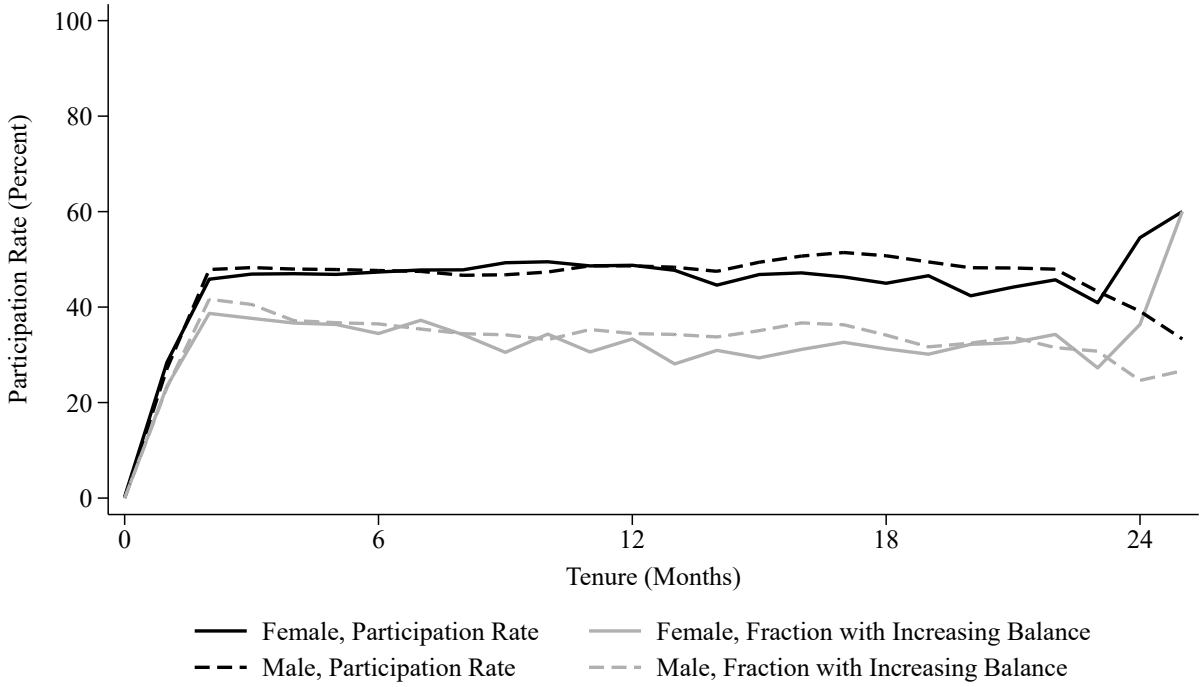
Appendix Figure 2. Participation Rate in and Fraction Contributing to Savings Pot by Hourly Wage Tercile, Three-Arm RCT

For each trial arm, membership month, and hourly wage tercile, we display the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) and the fraction of Wagestream members who made a contribution to the savings pot. Membership month 0 is the month the individual joined Wagestream. Individuals are included at a given membership month if they joined early enough to be observed at that horizon and had not separated from employment. Hourly wage data are only available for Bupa, so we exclude Co-op members from this analysis.



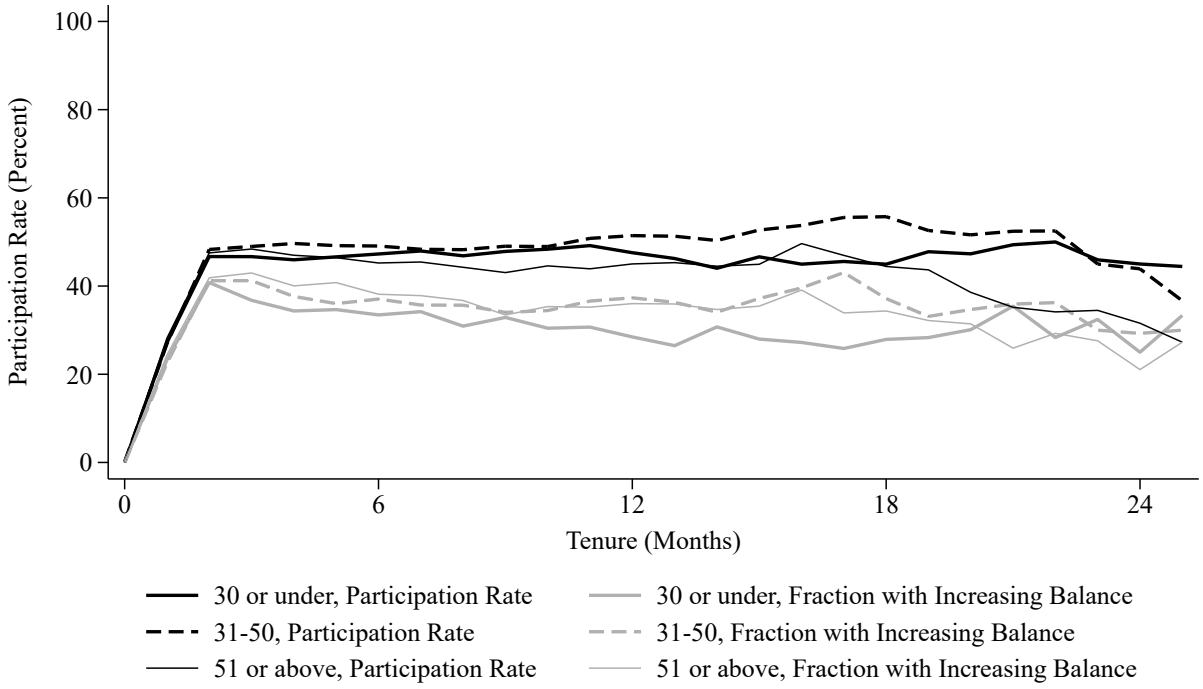
Appendix Figure 3. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Gender, Post-AE Cohort, Quasi-Experiment

For employees hired between November 1, 2021, and December 31, 2023, and for each gender and tenure month, we display the participation rate (the fraction of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account) and the fraction of employees with a balance in their short-term savings account that is higher than it was in the previous month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. We exclude individuals with missing gender data or with a reported gender other than male or female.



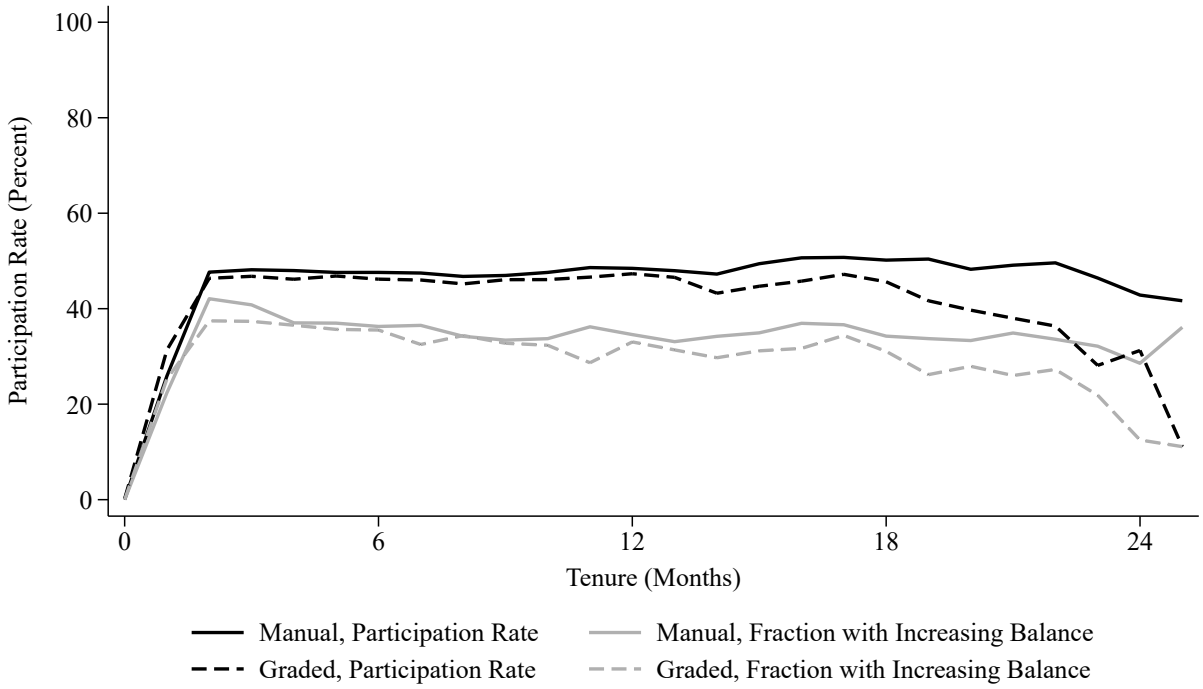
Appendix Figure 4. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Age, Post-AE Cohort, Quasi-Experiment

For employees hired between November 1, 2021, and December 31, 2023, and for each age band and tenure month, we display the participation rate (the fraction of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account) and the fraction of employees with a balance in their short-term savings account that is higher than it was in the previous month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. We exclude individuals with missing age data. We sort based on the first non-missing age value for each employee.



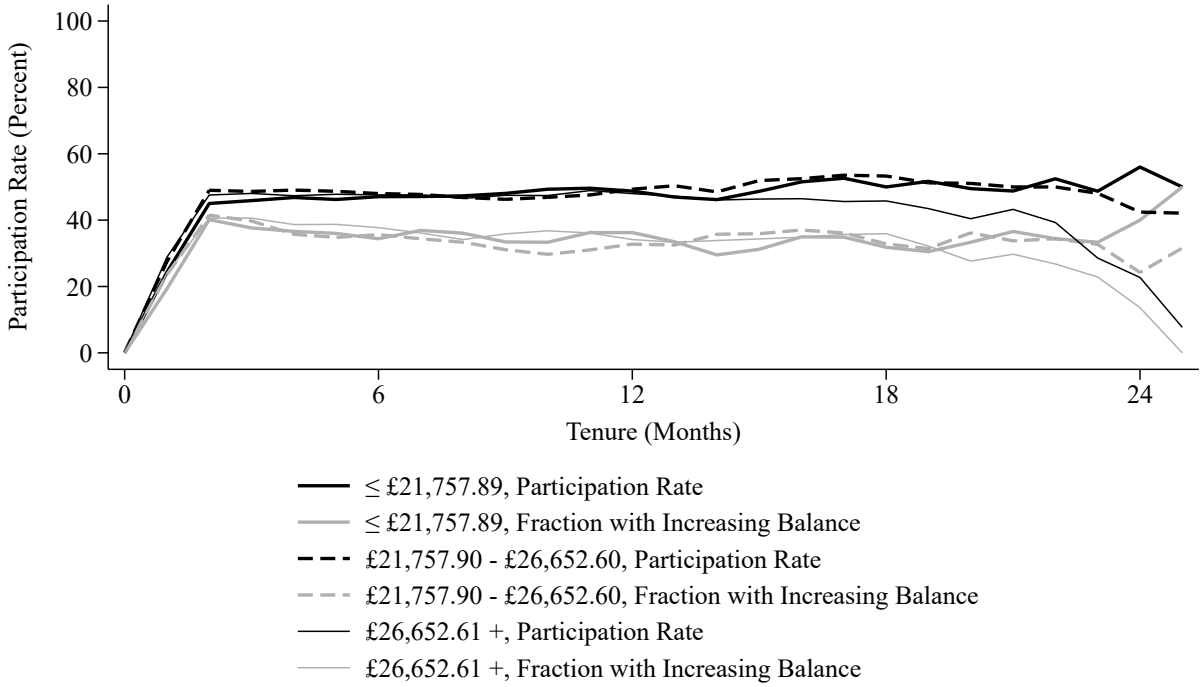
Appendix Figure 5. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Role, Post-AE Cohort, Quasi-Experiment

For employees hired between November 1, 2021, and December 31, 2023, and for each role type and tenure month, we display the participation rate (the fraction of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account) and the fraction of employees with a balance in their short-term savings account that is higher than it was in the previous month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. In general, manual roles are more likely to be field-based and hourly; graded roles are more likely to be office-based and salaried. We exclude individuals with missing role data, as well as the few individuals who alternate between manual and graded roles.



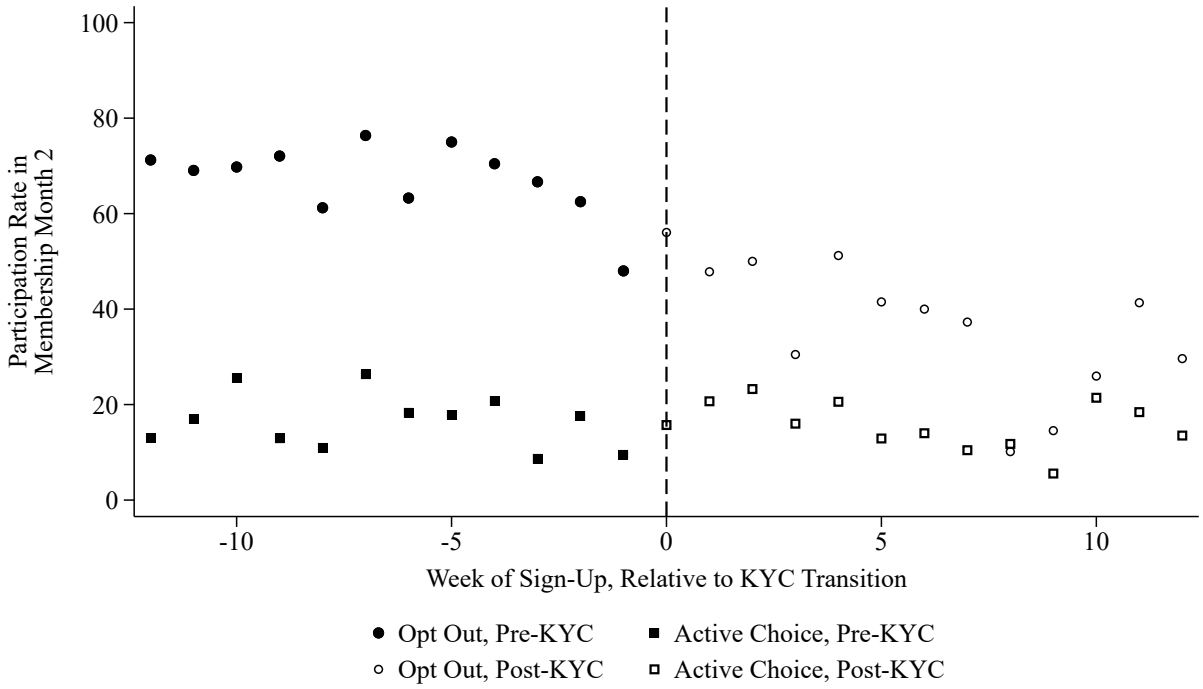
Appendix Figure 6. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Annualized Starting Pay, Post-AE Cohort, Quasi-Experiment

For employees hired between November 1, 2021, and December 31, 2023, and for each tercile of annualized starting pay and tenure month, we display the participation rate (the fraction of employees with a positive balance in or a positive elected payroll contribution to their short-term savings account) and the fraction of employees with a balance in their short-term savings account that is higher than it was in the previous month. Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. We observe annual pay for some workers and hourly pay for others. We also observe scheduled hours per week for most workers. We calculate annualized pay for hourly workers with observed schedules as their hourly rate × scheduled hours per week × 52. We drop hourly workers with zero or unobserved scheduled hours per week.



Appendix Figure 7. Participation Rate in Membership Month 2, Before and After KYC Regime Change, Three-Arm RCT and Post-KYC RCT

Within each experiment arm and week of Wagestream enrollment, we plot the participation rate (the fraction of Wagestream members with a positive balance in or contribution to their savings pot) in membership month 2. Membership month 0 is the month the individual joined Wagestream. Individuals are included if they joined early enough to be observed at membership month 2 and had not separated from employment. Calendar week 0 in the horizontal axis includes members who joined Wagestream between September 19, 2023 (the date from which personal information was collected during enrollment to facilitate a KYC check for savers) and September 25, 2023.



Appendix Figure 8. Combined Short-Term and Pension Savings Elections, Quasi-Experiment

For each hire cohort and tenure month, we calculate the average elected combined short-term and pension savings as a share of salary. We exclude employees who, at hire, were younger than 22 or at least 66. We additionally exclude employees with annualized starting salaries less than £10,000 and employees with zero contracted hours per week. The omitted employees would not have been subject to pension automatic enrollment at hire. We additionally omit employees with right-censored pay (those with annualized pay above £50,270). Our calculation of short-term savings is annualized elected contribution amounts divided by annualized salary. Our calculation of pension savings includes the employer match. Both the employee contribution and the employer match are calculated on qualifying earnings only (annualized earnings above £6,240), such that a 5% recorded employee contribution rate on a £30,000 annualized salary is presented here as a 3.96% contribution rate ([(30000-6240) × 0.05] ÷ 30000 = 0.0396). The Pre-AE cohort contains employees hired in the 12 months before the introduction of automatic enrollment into short-term savings (November 1, 2020 – October 31, 2021). The Post-AE cohort contains employees hired afterwards (November 1, 2021 – December 31, 2023). Tenure month 0 is the month of hire. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated. July 2022 data are dropped due to data quality concerns.