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

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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.

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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 will be 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, Phillips et al. 2021). Employer-sponsored payroll

[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. (2023) study how it affected borrowing and creditworthiness.

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 contribution. We document and evaluate two large experiments.

Section II describes and analyzes the first experiment, 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; an 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. Nine months later, participation was 44 percentage points higher under automatic enrollment than opt-in enrollment, and average balances were £106 higher. Active choice enrollment yielded results similar to opt-in enrollment, but the active choice design (which made enrollment a two-step process) may have contributed to its poor performance. In preliminary results from a later experiment where active choice was implemented as a one-step choice, active choice increased participation rates by 22 percentage points relative to the opt-in control group.

Section III describes and analyzes a second experiment, which 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. 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.

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

II. Experiment 1: Randomized controlled trial of automatic enrollment and active choice

A. Experiment description

We study a randomized controlled trial (RCT) implemented by Wagestream – which offers a financial benefits platform used by employers in the U.K., 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, Bupa employees could not access more than £3,000 per pay period and Co-op employees could not access more than £400 per pay period, regardless of their accrued gross wages.

Savers in the savings pot elect a savings goal, up to £1,000.[3] 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 this threshold. Wagestream additionally offers financial coaching, micro-savings,[4] and monthly incentives to encourage financial wellbeing.

[3] 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.

[4] 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.

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 the save on 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,[5] 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. It partners with e-money providers[6] 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 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 required new members who proactively

[5] 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.

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

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.

B. Data description

We use data provided by Wagestream on members who were randomized between October 24, 2022, and August 31, 2023.[7] 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.[8] We drop 779 members who were assigned to an experimental arm during the period February 27 – March 21, 2023, when the temporary KYC check process was in effect (and was not balanced across arms as explained above).

[7] We have received data collected through October 16, 2023. In the analyses reported in the present version of this paper, we exclude data collected beginning on September 19, 2023, because Wagestream implemented a new KYC process on this date. (Future analyses will incorporate this data.) We further exclude data collected between September 1 and September 18, 2023, because most employees did not receive a wage payment in this period.

[8] Six individuals 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.

C. Comparison of experiment arms

We compare the automatic enrollment and active choice arms to an opt-in (control) arm in order to estimate the effects of each intervention. There are 2,419 individuals in the opt-in (control) arm, 2,490 individuals in the active choice arm, and 2,495 individuals in the automatic enrollment arm. We define month 0 as the month the individual joined Wagestream and was randomized into a study arm.[9]

Table 1 compares the characteristics of the three arms. There is no statistically significant difference in 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 £0.36 – £0.41 higher than the other arms. Sample sizes decline with membership tenure both because of employee attrition and because our data end in August 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). Thus, individuals from the Co-op may have been more likely than Bupa employees to join Wagestream with the intention to save.

D. Short-term savings participation

Figure 1 shows the savings pot participation rate in each of the three study arms from the time of randomization onward. We define participation in a given month as having a non-zero account balance or a non-zero contribution amount in that month. The denominator for all

[9] Employees may join Wagestream at any time in their tenure. Over 60% of individuals in our study joined within the first 30 days of their hire. However, 12% of individuals joined more than three years into their employment.

participation rates is the number of individuals randomized to the respective experimental arm who joined early enough to be observed in a given month and had not yet separated from the participating employer.[10] Figure 1 also shows the fraction of members who made a contribution to the savings pot each month.

In month 1, 68.7% of the opt-out (automatic enrollment) arm is participating, compared to 13.7% of the active choice arm and 10.5% of the opt-in (control) arm. These differences in participation remain relatively consistent across the entire study period. In month 9—currently the last month with per-arm sample sizes that exceed 100 individuals—67.2% of the opt-out arm is participating, compared to 17.1% of the active choice arm and 19.6% of the opt-in arm. Not all participants continue to make payroll contributions to their savings pots, but the majority do so. In the opt-out arm, 67.3% of members contribute in month 1, and 67.2% contribute in month 9. In the active choice arm, 13.5% of members contribute in month 1 and 17.1% contribute in month 9. In the opt-in arm, 10.3% contribute in month 1 and 17.8% contribute in month 9. Differences in both participation rates and the fraction contributing between the opt-out and control arms are statistically significant in all months (see Table 2, columns 1 and 2). Differences in participation rates between the active choice and control arms are statistically significant in months 0-1, weakly significant in months 2-3, and insignificant thereafter; differences in the fraction contributing are statistically significant in months 0, 1, and 3, weakly significant in month 2, and otherwise insignificant (see Table 3, columns 1 and 2).

[10] 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 210 employees in the denominator whose accounts are marked "disabled" by Wagestream but currently have no recorded separation date; this represents 2.8% of the total sample. Of these 210 employees, only eight (4%) have a positive terminal recorded balance and are therefore considered participants after their accounts are marked disabled. None of these 210 accounts receive contributions after they have been disabled.

Figures 2 and 3 show participation rates and the fraction contributing to their savings pot separately by employer and—for Bupa only—by initial hourly wage. The differences across study arms are similar across employers and wage terciles. Participation rates in the opt-in and active choice arms are slightly higher at the Co-op than at Bupa, and they trend upwards over the study period at the Co-op, whereas participation is flat or trending downward at Bupa. These variations are perhaps driven by differences in the employee characteristics and incentives across the two companies (see Section II.C).

Across all arms, participation is relatively stable for the first nine months after joining Wagestream. However, individuals in the opt-in and active choice arms in this study are greater than 20 times more likely to participate than those at other U.K. companies whose opt-in short-term payroll savings accounts were studied by Berk et al. (2024). We believe these differences are largely driven by differences in the study populations. In this RCT, our study population includes only employees who choose to join Wagestream; these employees may be more engaged with their finances than employees who do not join Wagestream. Indeed, in experiment 2 in this paper, our study population includes all employees hired after November 1, 2020, and we find opt-in participation rates that are more consistent with those in Berk et al. (2024). It may also be the case that the Wagestream app makes it easier or more appealing for users to opt into saving.

A more surprising result is that the active choice arm does not generate higher enrollment than the control arm. This result might indicate that lighter-touch interventions are insufficient to increase short-term savings rates in a novel type of account. However, it is likely that the design of the active choice intervention could be modified to generate higher participation. In fall 2023, Wagestream piloted a single-step active choice intervention with members from client employers other than Bupa and Co-op. Instead of requiring users who respond affirmatively to a savings

prompt to then select a savings amount, this intervention just presented users with a slider to choose their savings amount. A decision not to save was made by moving the slider to £0. Our preliminary analysis of data from this pilot shows that four months after the intervention was delivered, 25.9% of the treated group was participating in the short-term savings program, compared to 4.2% of the control group.

E. Balance accumulation

Figure 4 shows mean balances by month for individuals who are Wagestream members in that month. In month 4, the mean balance in the opt-out arm is £71, compared to £16 in the active choice arm and £16 in the opt-in arm. These differences grow over the entire study period. By month 9, the mean balance in the opt-out arm is £140, compared to £21 in the active choice and £26 in the opt-in arm. The effect of automatic enrollment on mean balances is statistically significant in all months; the effect of active choice on mean balances is significant in month 0, weakly significant in month 1, and insignificant thereafter (see Tables 2 and 3, column 3).

In Figure 5, we restrict our analysis to individuals with a positive savings balance in a given month. In month 4, the conditional mean balance is £102 in the opt-out arm, £98 in the active choice arm, and £101 in the control arm. The differences between the study arms expand over time. By month 9, the conditional mean balance is £222 in the opt-out arm, compared to £127 in the active choice arm and £131 in the opt-in arm. The effect of automatic enrollment on conditional mean balances is marginally significant and positive in month 9 (see Table 2, column 4); the effect of active choice is always insignificant (see Table 3, column 4).

The combination of Figures 4 and 5 illustrate the role that participating at all plays in balance accumulation. When we do not condition on participating, the difference in accumulated

balances is stark and grows consistently over time. The large number of non-participants with £0 balances drives down the average balance across all arms, and the effect is therefore most pronounced in the active choice and opt-in arms, where participation is roughly 50 percentage points lower than in the opt-out arm. However, when we condition on participating, we see that average balances accumulate at similar paces for at least the first 6 months of Wagestream membership. Although conditional mean balances across arms do diverge thereafter, we note that sample sizes shrink considerably as membership month increases.

F. Contributions and withdrawals

We turn next to an analysis of flows into and out of the short-term savings accounts. Figure 6 shows median and mean non-zero contribution amounts by month. In the opt-out cohort, the median contribution amount is consistently equal to the £40 default; the mean contribution amount is consistently slightly higher. There is significantly more variation in the active choice and opt-in arms. The £15 preset in the active choice arm does not appear particularly sticky; compared to the opt-out arm, where at least half of savers consistently contribute the default £40, a minority of active choice savers retain the £15 preset. We emphasize that the number of savers is significantly smaller in the active choice and opt-in arms, and that across all arms, sample sizes diminish as membership length increases.

The £40 default 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 in order to accommodate populations with a wide range of income levels.

Figure 7 displays the share of savers in each arm taking a withdrawal in each month. Multiple withdrawals taken in a single month are aggregated as a single withdrawal. Withdrawal rates in the opt-in and active choice arms are generally between 31% and 54%; withdrawal rates in the opt-out arm are generally between 31% and 38%. The share of savers taking a withdrawal increases over months 0-2 and remains relatively flat thereafter for all arms. The differences between the opt-out and control arms and the active choice and control arms are generally not statistically significant (see Table 4, columns 1 and 4). Figure 8 shows the share of savers in each arm who have taken one or more, three or more, or five or more withdrawals to date. Multiple withdrawals taken in a single month are counted as one withdrawal. The number of withdrawals taken are similar in the opt-out and active choice arms, while control arm savers tend to withdraw more frequently. By month 9, 58% of savers in the opt-out arm and 55% of savers in the active choice arm have taken at least one withdrawal, compared to 71% of savers in the control arm. Twenty-one percent of savers in the opt-out arm and 18% of savers in the active choice arm have taken at least five withdrawals, compared to 29% in the control arm. More than half of savers take at least one withdrawal, but many take no withdrawal during the study period.

Figure 9 displays information about the size of the average positive withdrawal taken by each arm. In all trial arms, the average withdrawal amount rises with membership length. In the opt-out arm, the average withdrawal is £41 in month 0 and £141 in month 9. In the active choice arm, the average withdrawal is £85 in month 0 and £147 in month 9. In the opt-in arm, the average withdrawal is £64 in month 0 and £148 in month 9. However, the average withdrawal as a share

of the available account balance falls as membership length increases. Across all arms, the average withdrawal represents between 94% and 100% of the available balance in month 0 and between 73% and 77% in month 9. Compared to their peers in the opt-in and active choice arms, automatically enrolled savers tend to take withdrawals that are slightly smaller in absolute terms, but similar as a share of the available balance. Automatic enrollment has a statistically significant negative effect on average withdrawal amounts in months 0-2 and 5 and a weakly significant negative effect in month 7. Active choice generally has no significant effect on withdrawal amounts in absolute or proportional terms. (See Table 4, columns 2-3 and 5-6).

Figure 10 shows the relationship between withdrawals, available balances, and recent contributions. The left panel plots the percent of withdrawals approximately equal to (between 95% and 100% of) the available account balance. The number falls steadily over months 0-9, suggesting that savers become less constrained by their available balance as their balances grow. The right panel plots the percent of withdrawals approximately equal to the previous contribution and smaller than the available balance. Over months 3-8, the range of withdrawals in this category is 5%-16% in the opt-out arm, 2%-20% in the active choice arm, and 2%-18% in the opt-in arm. As liquidity shocks are unlikely to exactly equal the previous contribution amount, the right panel may represent instances where a member was influenced by the psychologically focal amount of the prior contribution.

G. Earned wage access utilization

One important feature of Wagestream membership is the earned wage access benefit. Trial participants can access up to 40% of their earned wages before their regular payday.[11] Accessed

[11] Our calculated "wages accessed as a share of each paycheck" variable exceeds the 40% limit 7.3% of the time because we only observe pay net of taxes and employer deductions.

wages must not exceed £3,000 for Bupa employees or £400 for Co-op employees. Earned wage access may be a substitute for credit, 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 need for high-cost credit.

Figure 11 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 weakly statistically significant positive effect on earned wage access utilization in months 1 and 3, but otherwise is insignificant; active choice has no significant effect on utilization (see Table 5, columns 1 and 4). Figure 12 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 minimal. By month 9, 50% of the opt-out arm has used the benefit at least once, compared to 49% of the control arm and 50% of the active choice arm. Thirty-one percent of the opt-out arm has used the benefit at least five times, compared to 29% of the control arm and 31% of the active choice arm.

Figure 13 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 active choice in month 2 and 4 (see table 5, columns 2-3 and 5-6).

Why does automatic enrollment not decrease the use of earned wage access despite significantly increasing savings pot participation and balances? Figure 14 shows the percentage of accessed wage payments 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 4.9%. In the opt-out arm, the percentage reaches 12.8% in month 4 and 18.2% in month 9. Therefore, a pot withdrawal could not substitute for an earned wage access payment in most cases. Table 6 shows the relationship between earned wage access utilization and short-term savings pot utilization across the three study arms. Members in the opt-out arm who use the earned wage access benefit are much more likely to have an available pot balance, and therefore much more likely to take a withdrawal concurrently with accessing their wages.

Figures 11 and 12 indicated that opt-out payroll savings, despite helping employees build up a liquidity buffer, does not change use of earned wage access. Figure 14 suggests that much of this is 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. Additional months of data are needed to study long-term effects of opt-out payroll savings on use of earned wage access.

III. Experiment 2: Introduction of automatic enrollment for new hires

A. Experiment description

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 7). 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.[12] 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 benefits from the credit union. These include an annual dividend paid to members, a modest

[12] 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.

bereavement benefit, and access to unsecured personal loans up to £20,000.[13] 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.[14] 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 population.[15] All new hires who completed the consent step were automatically enrolled unless they subsequently opted out.

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

[13] 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.
[14] For an overview of the U.K. regulatory environment, see Cooper et al. (2021).
[15] 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. 48.5% of employees hired between November 1, 2021, and January 31, 2022, are participating in tenure month 4, compared to 53.2% of employees hired between March 1, 2022, and May 31, 2022.

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, consumption, and income shocks to individuals and their households, as well as general macroeconomic turmoil in the U.K. economy. 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 in Experiment 1) in Fall 2022. Although this partnership did not originally include access to Wagestream savings pots for SUEZ employee, access to the

[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%.

Wagestream pots has been available on an opt-in basis since Summer 2023. No SUEZ employees have been automatically enrolled into saving at Wagestream.

B. Data description

We use a merged data set containing data collected by three sources: the employer, the credit union, and Nest Insight.

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.

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)

[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.

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; 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.[18]

We take several steps to clean the data. First, we drop all 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 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.[19] We also drop 30 individuals who were rehired one or more times during the study period.

C. Comparison of pre- and post-automatic enrollment hire cohorts

To estimate the impact of automatic enrollment, we compare the behavior of SUEZ employees hired before and after the introduction of automatic enrollment on November 1, 2021.

[18] Nest Insight collected, and will continue to collect, survey data on SUEZ employees' financial well-being and attitudes. Where possible, these survey data have been merged with the administrative data from SUEZ and TransaveUK.

[19] Of the 144 hires dropped because they work in a region that does not use the online onboarding system, 51 (41%) were hired before the introduction of automatic enrollment and 85 (59%) were hired after. Of the 268 hires dropped because they joined SUEZ under TUPE regulations, 17 (6%) joined before the introduction of automatic enrollment and 251 (94%) joined after. For more information about TUPE, see https://www.gov.uk/transfers-takeovers

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. 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 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 7 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.

D. Short-term savings scheme participation

Figure 15 shows participation rates in the payroll savings scheme by tenure month for the pre- and post-AE cohorts. We define participation in a given month as having a non-zero account

balance or a non-zero elected contribution amount at any time in that month. In tenure month 3, 1.8% of the pre-AE cohort is participating, compared to 48.1% of the post-AE cohort. These levels of participation are consistent through month 18, when 1.2% of the pre-AE cohort is participating and 49.6% of the post-AE cohort is participating. The difference in participation between the two cohorts is statistically significant across the study period (see Table 8, column 1).

Figure 15 additionally plots the fraction of post-AE cohort members in a given month whose short-term savings account balance is higher at the end of that month than at the end of the previous month. We use this as a proxy for a contribution to the account having been made. We believe this proxy is more reliable than the presence of a positive contribution election, because not every positive contribution election in our data appears to be accompanied by a positive flow into the account.[20] Approximately one-third of the post-AE cohort has an increasing balance in months 2-22. The differences between cohorts in the fraction with an increasing balance are statistically significant across the study period (see Table 8, column 2).

Figures 16-19 show participation rates and the fraction with increasing balances by tenure month for subgroups of the post-AE cohort. In the first year of tenure, it appears that gender, age, job role, and starting pay do not significantly affect short-term savings scheme participation. In later months, there is some evidence that workers who are female, 30 or younger, 51 or older, in graded roles (more likely to be office-based and salaried), or in the highest tercile of starting pay participate at lower rates. However, these patterns occur in the tenure regions with smaller sample sizes. The fraction of each subgroup with an increasing balance follows similar trends.

[20] The fraction of employees with an increasing balance understates the actual fraction with contributions flowing into their account, as it misses instances where an individual made a contribution but also made a withdrawal that was equal to or larger than the contribution.

The low opt-in participation rate observed in this study is consistent with our prior work on payroll schemes for short-term savings, which saw opt-in participation rates below 1% at five U.K. employers (Berk et al. 2024). Overall participation rates are stable for at least 18 months following hire, indicating that initial decisions regarding saving are persistent.

E. Balance accumulation

Figure 20 shows mean and median balances by tenure month for the pre- and post-AE cohorts. In tenure month 3, the mean balance in the pre-AE cohort is less than £1, compared to over £44 in the post-AE cohort. Mean balances continue to diverge over time, never exceeding £4 for the pre-AE cohort but peaking at £198 for the post-AE cohort in month 17. Automatic enrollment has a statistically significant effect on average balances (see Table 8, column 3). For both cohorts, the median balance is always £0. Although participation in the post-AE cohort briefly surpasses 50%, the occasional lag between positive contribution elections and their corresponding positive balance changes causes the median balance to be persistently £0.

In Figure 21, we plot mean balances and percentiles of balances by tenure month conditional on having a positive balance. In tenure month 3, the conditional mean balance among pre-AE cohort members is £21; the 10th, 25th, 50th, 75th, and 90th percentiles are £1, £6, £16, £36, and £50, respectively. The conditional mean balance among post-AE cohort members is £93; the 10th, 25th, 50th, 75th, and 90th percentiles are £40, £80, £80, £120, and £120, respectively. The differences between the cohorts grow over time. In tenure month 18, the conditional mean balance among pre-AE cohort members is £55; the 10th, 25th, 50th, 75th, and 90th percentiles are £1, £2, £44, £72, and £200, respectively. The conditional mean balance among post-AE cohort members is £398; the 10th, 25th, 50th, 75th, and 90th percentiles are £2, £41, £308, £681, and

£720, respectively. The difference in conditional mean balances is statistically significant across the study period (see Table 8, column 4).

The combination of Figures 20 and 21 shows that to a much larger extent than in Experiment 1, differences in balance accumulation are driven by more than divergent levels of participation. Even when we restrict our analysis to employees with positive balances, mean balances in the post-AE cohort are often four or more times larger than in the pre-AE cohort. Employees who opt into saving behave differently from those who are defaulted into saving.

F. Contributions and withdrawals

We turn next to an analysis of flows into and out of the short-term savings accounts. Figure 22 shows median and mean elected contribution amounts by tenure month for employees in the pre- and post-AE cohorts who made a positive contribution in that month. In the post-AE cohort, the median contribution rate is consistently equal to the £40 default; the mean contribution rate is consistently slightly higher. (The mean is £60 in tenure month 0, but relatively few members contribute in tenure month 0. The median post-AE cohort contribution election is also £60 in month 0.) There is significant variation in the pre-AE cohort. This is consistent with the contribution rate behavior we observe in experiment 1.

Figures 23-25 document information about withdrawals. Figure 23 displays the share of savers in each cohort taking any withdrawal in each tenure month. The share of post-AE cohort savers taking withdrawals rises steadily with tenure, peaking at 33% in month 24. The share of pre-AE cohort savers taking withdrawals fluctuates; however, it is higher than in the post-AE cohort in all but three months. The differences in withdrawal rates are not statistically significant (see Table 9, column 1). Figure 24 shows the share of savers who have taken one or more, three

or more, and five or more withdrawals to date. By tenure month 18, 59% of the savers in the post-AE cohort have taken at least one withdrawal, compared to 71% of the savers in the pre-AE cohort. Twenty-seven percent of the post-AE cohort savers have taken at least five withdrawals, compared to 43% of the pre-AE cohort savers. There is significant variation in the pre-AE cohort due to small sample sizes.

Figure 25 displays information about the magnitude of the average positive withdrawal taken by savers in each cohort.[21] The mean withdrawal amount in the post-AE cohort trends upwards with tenure, from £76 in month 3 to £185 in month 18. However, as a share of the available balance, the average post-AE cohort withdrawal trends downward; it is between 62% and 81% of the available balance in almost every tenure month.[22] The amount a saver chooses to withdraw is constrained by the amount she has saved to date. Withdrawal amounts in the pre-AE cohort are highly variable due to small sample sizes.[23] Table 9 (columns 2 and 3) shows that differences between the cohorts are not statistically significant.

Figure 26 shows the relationship between withdrawals, available balances, and recent contributions. The left panel plots the percent of withdrawals approximately equal to the available account balance. The percent of post-AE cohort withdrawals in this category is highest in month 1, and in the range of 20%-54% over months 2-25. The right panel plots the percent of withdrawals approximately equal to the previous contribution and smaller than the available balance. The

[21] The number of savers in the pre-AE cohort is very low, making it difficult to interpret differences in the magnitude of withdrawals.

[22] Approximately 4% of withdrawals observed in our data appear to exceed the available balance due to accounting delays. In such cases, we set the share of balance equal to 100%. Because accounting delays could cause other withdrawals to appear smaller as a share of balance than they are, this decision may bias the computed average share of balance downwards.

[23] Due to accounting delays, roughly 4% of observed withdrawals appear to be greater than 100% of the available balance. In such cases, we divide the withdrawal by the available balance plus the withdrawal to calculate the share of balance withdrawn.

percent of post-AE cohort withdrawals in this category is consistently in the range 16%-43% over months 2-24. Small sample sizes make it difficult to interpret trends in the pre-AE cohort.

G. Interaction with pension savings

The U.K. began rolling out mandatory automatic enrollment into pensions in 2012, and all employers have automatically enrolled their eligible employees since 2018.[24] For our entire study period, minimum pension contribution rates have totaled 8% of salary, including a 3% employer contribution. A natural question is whether an increase in short-term savings generated by automatic enrollment crowds out long-term savings. Figure 27 suggests that this is not the case in our experiment. In the pre-AE cohort, pension participation is 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 9 (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.

Figure 28 additionally plots the sum of short-term and pension savings as a share of salary for each cohort, for 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 subject

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

to pension automatic enrollment at the time of hire.[25] For the pre-AE cohort, the mean total savings rate is 4.9% in tenure month 3 and between 4.8% and 5.3% in each of months 0-18. For the post-AE cohort, the mean total savings rate is 6.4% in tenure month 3 and between 5.3% and 6.4% in each of months 0-18. Thus, for the first 18 months of tenure, automatic enrollment into short-term savings appears to increase total savings as a share of pay by roughly 1 percentage point. Table 9 (column 5) shows that these differences are statistically significant across the study period. As discussed in Section III.D above, the limitations of our contribution elections data may cause us to overstate short-term savings rates.

H. Personal loan utilization

We turn next to an evaluation of the relationship between automatic enrollment into short-term savings and credit utilization. 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 29 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

[25] 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 presented here as a 3.96% 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)

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.[26] 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. Only three pre-AE cohort members have an active loan at month 12, making it difficult to draw meaningful conclusions about the size of the typical personal loan.

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. 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.

IV. Conclusion

Automatic enrollment increases participation and balances in short-term payroll savings schemes. We first study a randomized controlled trial implemented by a workplace finance company in conjunction with two of its client employers. One month after randomization, we find that participation is 57 percentage points higher and mean balances £12 higher under automatic enrollment than under opt-in enrollment. Differences in participation and mean balances are

[26] Recall, from Section III.B and Table 7, that the employer data begins in November 2020, while the credit union data begins in December 2021.

persistent. Nine months after randomization, participation is 48 percentage points higher and mean balances £114 higher under automatic enrollment than under opt-in enrollment. An active choice treatment has little effect relative to opt-in enrollment, but this may be due to the two-stage choice process that this particular active choice implementation featured.

Withdrawals are more common under automatic enrollment, but similar in magnitude conditional on withdrawing. Automatic enrollment 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 due to the fact that 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.

We additionally study an experiment created by a large employer's decision to automatically enroll its new hires into a payroll savings scheme. At tenure month 3, we find that participation is 46 percentage points higher and mean balances £44 higher in the automatic enrollment regime than in the opt-in regime. Again, differences in participation and mean balances are persistent. Eighteen months after hire, participation is 48 percentage points higher and mean balances £192 higher under automatic enrollment. Automatic enrollment into short-term savings does not appear to reduce pension savings; total short-term and pension savings as a share of salary are roughly 1 percentage point higher than in the opt-in regime. But automatic enrollment increases utilization of loans offered by the credit union housing the payroll savings accounts—loan balances are higher by £134 at tenure month 12, roughly the amount saved due to automatic enrollment by

that tenure month—perhaps because participation in the payroll savings scheme increased awareness of the availability of the loan offer.

Finally, the default contribution amount under automatic enrollment is £40 per monthly paycheck in both experiments. For the average employee at the participating employers, this is approximately 1.9% of gross pay. In both experiments, 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.

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Table 1. Summary Statistics, Experiment 1

This table presents summary statistics for the Wagestream members who are included in our analyses. 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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date. Standard errors are shown in parentheses. We are currently 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)	£12.28 (0.114)	£12.69 (0.135)	£12.33 (0.114)	0.035
Co-op employees	64.6% (1.0)	65.9% (1.0)	66.6% (0.9)	0.322
Sample size				
Month 0	2,419	2,490	2,495	
Month 1	2,095	2,118	2,161	
Month 2	1,718	1,741	1,758	
Month 3	1,332	1,362	1,403	
Month 4	1,072	1,096	1,112	
Month 5	766	781	768	
Month 6	633	661	629	
Month 7	407	459	445	
Month 8	189	218	202	
Month 9	107	129	116	
Month 10	18	17	19	

Table 2. Effect of Automatic Enrollment on Participation Rates, Fraction Contributing, and Mean Balances, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date. 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	0.189***	0.189***	1.64***	0.67
	(0.009)	(0.009)	(0.10)	(0.88)
1	0.582***	0.571***	12.49***	-1.92
	(0.012)	(0.012)	(0.51)	(1.61)
2	0.579***	0.537***	28.85***	-1.97
	(0.014)	(0.014)	(1.15)	(2.94)
3	0.563***	0.513***	42.82***	-4.29
	(0.016)	(0.016)	(2.09)	(5.27)
4	0.556***	0.500***	55.09***	0.36
	(0.018)	(0.018)	(3.17)	(7.95)
5	0.533***	0.489***	65.28***	-1.87
	(0.021)	(0.022)	(4.77)	(11.94)
6	0.526***	0.484***	77.38***	5.16
	(0.024)	(0.024)	(6.41)	(16.32)
7	0.515***	0.501***	85.86***	23.69
	(0.029)	(0.029)	(8.98)	(22.37)
8	0.540***	0.521***	108.35***	53.47
	(0.042)	(0.042)	(13.59)	(35.92)
9	0.476***	0.495***	114.06***	91.22**
	(0.059)	(0.058)	(19.42)	(44.82)
Max *N* (Month)	4,914 (Month 0)	4,914 (Month 0)	4,914 (Month 0)	1,643 (Month 1)
Min *N* (Month)	223 (Month 9)	223 (Month 9)	223 (Month 9)	94 (Month 9)

Table 3. Effect of Active Choice on Participation Rates, Fraction Contributing, and Mean Balances, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date. 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	0.018***	0.019***	0.14**	-0.42
	(0.005)	(0.005)	(0.06)	(1.42)
1	0.032***	0.032***	0.66*	-0.69
	(0.010)	(0.010)	(0.40)	(2.70)
2	0.021*	0.021*	0.83	-2.17
	(0.012)	(0.012)	(0.97)	(5.14)
3	0.027*	0.030**	0.68	-8.00
	(0.014)	(0.014)	(1.74)	(8.62)
4	0.008	0.014	0.14	-2.73
	(0.016)	(0.015)	(2.59)	(13.13)
5	0.010	0.011	0.85	-3.48
	(0.019)	(0.018)	(3.97)	(19.39)
6	0.020	0.029	3.63	4.97
	(0.021)	(0.020)	(5.27)	(25.19)
7	0.019	0.039	9.28	41.62
	(0.027)	(0.026)	(7.67)	(34.91)
8	0.008	0.013	-3.01	-22.96
	(0.036)	(0.036)	(8.68)	(49.27)
9	-0.026	-0.007	-5.04	-4.04
	(0.051)	(0.050)	(13.44)	(67.26)
Max *N* (Month)	4,909 (Month 0)	4,909 (Month 0)	4,909 (Month 0)	508 (Month 2)
Min *N* (Month)	236 (Month 9)	236 (Month 9)	236 (Month 9)	42 (Month 9)

Table 4. Effect of Automatic Enrollment and Active Choice on Withdrawal Rates and Amounts, Experiment 1

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. *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	-0.091*	-23.21***	0.037	-0.098	21.38	0.062
	(0.048)	(7.16)	(0.039)	(0.059)	(16.69)	(0.062)
1	-0.007	-15.68***	0.055	0.001	-4.98	0.057
	(0.031)	(5.14)	(0.033)	(0.039)	(7.65)	(0.043)
2	-0.051	-12.61**	0.043	-0.055	8.43	0.046
	(0.033)	(5.05)	(0.027)	(0.041)	(8.90)	(0.036)
3	-0.037	-9.03	0.004	0.028	1.99	0.005
	(0.037)	(7.79)	(0.032)	(0.047)	(11.28)	(0.038)
4	-0.004	-16.45	0.088**	-0.048	-1.08	0.076
	(0.041)	(10.16)	(0.035)	(0.052)	(17.97)	(0.048)
5	-0.065	-32.11**	0.003	-0.076	-13.17	-0.049
	(0.048)	(13.18)	(0.039)	(0.060)	(19.55)	(0.050)
6	-0.022	-34.66	0.036	-0.010	-27.45	0.035
	(0.054)	(21.03)	(0.046)	(0.066)	(33.11)	(0.058)
7	-0.159**	-37.79*	-0.068	-0.153*	-44.90	-0.136**
	(0.064)	(22.50)	(0.045)	(0.078)	(33.79)	(0.056)
8	0.003	-18.87	0.041	0.172	14.12	0.113
	(0.100)	(32.46)	(0.088)	(0.127)	(51.86)	(0.099)
9	-0.117	-6.54	0.036	-0.067	-0.17	0.026
	(0.120)	(61.99)	(0.097)	(0.155)	(57.96)	(0.104)
Max *N* (Month)	1,705 (Month 1)	486 (Month 2)	486 (Month 2)	520 (Month 2)	177 (Month 2)	177 (Month 2)
Min *N* (Month)	99 (Month 9)	38 (Month 9)	38 (Month 9)	43 (Month 9)	19 (Month 9)	19 (Month 9)

Table 5. Effect of Automatic Enrollment and Active Choice on Earned Wage Access Rates and Amounts, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date. 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		
	Earned Wage Access Usage Rate	Mean Positive Wage Access Amount	Mean Positive Access Share of Next Paycheck	Earned Wage Access Usage Rate	Mean Positive Wage Access Amount	Mean Positive Access Share of Next Paycheck
Month	(1)	(2)	(3)	(4)	(5)	(6)
0	0.012	1.61	-0.013	0.015	9.88	-0.004
	(0.012)	(8.95)	(0.012)	(0.012)	(9.65)	(0.013)
1	0.031**	-10.28	-0.004	0.011	0.12	0.006
	(0.015)	(10.58)	(0.005)	(0.015)	(10.71)	(0.006)
2	0.024	0.92	-0.003	0.005	27.55**	0.008
	(0.017)	(13.17)	(0.006)	(0.017)	(13.96)	(0.007)
3	0.036*	-8.53	-0.004	0.012	4.11	0.011
	(0.019)	(13.82)	(0.007)	(0.019)	(14.42)	(0.007)
4	0.020	2.41	0.002	-0.000	18.26	0.017*
	(0.021)	(17.91)	(0.008)	(0.021)	(17.49)	(0.008)
5	0.002	13.63	0.001	-0.016	23.22	-0.003
	(0.025)	(21.62)	(0.011)	(0.025)	(23.67)	(0.011)
6	0.001	12.04	-0.010	-0.005	25.87	-0.003
	(0.027)	(26.51)	(0.013)	(0.027)	(25.72)	(0.012)
7	-0.020	19.03	-0.002	-0.025	48.06	0.007
	(0.033)	(30.84)	(0.017)	(0.033)	(34.10)	(0.018)
8	-0.005	51.52	0.010	-0.022	41.28	0.003
	(0.046)	(61.74)	(0.028)	(0.045)	(63.80)	(0.028)
9	-0.052	-11.17	-0.006	-0.019	-31.58	-0.025
	(0.062)	(75.83)	(0.035)	(0.062)	(87.60)	(0.037)
Max *N* (Month)	4,914 (Month 0)	1,799 (Month 1)	1,898 (Month 1)	4,909 (Month 0)	1,739 (Month 1)	1,822 (Month 1)
Min *N* (Month)	223 (Month 9)	69 (Month 9)	68 (Month 9)	236 (Month 9)	77 (Month 9)	73 (Month 9)

Table 6. Relationship between Earned Wage Access Utilization and Short-Term Savings Pot Withdrawals, Experiment 1

This table presents the relationship between earned wage access utilization and short-term savings pot withdrawals, for each study arm. Multiple instances of wage access taken from a single paycheck are aggregated. Each column presents, for the selected study arm, the percentage of wage access instances taken by members (a) with no available short-term savings balance, (b) with a positive balance but no recorded withdrawal, (c) with a positive balance and a partial withdrawal, or (d) with a positive balance and a full withdrawal. Balances and withdrawals are assessed for the same month the wages were accessed. Partial withdrawals include any withdrawal larger than £0 but equal to less than 95% of the available savings pot balance. Full withdrawals include all withdrawals greater than or equal to 95% of the available savings pot balance. In 176 cases, an individual has a recorded withdrawal and a £0 balance; we interpret these as full withdrawals where an individual quickly withdrew a recent contribution. Standard errors are shown in parentheses.

	Opt-Out (1)	Active Choice (2)	Control (3)
No Short-Term Savings Balance	22.70	78.89	80.74
	(0.66)	(0.66)	(0.65)
Positive Short-Term Savings Balance, No Withdrawal Taken	40.41	10.69	9.60
	(0.77)	(0.50)	(0.49)
Positive Short-Term Savings Balance, Partial Withdrawal Taken	15.15	4.52	4.50
	(0.57)	(0.34)	(0.34)
Positive Short-Term Savings Balance, Full Withdrawal Taken	21.75	5.91	5.15
	(0.65)	(0.38)	(0.36)
N (instances of wages accessed)	4,057	3,895	3,739

Table 7. Summary Statistics, Experiment 2

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)	Difference	*p*-value of difference
Mean nominal starting pay (annualized)[1,2]	£24,009	£26,343	£2,334	0.000
Mean inflation-adjusted starting pay (annualized)[3]	£23,620	£23,468	-£152	0.525
Female	13.8%	13.8%	-0.0%	0.989
Age[4]				
30 or under	34.1%	33.7%	-0.4%	0.819
31-50	43.7%	43.8%	1.0%	0.954
51 +	22.2%	22.4%	0.3%	0.849
Manual position[5]	82.4%	78.5%	-3.9%	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 8. Effect of Automatic Enrollment on Participation Rates and Savings Accumulation, Experiment 2

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 (3) 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)
Max *N* (Month)	2,442 (Month 3)	2,442 (Month 3)	2,442 (Month 3)	1,053 (Month 3)
Min *N* (Month)	760 (Month 21)	760 (Month 21)	760 (Month 21)	117 (Month 21)

Table 9. Effect of Automatic Enrollment on Withdrawal Rates, Withdrawal Amounts, and Total Savings Rate, Experiment 2

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. Approximately 4% of withdrawals observed in our data appear to exceed the available balance due to accounting delays. In such cases, we set the share of balance equal to 100%. 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	-25.965	0.022	1.500***
	(0.169)	(87.07)	(25.005)	(0.016)	(0.113)
6	-0.115	-9.25	-27.905	0.043**	1.258***
	(0.143)	(132.90)	(19.180)	(0.018)	(0.135)
9	-0.110	10.83	-6.478	0.014	1.266***
	(0.141)	(117.22)	(13.699)	(0.019)	(0.154)
12	-0.132	34.32	1.504	0.005	1.405***
	(0.154)	(100.51)	(14.587)	(0.021)	(0.164)
15	-0.137	154.18	-10.326	-0.030	1.167***
	(0.154)	(144.72)	(13.284)	(0.024)	(0.181)
18	-0.031	124.77	18.638	-0.069**	0.743***
	(0.169)	(200.92)	(19.153)	(0.027)	(0.207)
21	-0.000	75.84	5.692	-0.001	1.300***
	(0.177)	(308.56)	(16.114)	(0.030)	(0.229)
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)	34 (Month 21)	34 (Month 21)	684 (Month 21	660 (Month 21)

Figure 1. Participation Rate in and Fraction Contributing to Savings Pot, Experiment 1
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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date.

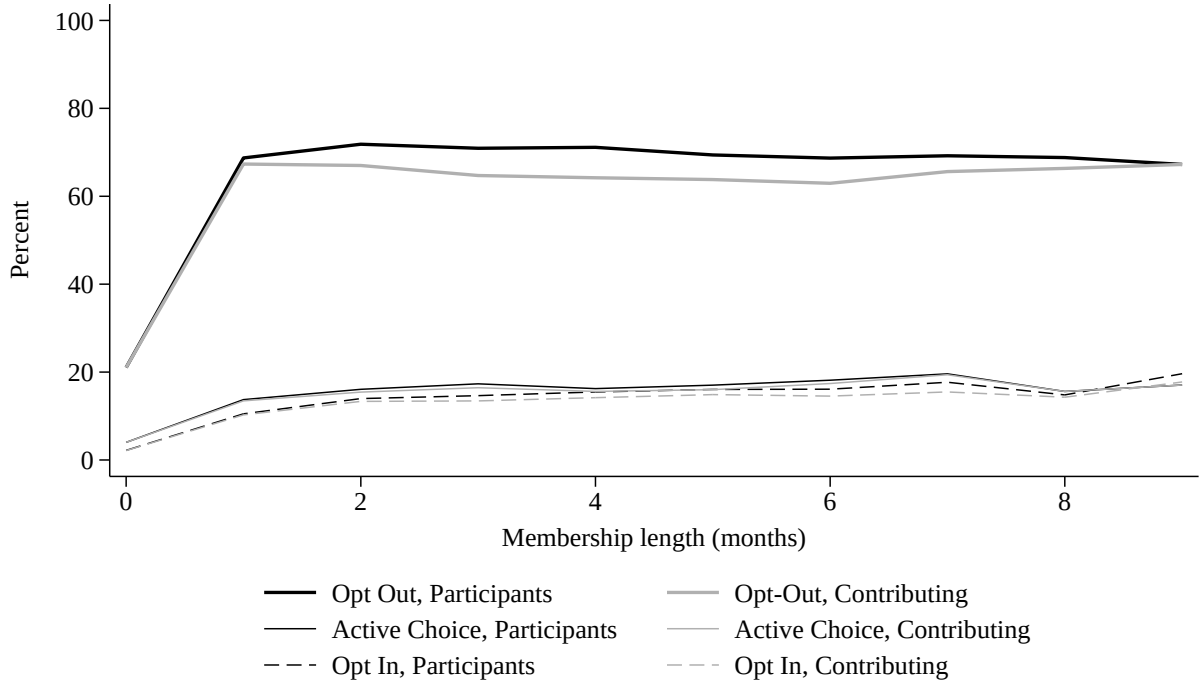

Figure 2. Participation Rate in and Fraction Contributing to Savings Pot by Employer, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date.

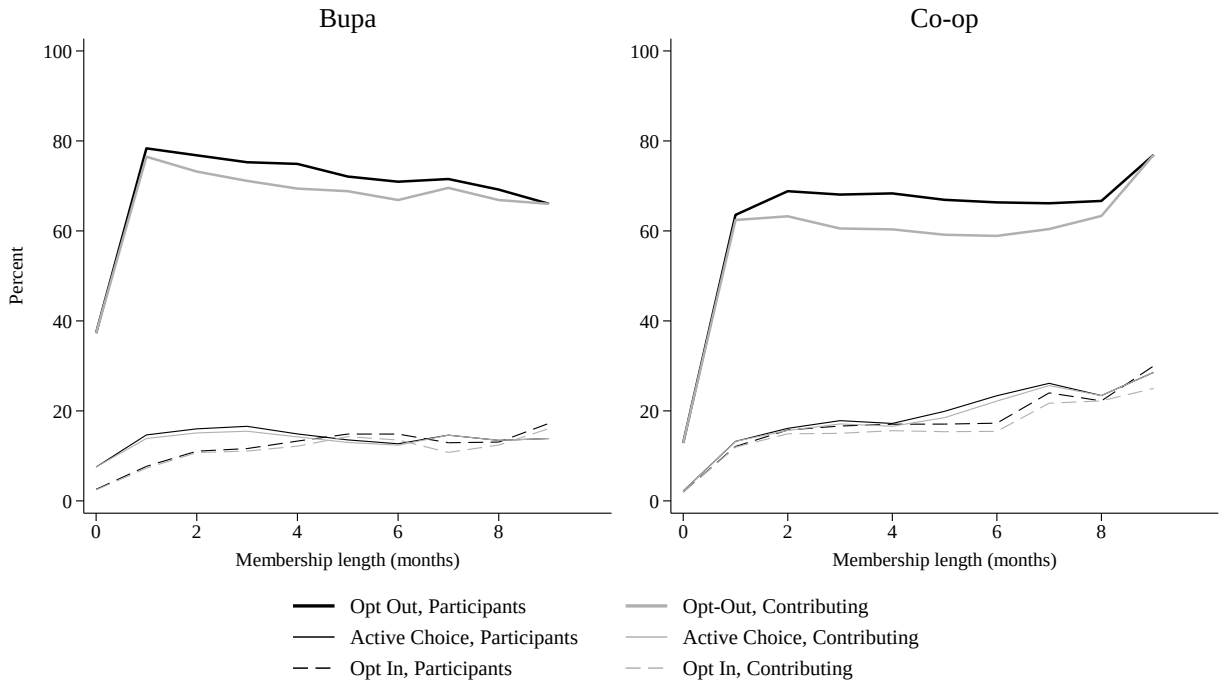

Figure 3. Participation Rate in and Fraction Contributing to Savings Pot by Hourly Wage Tercile, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date. Hourly wage data are only available for Bupa, so we exclude Co-op members from this analysis.

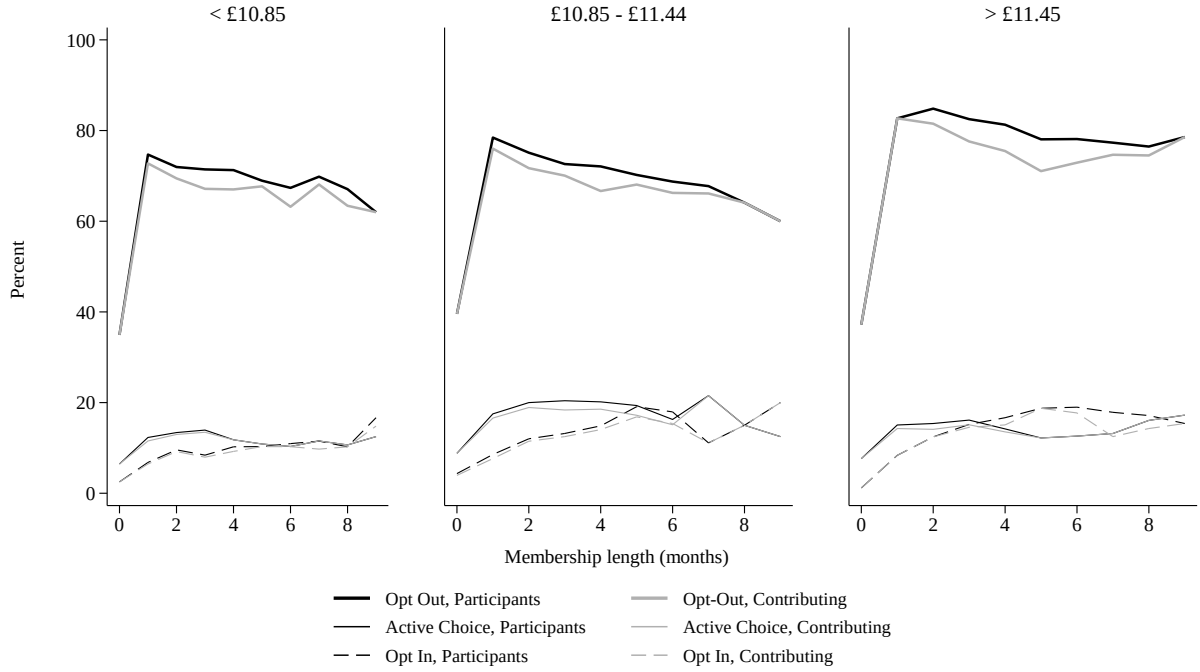

Figure 4. Savings Balances, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date.

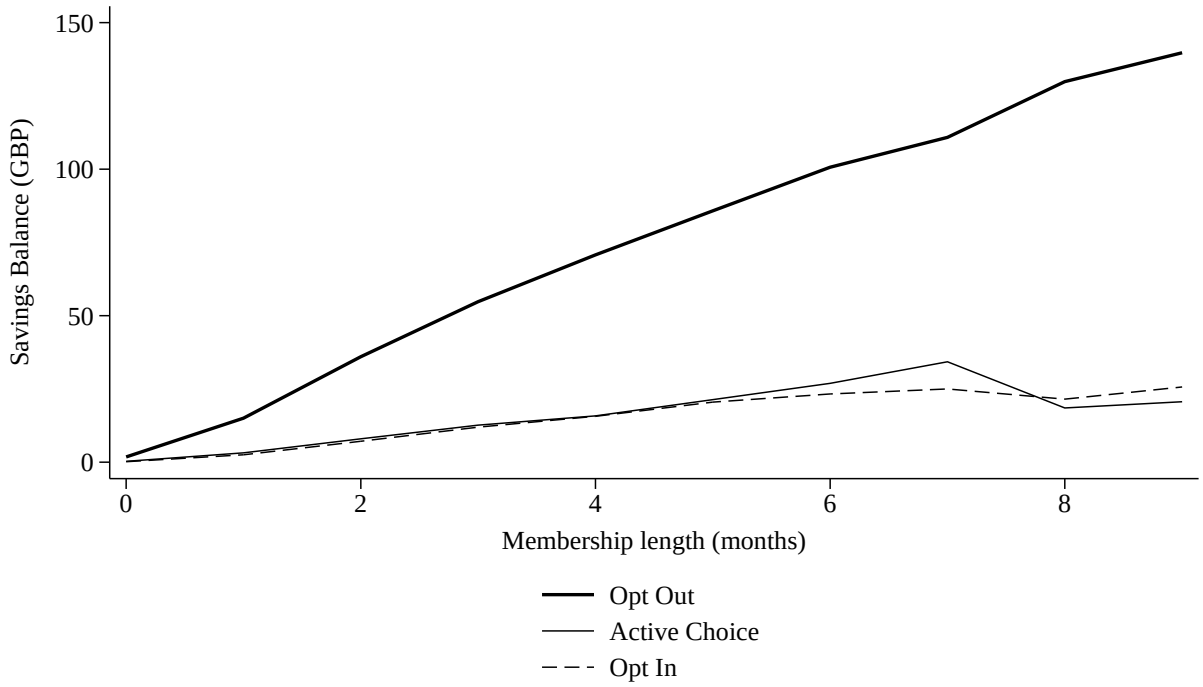

Figure 5. Savings Balances Conditional on Saving, Experiment 1

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.

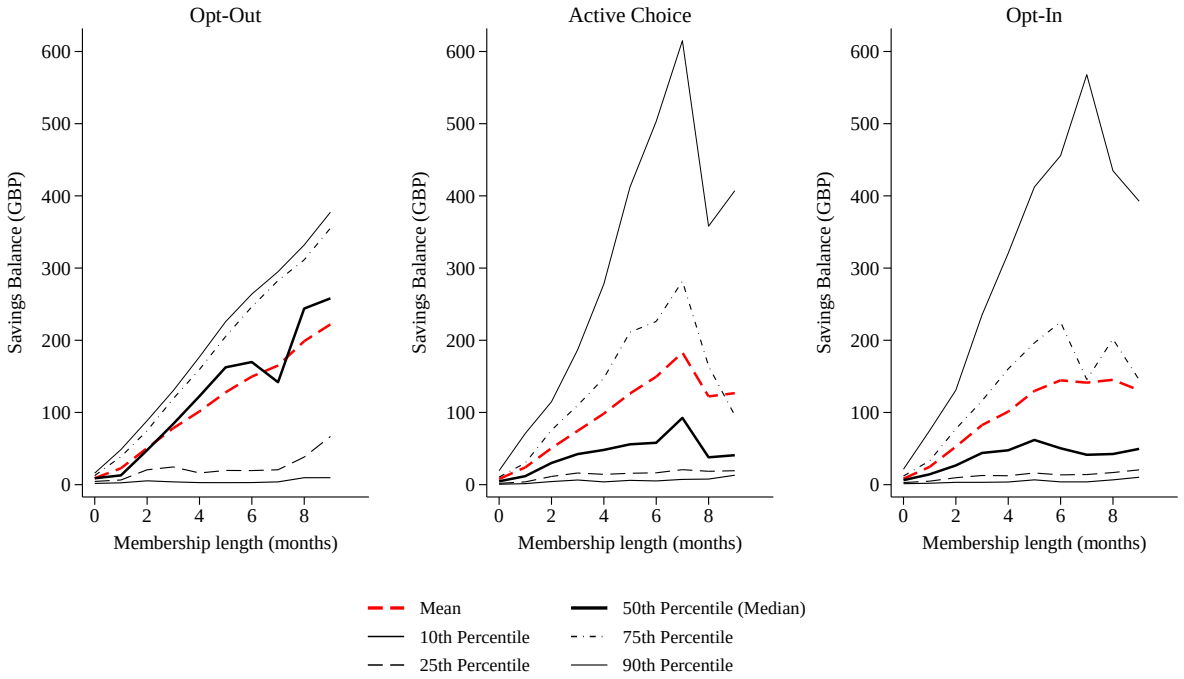

Figure 6. Contribution Amounts, Experiment 1

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.

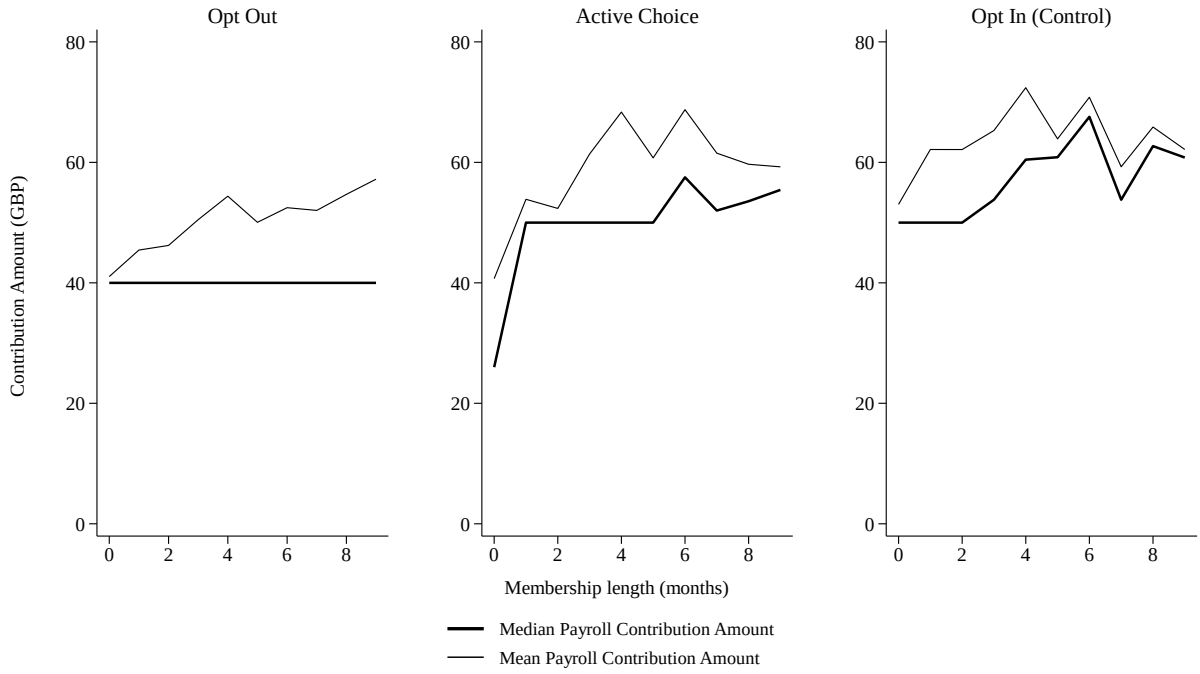

Figure 7. Withdrawal Rates, Experiment 1

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.

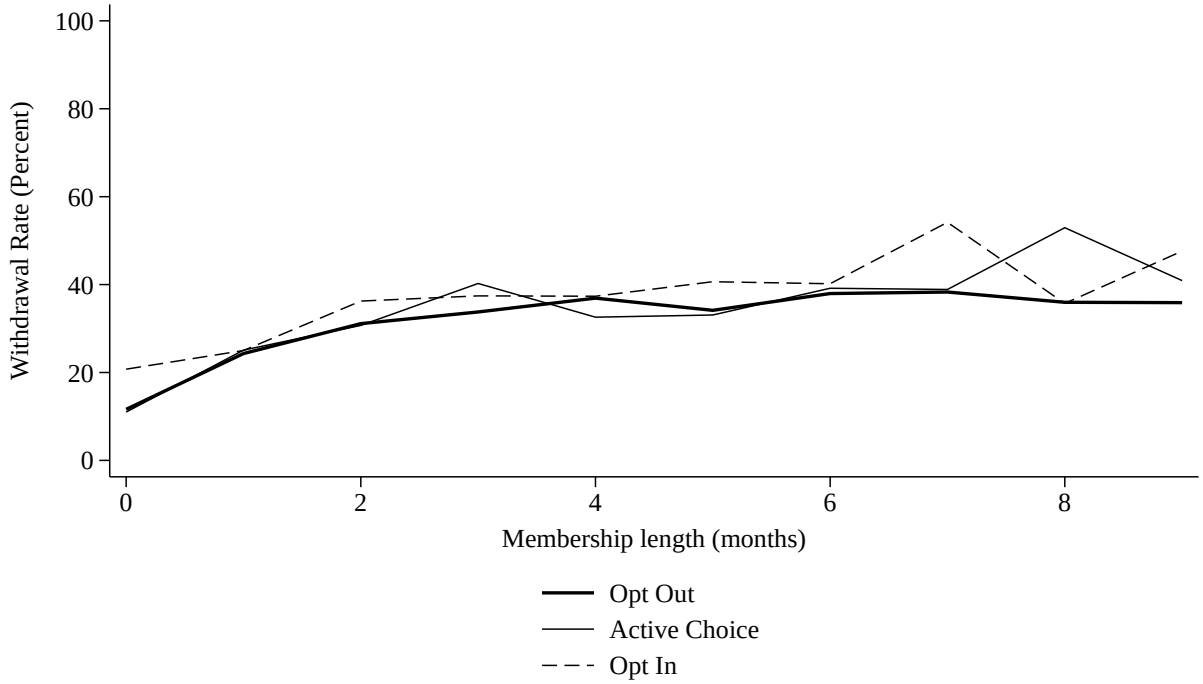

Figure 8. Cumulative Withdrawal Rates, Experiment 1

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 with a positive balance in and/or payroll contribution to their short-term savings account. Multiple withdrawals 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.

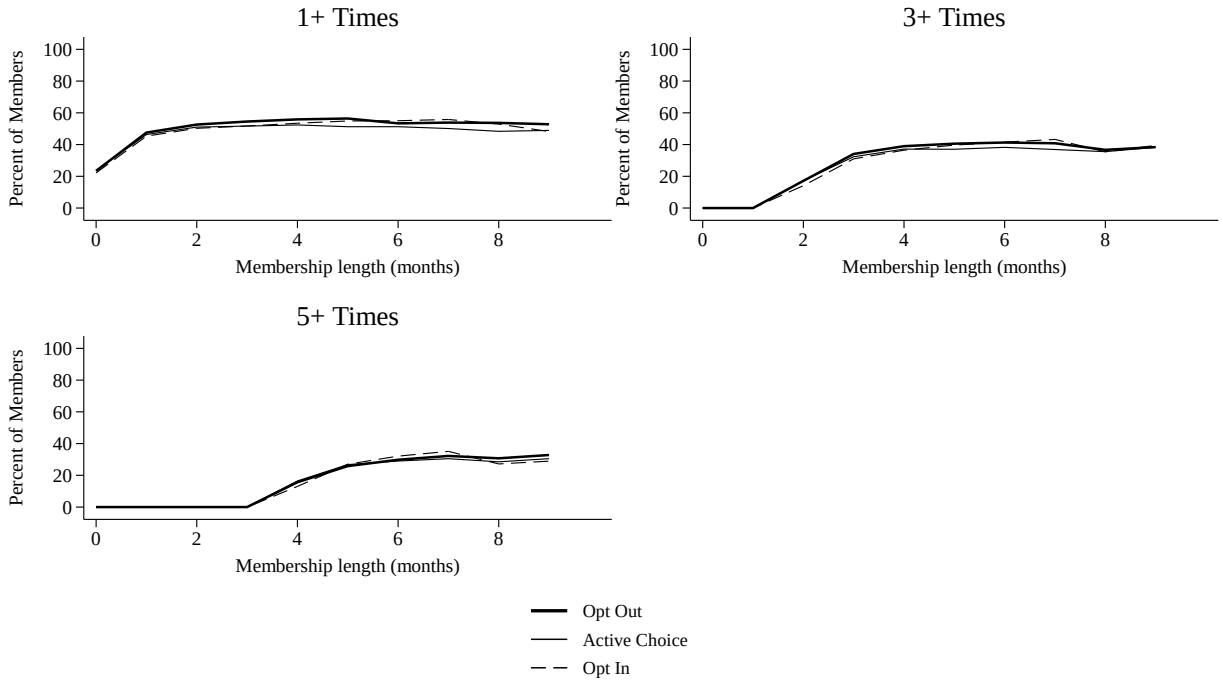

Figure 9. Withdrawal Amount, Experiment 1

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.

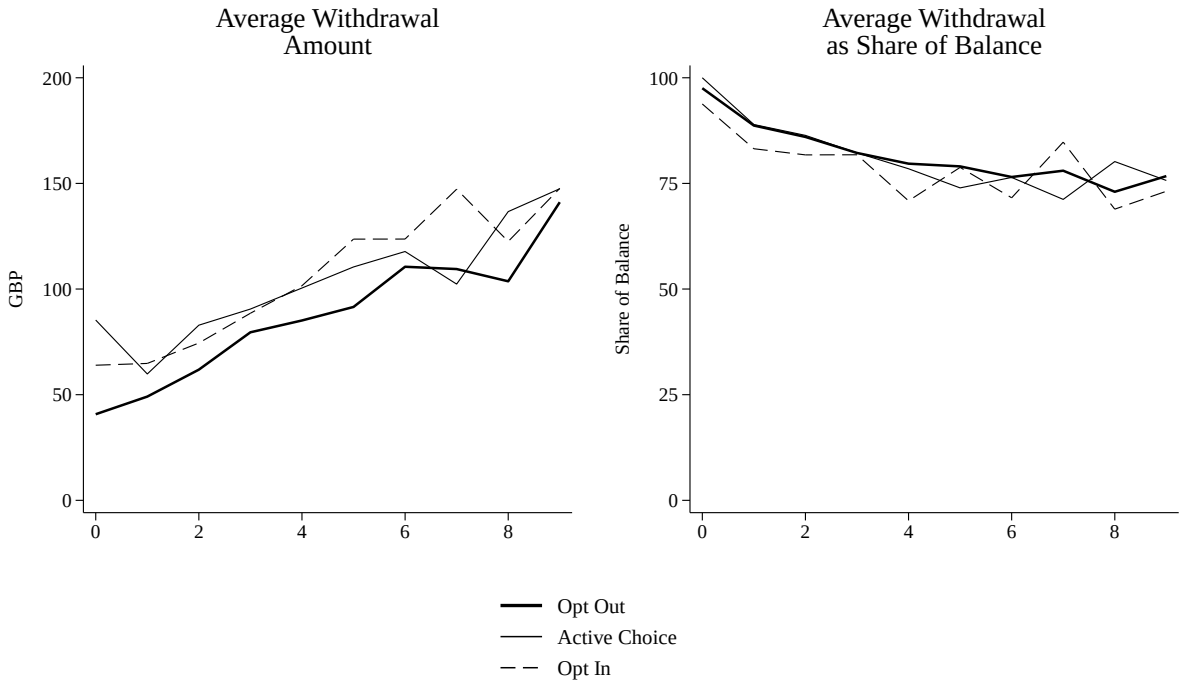

Figure 10. Withdrawals Equal to Balance and/or Previous Contribution, Experiment 1
For each trial arm and membership month, we show the percentage of withdrawals that are approximately equal to (between 95% and 100% of) the account balance and the percentage of withdrawals that are approximately equal to (between 95% and 100% of) the previous contribution and less than 95% of the available balance. Multiple withdrawals made by an individual in a single month are combined. When determining the account's balance, we add the starting balance to all contributions made during the 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.

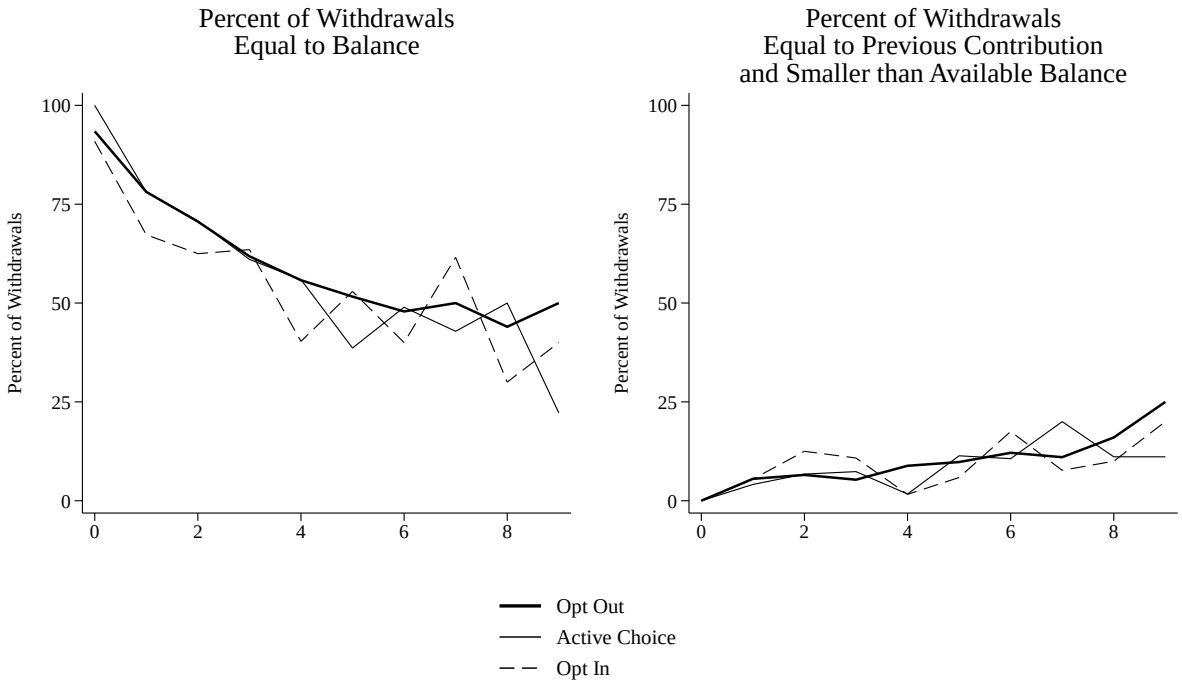

Figure 11. Earned Wage Access Utilization Rates, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date.

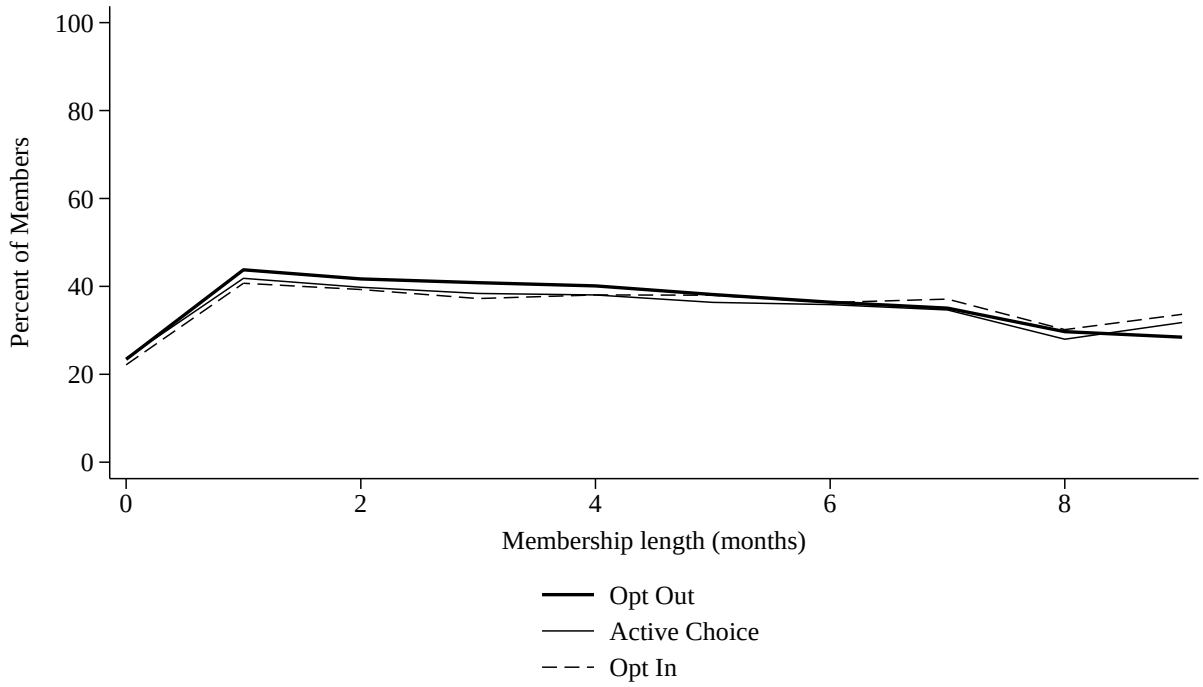

Figure 12. Cumulative Earned Wage Access Utilization Rates, Experiment 1

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. We include individuals whose accounts are marked "disabled" by Wagestream if they have no recorded separation date.

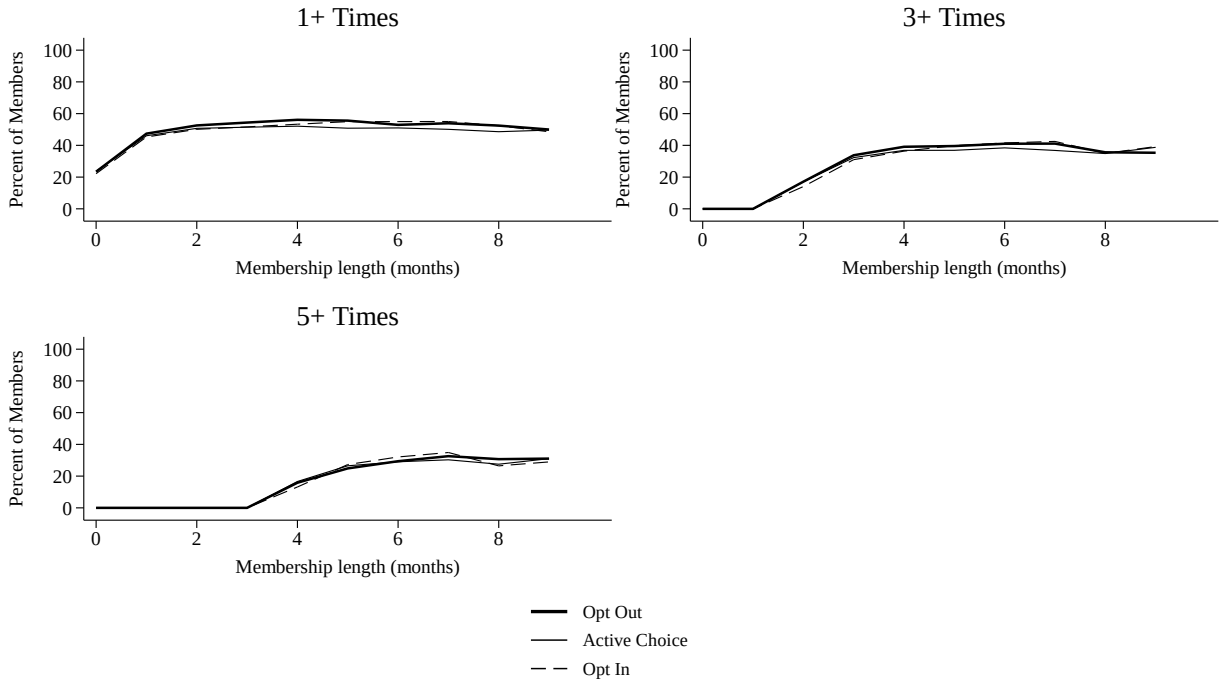

Figure 13. Earned Wage Access Behavior Conditional on Using, Experiment 1

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.

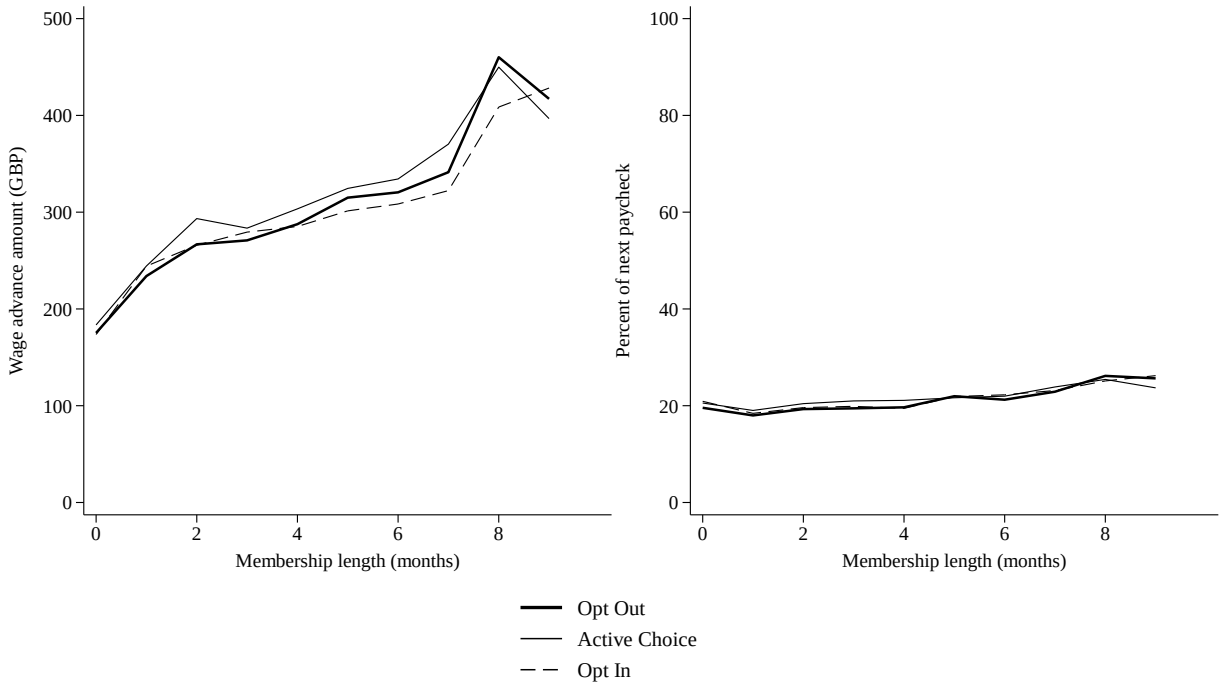

Figure 14. Percentage of Accessed Wage Payments Less than or Equal to Savings Pot Balance, Experiment 1

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.

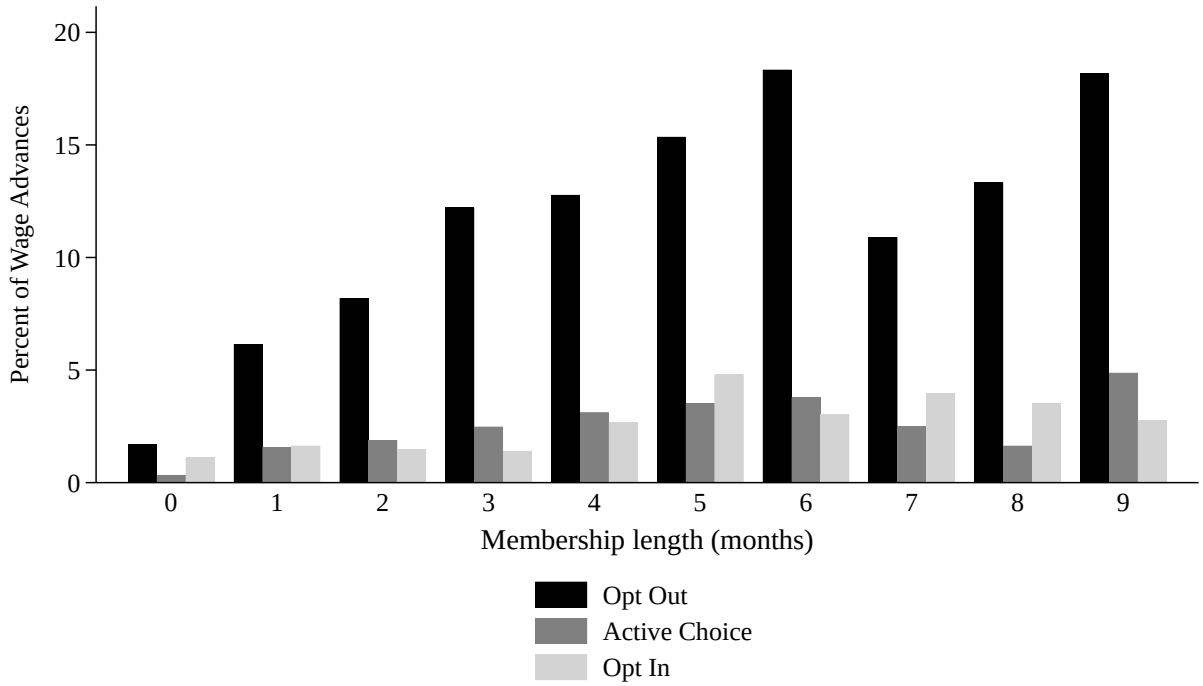

Figure 15. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account, Experiment 2

For each hire cohort and tenure month, we divide 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 additionally divide 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.

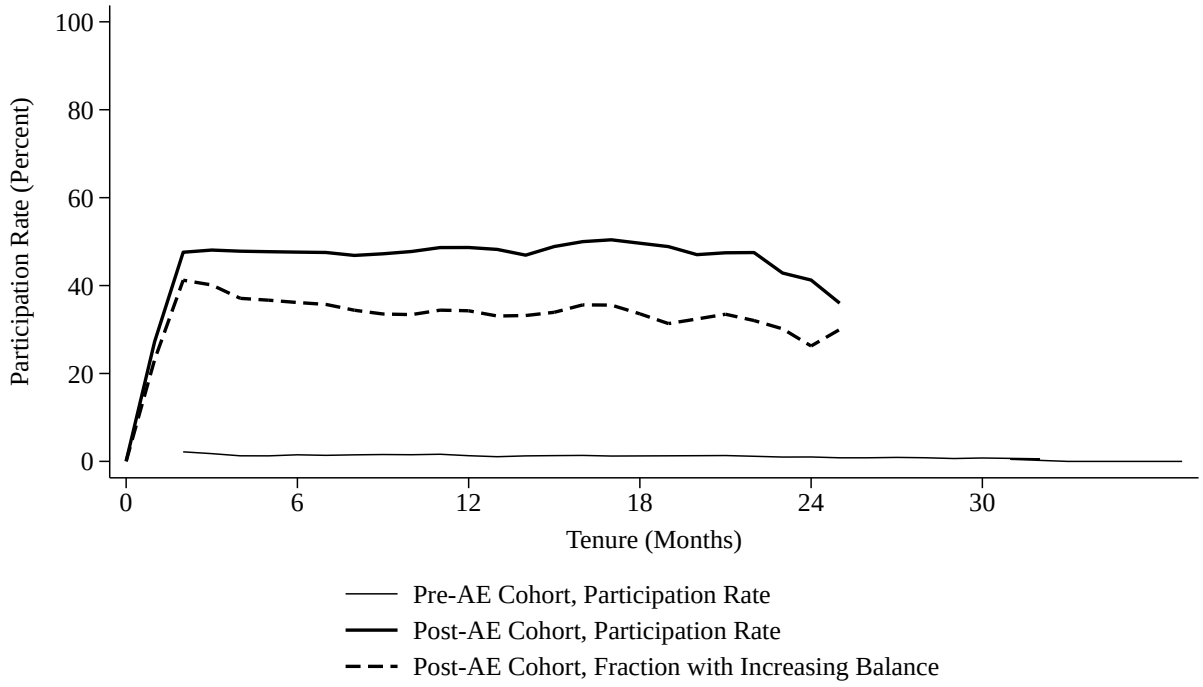

Figure 16. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Gender, Post-AE Cohort, Experiment 2

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.

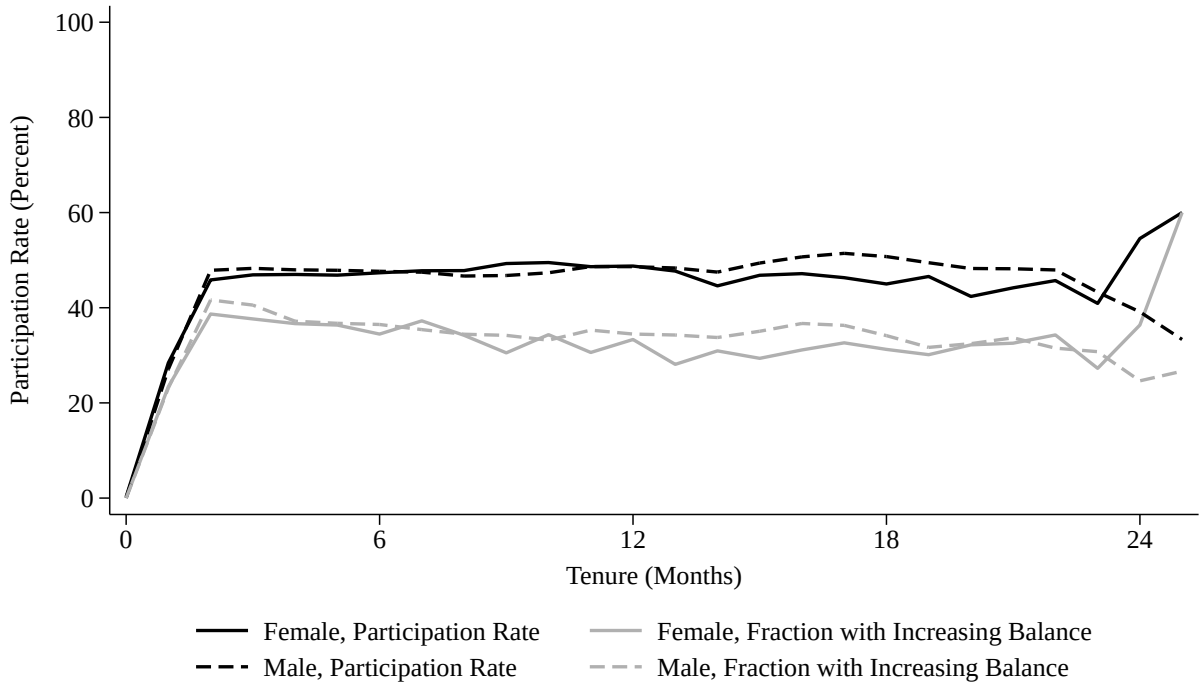

Figure 17. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Age, Post-AE Cohort, Experiment 2

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.

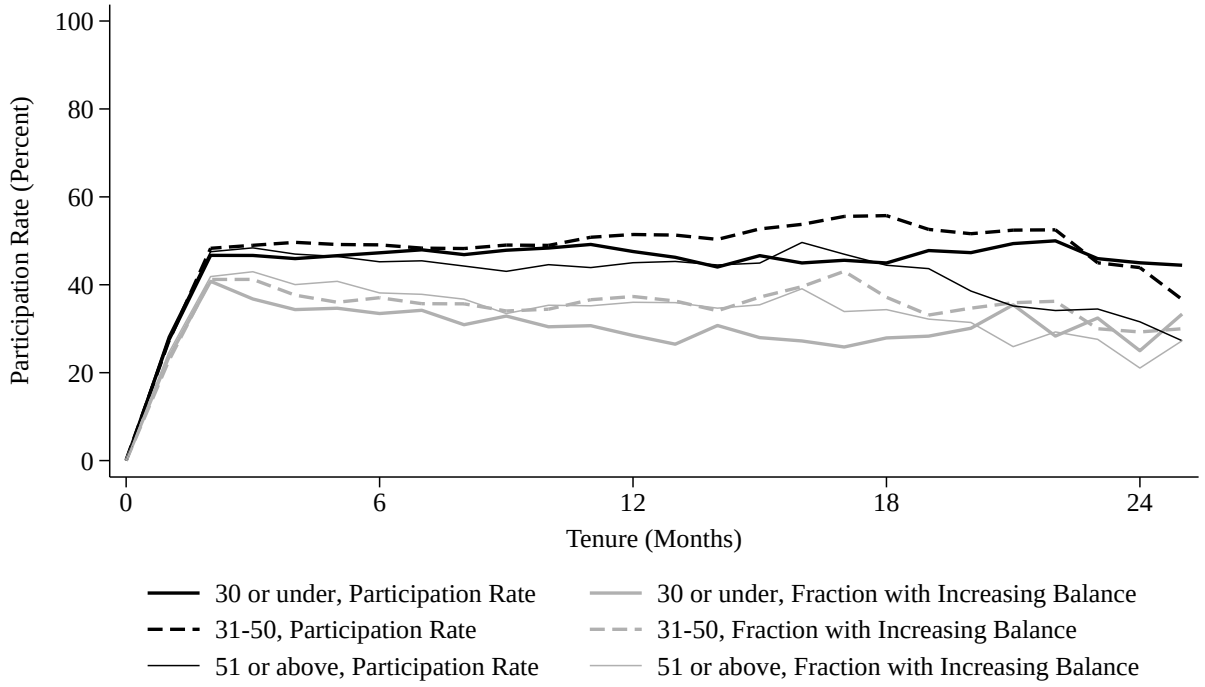

Figure 18. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Role, Post-AE Cohort, Experiment 2

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.

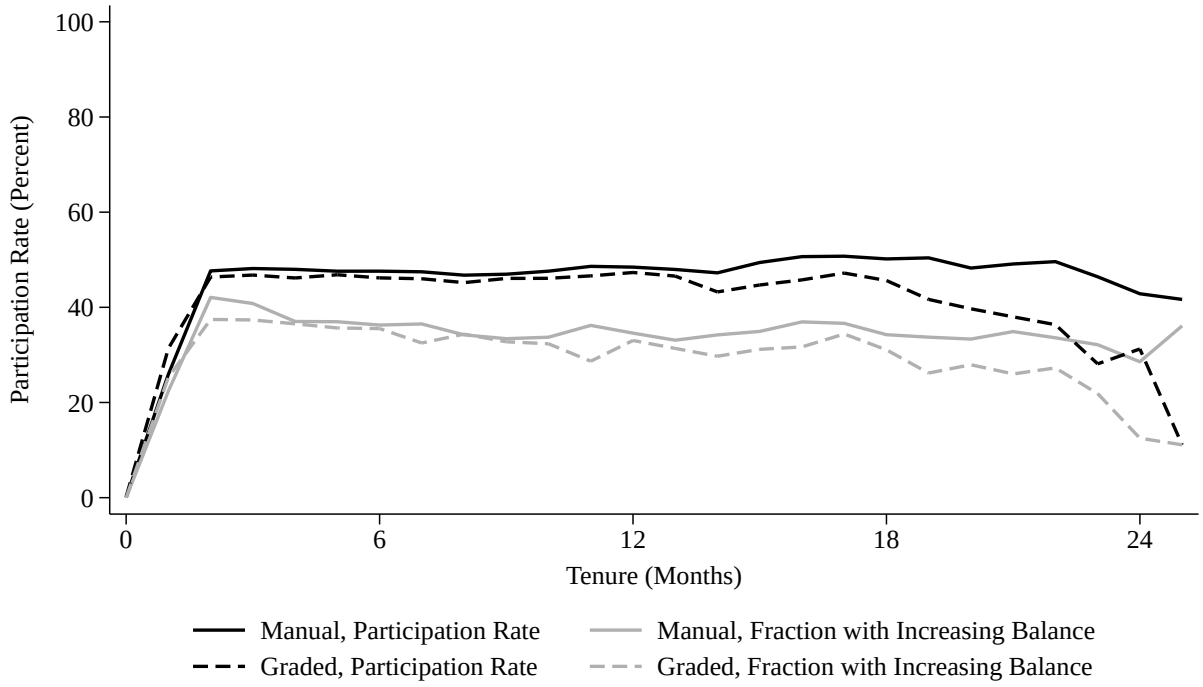

Figure 19. Participation Rate and Fraction with Increasing Balance in Short-Term Savings Account by Annualized Starting Pay, Post-AE Cohort, Experiment 2

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 by computing their hourly rate × scheduled hours per week × 52. We drop hourly workers with zero or unobserved scheduled hours per week.

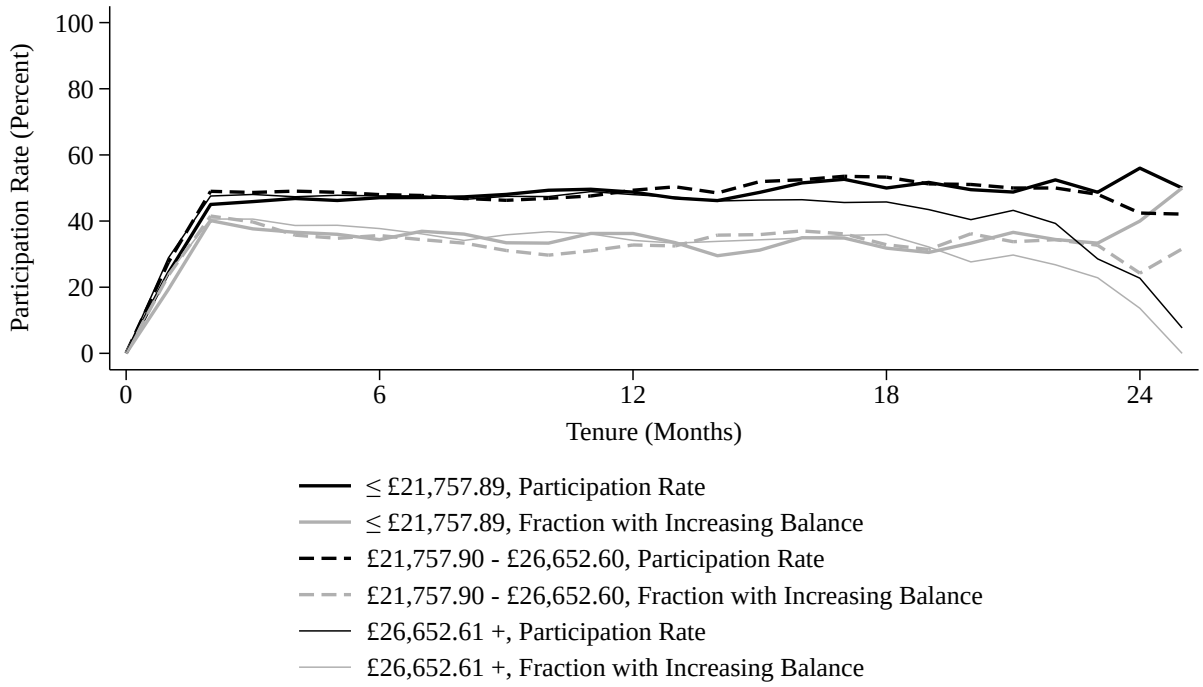

Figure 20. Savings Balances, Experiment 2

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.

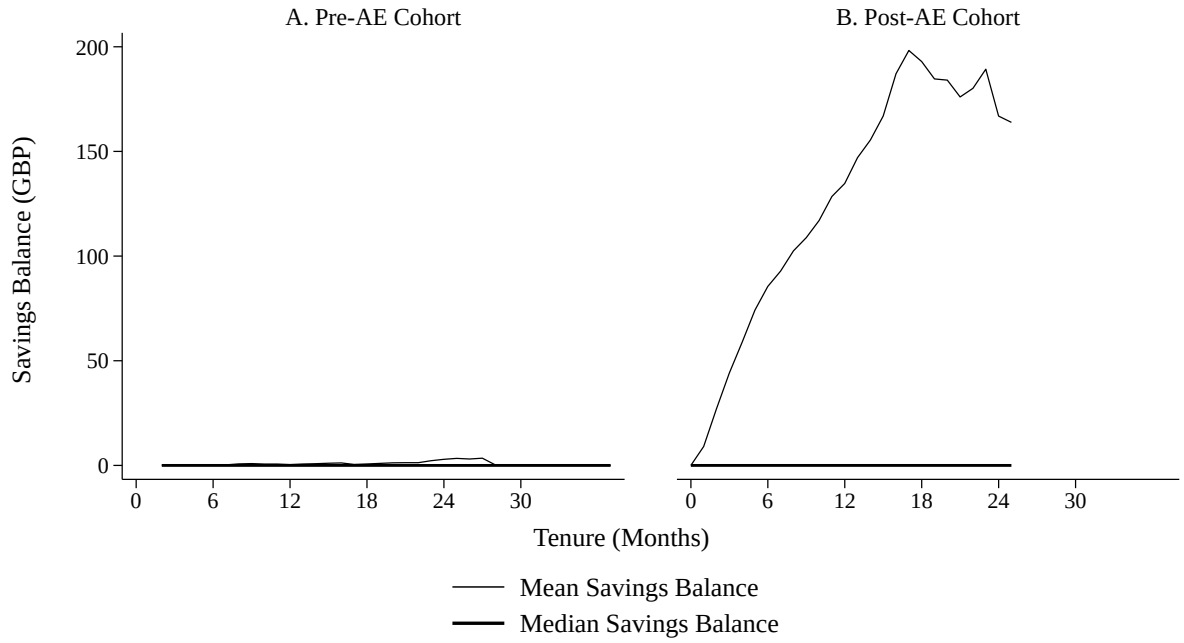

Figure 21. Savings Balances Conditional on Saving, Experiment 2

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.

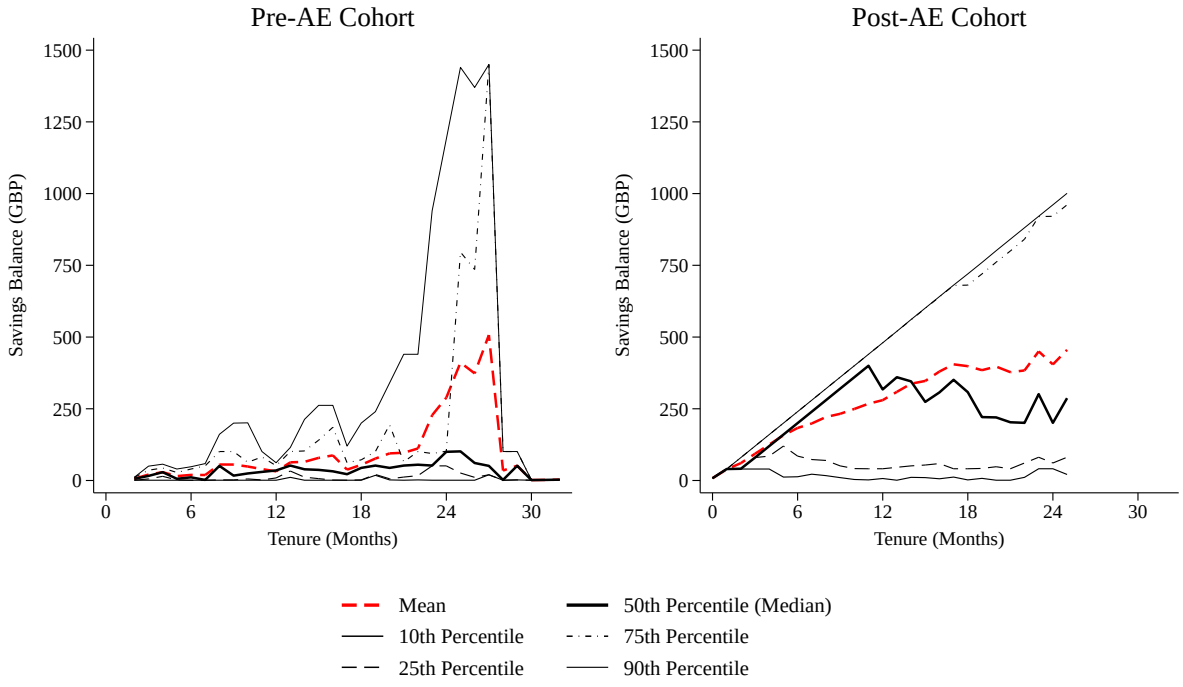

Figure 22. Elected Contribution Amounts, Experiment 2

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.

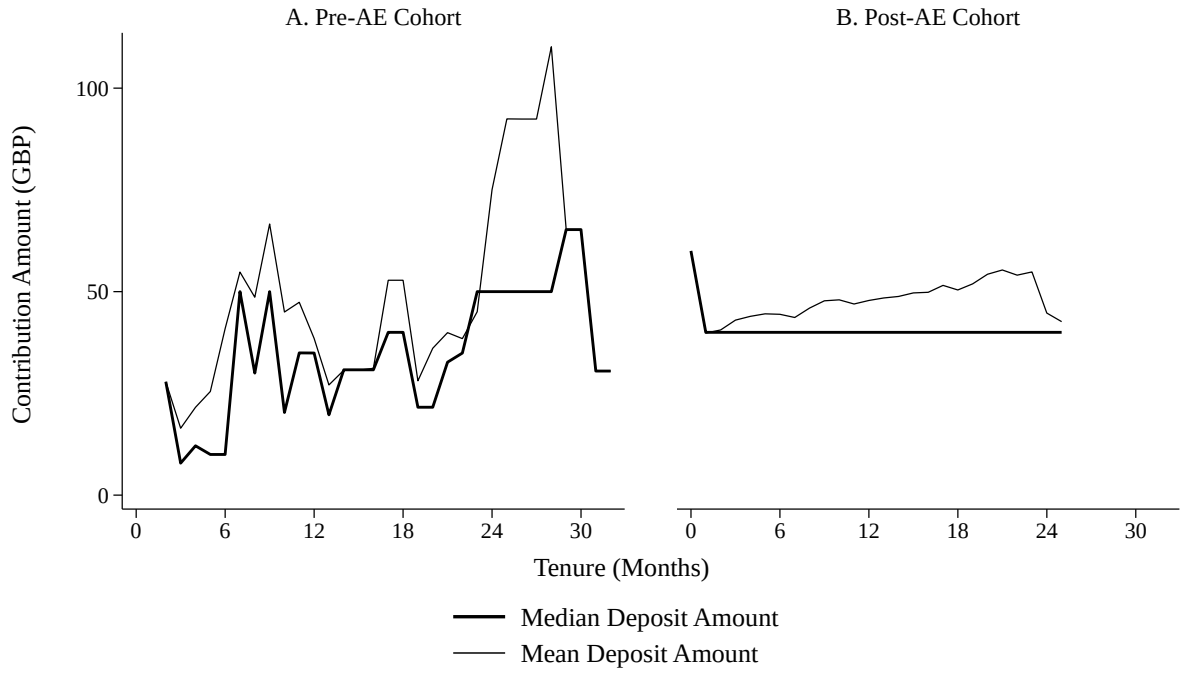

Figure 23. Withdrawal Rates, Experiment 2

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.

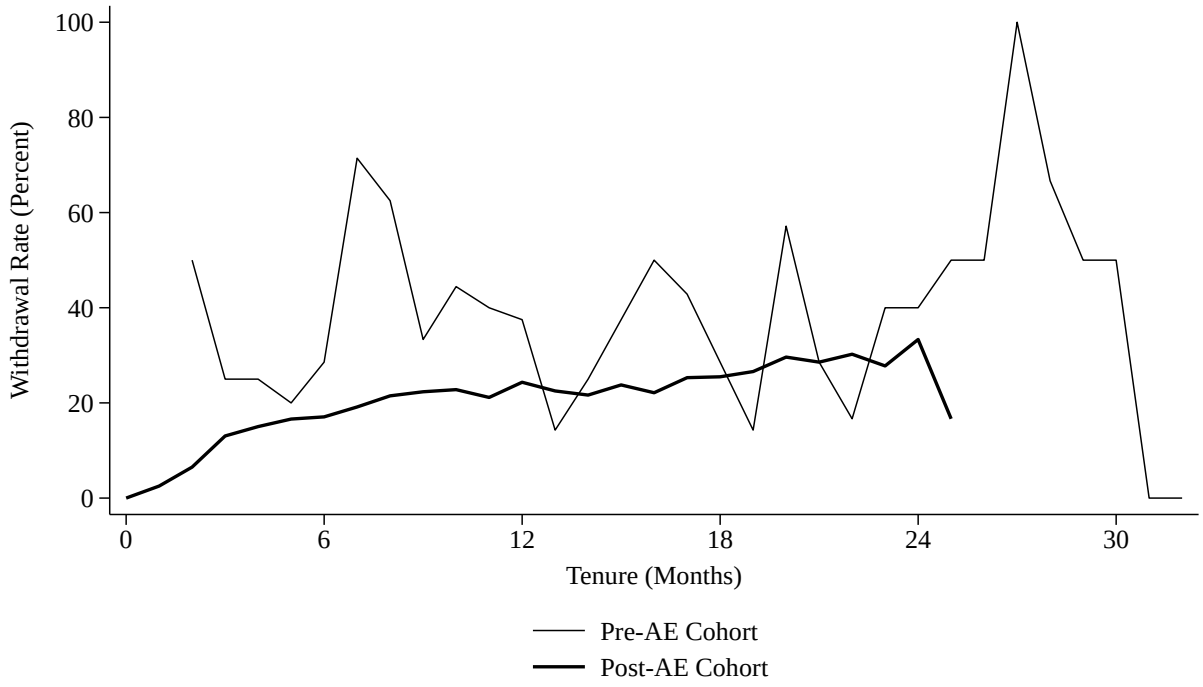

Figure 24. Cumulative Withdrawal Rates, Experiment 2

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 with a positive balance in or a positive elected payroll contribution to their short-term savings account in that month. 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. Employees are included at a given tenure if they were hired early enough to be observed at that horizon and had not yet separated.

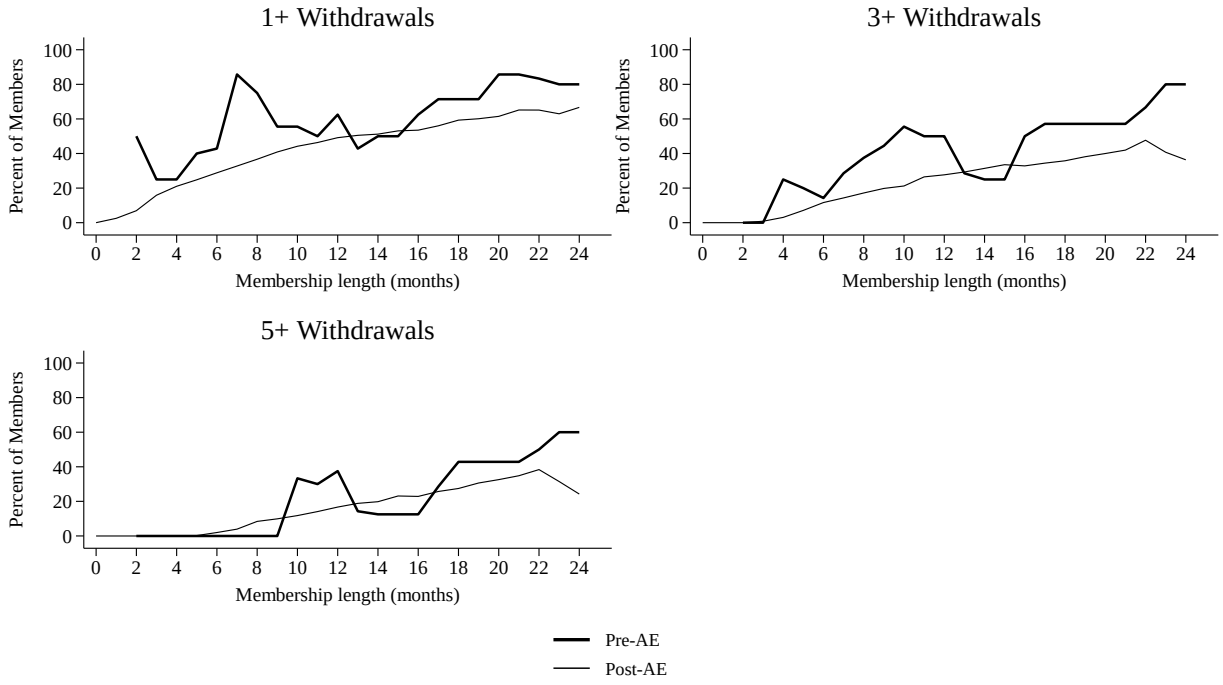

Figure 25. Withdrawal Amount, Experiment 2

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. Approximately 4% of withdrawals observed in our data appear to exceed the available balance due to accounting delays. In such cases, we set the share of balance equal to 100%. 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.

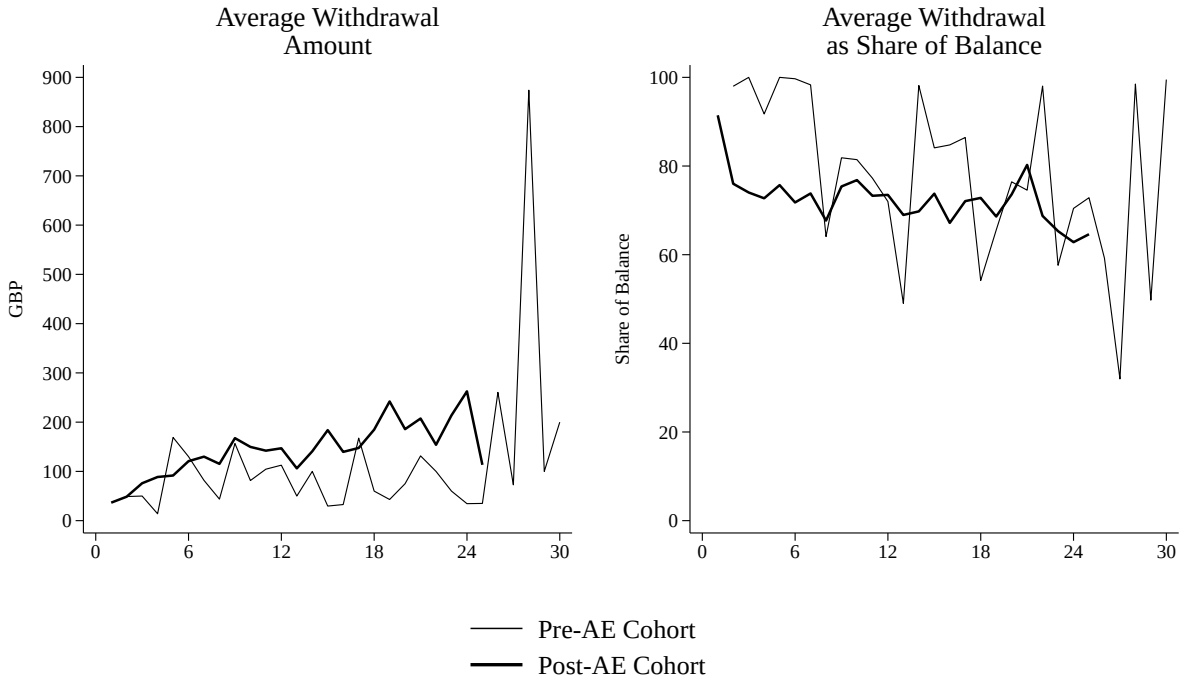

Figure 26. Withdrawals Equal to Balance and/or Previous Contribution, Experiment 2

For each hire cohort and tenure month, we show the percentage of withdrawals that are approximately equal to the account balance (between 95% and 100% of the available balance) and the percentage of withdrawals that are approximately equal to the previous contribution (between 95% and 100% of the previous contribution) and less than 95% of the available 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. Approximately 4% of withdrawals observed in our data appear to exceed the available balance due to accounting delays. In such cases, we set the share of balance equal to 100%. 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.

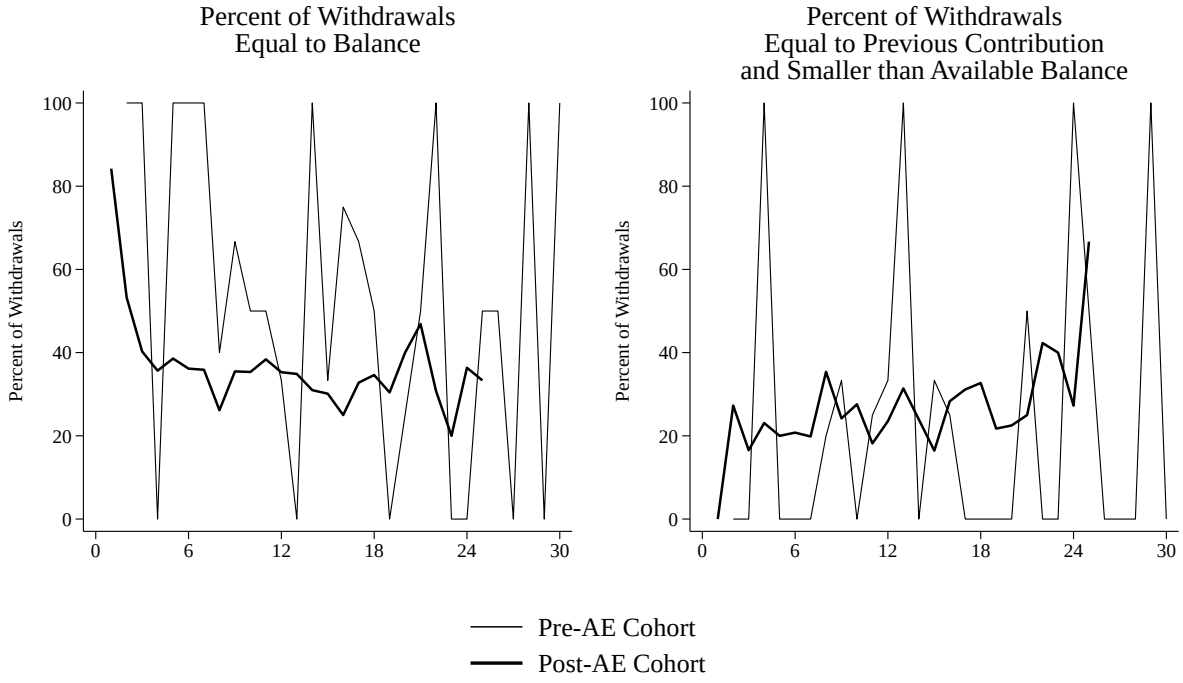

Figure 27. Pension Participation Rates, Experiment 2

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.

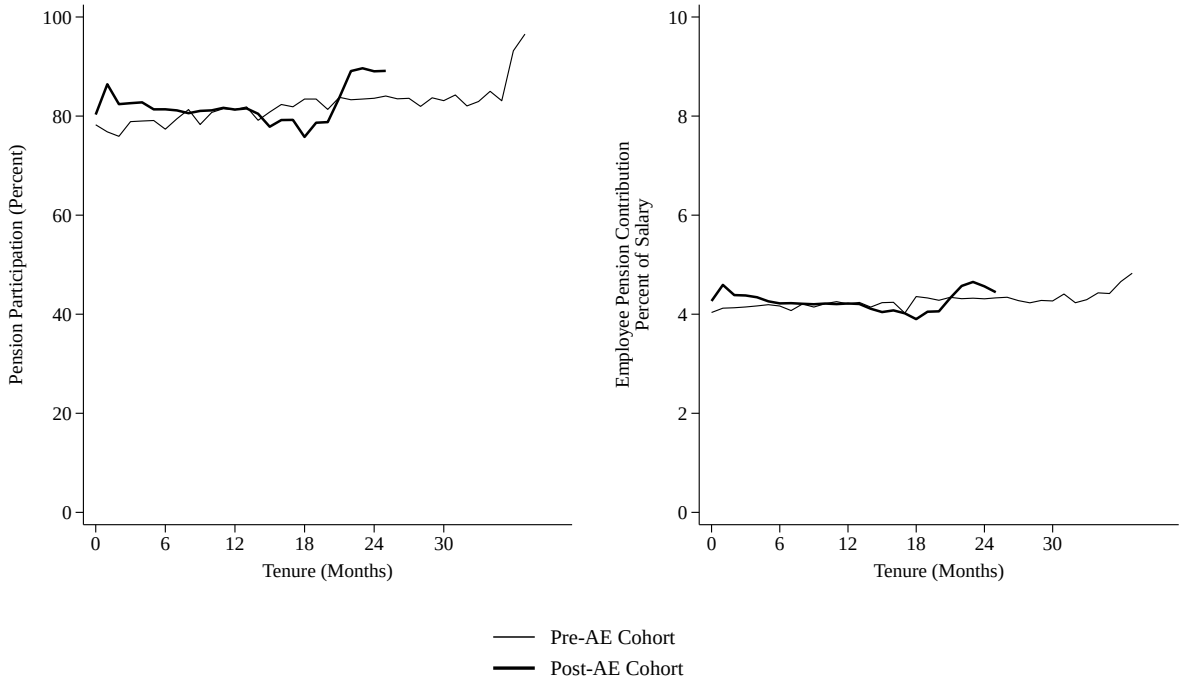

Figure 28. Combined Short-Term and Pension Savings Elections, Experiment 2

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.

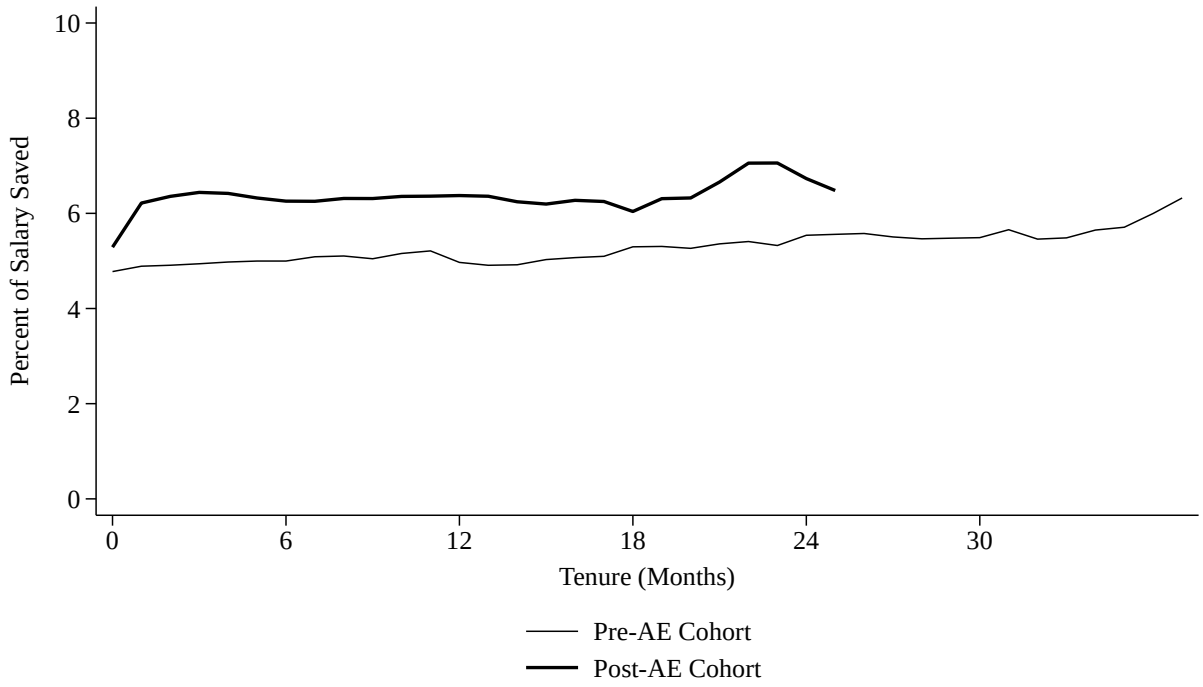

Figure 29. Loan Utilization at Tenure Month 12, Experiment 2

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.