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Does 401(k) loan repayment crowd out retirement saving? Evidence from administrative data and implications for plan design

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Abstract

SECURE 2.0 made it easier for 401(k) participants to use their long-term retirement assets as sources of short-term liquidity. To inform the potential design of 401(k) liquidity features, we use data from Vanguard 401(k) plans to study the contribution behavior of participants following loan issuances and hardship withdrawals. Contribution activity is remarkably stable during and after loan origination and hardship withdrawals. Relative to a control group of similar participants, loan takers' contribution rates fall by about 0.8 percentage points in the two years following loan issuance. Since loan repayments are generally collected through mandatory payroll deferrals, this result implies that participants experience large increases in their total deferral rate (contributions plus loan repayments) after loan issuance. Similarly, most participants continue making elective contributions after hardship withdrawals when they are not subject to mandatory contribution suspensions. For plan sponsors considering the introduction of penalty-free emergency withdrawals newly permitted under SECURE 2.0, our results suggest that most participants would be able to repay these withdrawals through an 'automatic repayment' feature while maintaining their previous elective contribution rate. Our findings, which are likely driven by participants' passive adherence to plan defaults, could also justify plan design changes aimed at increasing loan takers' long-run retirement saving. For example, upon successful loan repayment, plan sponsors could encourage or enact contribution rate increases that maintain a portion of the additional payroll deferrals that occurred during the repayment period.

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Introduction

401(k) plans serve not only as vehicles for long-term retirement saving but also as sources of short-term liquidity. In 2023, among plans for which Vanguard is the record-keeper, 10 percent of participants accessed their plan assets via either a loan or hardship withdrawal.[1] Similarly, Beshears et al. (2012) and Lu et al. (2017) find that over 40 percent of 401(k) participants take at least one loan over longer periods of five to seven years. Recent legislative changes under SECURE 2.0, including the emergency withdrawal provision allowing participants to take annual penalty-free distributions of up to $1,000, are likely to increase early withdrawals in coming years. As more participants use 401(k) assets to fund emergency spending needs, it is important to understand the tradeoffs between liquidity and long-run wealth accumulation. How can plan sponsors design 401(k) liquidity features to minimize leakage and maximize ongoing contributions, without placing undue financial stress on their participants?

Answering this question requires a joint analysis of distribution and contribution behavior, which prior empirical work in the 401(k) literature has not conducted.[2] Leveraging administrative data covering Vanguard's recordkeeping population, we study participants taking loans and hardship withdrawals and establish a new empirical fact: elective contributions are remarkably stable after liquidity-based distributions. Participants accessing their assets during employment usually do not elect to reduce their contribution rate, with about a quarter of loan and hardship withdrawal takers voluntarily decreasing their contributions in the two years following the distribution. Relative to a control group of observably similar participants who do not take a loan, loan takers' average contribution rates fall by only 0.8 percentage points over a two-year horizon. The stability of contributions holds across the income and loan size distributions, as well as for hardship withdrawal takers who are not subject to mandatory contribution suspensions.

Our results have implications for the implementation of the optional emergency withdrawal feature newly permitted under SECURE 2.0. Beginning in 2024, plan sponsors may allow participants to take penalty-free withdrawals of up to $1,000 per year for 'unforeseeable or immediate financial needs relating to necessary personal or family emergency expenses.'[3] The lack of a 10 percent tax penalty—along with the self-certification of financial need[4]—make the new emergency withdrawals a uniquely flexible liquidity option that could see high participant usage rates at adopting employers. This additional liquidity is valuable to participants facing pressing spending needs, but the potential for increased withdrawal activity raises the risk of costly retirement saving leakage.

Our empirical findings point toward practical steps that plan sponsors could take to minimize any unnecessary leakage arising from the new emergency withdrawals. The most effective intervention would be an 'automatic repayment' feature that encourages or defaults participants into repaying the withdrawal through payroll deferrals that are incremental to their elective contributions, essentially treating the withdrawal as if it were a loan. The stability of elective contributions after loan issuance suggests that emergency withdrawal takers would show a similar capacity to repay the withdrawal amount while maintaining their previous contribution rate.

We find that most participants could pay back a $1,000 withdrawal within a two-year period through a two-percentage-point increase in their contributions. Automatic repayment, which could be implemented with designated repayment transactions or with a small increase in the elective contribution rate, would nudge participants to replenish their retirement account in a timely manner and ensure that the withdrawn funds resume earning market returns. Maintaining

elective deferrals during the repayment period would prevent unnecessary saving reductions and ensure that participants do not miss out on valuable employer matching contributions.

Like other aspects of participant behavior, our results are likely driven by passive adherence to plan defaults. In the absence of automatic contribution suspensions (which are rarely used for loans and prohibited for hardship withdrawals from 2020 onward), the default path for contribution rates is to continue on their pre-distribution trajectory. In fact, about 40 percent of the loan and hardship withdrawal takers in our sample see their contribution rate automatically *escalated* during the two-year period following the distribution. Downward contribution adjustments require an active choice from participants, which in most cases is not forthcoming.

Because loan repayments are generally collected through mandatory payroll deferrals, the stability of elective contribution rates implies that loan takers experience large increases in their total deferral rate (contributions plus repayments) at the time of issuance. This fact, along with participants' tendency toward default adherence, presents intriguing possibilities for the design of the plan loan feature itself. For example, plan sponsors could encourage or default participants who successfully pay off loans into elective contribution increases that maintain a portion of the increased total deferral rate that occurred during the repayment period. Successful repayment histories effectively reveal participants' ability to support higher deferral rates, and given the substantial size of loan repayments (about 6 percent of income on average), policies that act on this information to raise ongoing contribution rates could achieve meaningful increases in retirement wealth accumulation. Successful repayment could provide particularly valuable information about savings capacity for less engaged participants whose pre-loan contribution rates were set by plan defaults rather than active choices.

The main limitation of our analysis is our lack of broader household financial data. Because we can only track participants' financial activity within the 401(k) plan, we cannot speak to adjustments that may be occurring in other parts of their household budget. In particular, it is possible that loan takers fund a portion of their increased payroll deferral burden by cutting back on essential spending needs, leaving bills unpaid, or taking on credit card debt. If these kinds of costly adjustments are occurring, the normative implications of the stable contribution activity we observe become less clear. The consistency of our main empirical results across the income and loan size distributions partially addresses this concern: if loan repayment caused household financial stress, we might expect to see at least some of that stress appear for the lower-income participants and smaller loans in our sample. The nature of our automatic repayment proposals—making contribution increases for loan and emergency withdrawal takers the default but not mandatory—also matters, as participants experiencing household financial stress would be free to opt out.

The rest of the paper is organized as follows. Section 2 describes our administrative 401(k) data and our event study approach to analyzing loan takers' contribution rates. Section 3 presents the main empirical results. Section 4 discusses the policy implications of our empirical results and Section 5 briefly concludes.

Data and Methodology

Vanguard administrative data

We use administrative 401(k) plan data from Vanguard. The database includes all information that Vanguard collects in the normal course of its recordkeeping responsibilities, including employee hire and separation dates, employee contribution rates, employee and

employer contribution transactions, loan issuances and repayments, and hardship withdrawals and other distributions.

Vanguard administers over 1,700 plans covering roughly 5 million participants. Because our primary empirical focus is on loan repayment, most of our analysis is restricted to a slightly smaller set of about 1,400 plans that offer loans. Since larger plans are more likely to offer loans, this subset contains over 90 percent of the participants in Vanguard plans.[5]

Sample timeframes

Analyzing recent cohorts of loan takers requires us to use data from the coronavirus pandemic period. To ensure that our findings are relevant outside of pandemic periods, we analyze not only a recent sample of loans issued in 2021, but also a pre-pandemic sample of loans issued in 2017.

We track the contribution behavior of loan takers for two years following loan issuance. As a result, the most recent set of loan takers permitted by our empirical methodology had loan issuances in December 2021. We form our first sample by extending the loan issuance timeframe back through the beginning of the calendar year and consider all participants with a loan issuance in 2021. Taking December 2019 as the last month of pre-pandemic contribution activity, we define our pre-pandemic sample as participants with a loan issuance in 2017.

As shown in Section 3, our empirical results are quite similar for the 2017 and 2021 samples; contribution crowd-out during loan repayment is in fact slightly smaller for the more recent 2021 sample. The similarity of our results across the two samples suggests that participants' ability to maintain elective deferrals while repaying loans is a durable empirical pattern.

Though contribution behavior during loan repayment is our primary focus, contribution behavior after hardship withdrawals (which tend to be smaller than loan amounts and used for

similar purposes as the new emergency withdrawals) is also informative. We supplement our analysis by studying the contribution activity of participants who took hardship withdrawals during the same 2017 and 2021 timeframes used to define our loan-issuance samples.

Summary statistics

Table 1 gives summary statistics for our samples of loan and hardship withdrawal takers in Vanguard plans. The median loan taker is just over 40 years old with a plan tenure of five years and annual income around $60,000. The average loan amount is about $10,000 in 2017 and about $12,000 in 2021; given the skewness of the loan size distribution, the corresponding median loan amounts are substantially smaller ($6,000 in 2017 and roughly $7,000 in 2021). Small loans approximating the size of the new emergency withdrawals are relatively rare but still common enough to study empirically: the 10th percentile of the loan size distribution in both samples is just over $1,000.

(*Table 1 here*)

Because hardship withdrawals are less common than plan loans, our hardship withdrawal samples are significantly smaller than our loan samples. Hardship withdrawals are also noticeably smaller in dollar terms: median withdrawal amounts are below $3,000 in both the 2017 and 2021 samples and roughly 25 percent of withdrawals are smaller than the new $1,000 emergency withdrawal limit. Finally, hardship withdrawal takers have slightly lower incomes than loan takers, with median values about $8,000 less than the corresponding figures for the loan samples.

Event study of loan takers

For each loan taker in our 2017 and 2021 samples, we analyze contribution behavior—the elected contribution rate[6]—for six months prior to and 24 months after loan issuance. We restrict the event study analysis to loan takers who were still employed at the same plan sponsor 24 months

after issuance (thereby eliminating cases where contribution rates drop to zero for separated employees). If a participant took multiple loans during either of our 2017 or 2021 sampling timeframes, we index event time relative to the participant's first such loan issuance.

Changes in loan takers' contribution rates over time may reflect a variety of factors: macroeconomic conditions, changes in participants' income, and plan-specific features such as annual automatic-escalation policies, among others. To focus on contribution rate changes that we can plausibly attribute to the effect of the loan issuance itself, we compare loan takers to a control group of participants who did not take loans during our specified timeframes, but who are similar in plan tenure, age, income, and initial contribution rate. Specifically, we match each loan taker to one control participant who:

- is in the same plan as the loan taker,
- is employed at the same plan sponsor 24 months after the relevant loan issuance,
- did not take any loans or hardship withdrawals in the six months before or during the month of the relevant loan issuance,
- has the same tenure (measured as whole years since plan entry) as the loan taker at the time of the relevant loan issuance,
- has an absolute age difference with the loan taker of five years or less,
- has an absolute income difference with the loan taker of 25 percent or less at the time of the relevant loan issuance,
- and has the same elected contribution rate as the loan taker six months before the relevant loan issuance.

If multiple potential control participants satisfy all of these criteria, we choose one randomly; if no suitable control participants exist, we exclude the relevant loan taker from our event study analysis.

Because we screen for loans and hardship withdrawals only in the six months before the relevant loan issuance, it is possible for a control participant to take a loan or hardship withdrawal after their matched loan taker's loan issuance (or outside of our 31-month timeframe altogether).

Appendix Table A.1 shows how our sample size is affected by each of the filtering steps we take in moving from our full 2017 and 2021 loan issuance samples to the subsamples that we analyze in our event study. Restricting to loan takers who are still employed 24 months after issuance drops about 20 percent of participants. A small minority of plan sponsors do not report participants' elected contribution rates (our main outcome variable) to Vanguard; dropping participants from these plans causes a small reduction in sample size. After successfully matching about 60 percent of the remaining loan takers to a suitable control participant, we are left with 137,698 loan takers in the 2017 sample and 114,752 in the 2021 sample. We restrict to this smaller matched sample only in analyses that compare loan takers' contribution rates to the control group.

Results

Finding 1: Contribution activity is remarkably stable during and after loan origination and hardship withdrawals.

Loan repayment patterns and voluntary contribution changes among our samples indicate that participants can maintain their previous contribution level even after taking liquidity-based distributions. Those who take loans or hardship withdrawals rarely elect to reduce their contribution rate after the distribution. Moreover, the vast majority of 401(k) loan takers who remain employed long enough to repay their loans through payroll deferrals do so successfully.

We first compute default rates for the 401(k) loans in our sample.[7] Because loan repayment periods can stretch up to five years, it is important to note that we only capture defaults occurring

within our two-year post-issuance period. The default rate is 4 percent among participants who are still employed at the lending plan's sponsor two years after issuance; among participants who separate within this two-year period, the default rate is 71 percent. Since employers can generally require that the full amount of outstanding loan balances be repaid at the time of separation, the disparity in default rates between the two groups is intuitive and reflects similar findings from prior research using Vanguard recordkeeping data (Lu et al., 2017). In the case of the new emergency withdrawals under SECURE 2.0, the optional nature of repayment means there would be no requirement from the plan sponsor (or tax-penalty incentive for the participant) to accelerate repayment at the time of separation. The share of participants in the 2017 sample defaulting during employment is slightly higher, at 10 percent.

Changes in elective contribution rates after loan issuance give additional information about participants' repayment capacity. In particular, voluntary decreases in contribution rates could indicate that loan repayment stresses participants' finances or otherwise interferes with their ability to save for retirement. Figure 1 demonstrates that voluntary decreases are not typical, as only 26 percent of loan takers and 24 percent of hardship withdrawal takers in the 2021 sample voluntarily decrease their contribution rate at any point in the two years following after issuance. The share of participants who voluntarily *increase* their contribution at any point during the two-year post-issuance period is essentially the same, with 26 percent of loan takers and 24 percent of hardship withdrawal takers doing so. The most common type of contribution rate change (affecting 38 percent of loan takers and 41 percent of hardship withdrawal takers) is automatic escalation, a common feature of automatic-enrollment plans that usually raises participant contribution rates by one or two percentage points on an annual basis.[8]

(*Figure 1 here*)

Appendix Figures A.1 and A.2 summarize contribution rate changes during our two-year post-issuance period for both the 2017 and 2021 samples. Voluntary changes are similar across the two samples; the most important difference is the share of hardship withdrawal takers whose contributions are suspended in 2017 versus 2021. Suspensions are distinct from voluntary decreases and occur when a participant's contribution rate is automatically set to zero by the plan sponsor. Prevailing IRS rules in 2017 required many plan sponsors to suspend employee contributions for the six months following a hardship withdrawal; as a result, the suspension rate in our 2017 sample is 80 percent. This requirement was eliminated in 2019 and the suspension rate in our 2021 sample drops to near zero. There is only a slight rise in voluntary decreases among the 2021 sample (in which 24 percent of participants have a voluntary decrease, versus 21 percent in the 2017 sample), suggesting that the pre-2019 rules did not mostly suspend participants who otherwise would have chosen to lower their contribution rate. Participants thus appear willing and able to continue their normal contribution activity even after hardship withdrawals that often occur during periods of significant household financial stress.

Finding 2: 401(k) loan takers are able to sustain their retirement saving during repayment, regardless of loan size.

Loan takers' contribution rates (beyond the amount of their loan repayments) decrease by only a small amount relative to the control group, indicating that most participants can maintain their elective contribution activity even while repaying loans. Contribution rates are similarly stable for hardship withdrawal takers when they are not subject to mandatory contribution suspensions.

Figure 2 illustrates our central finding: elective contribution rates are remarkably stable around and after loan issuance. Focusing on loans for $1,000 or less in the 2021 sample, we show

average contribution rates and loan repayment amounts as a percent of monthly income over the course of our 31-month timeframe. Repayment amounts rise from zero in the month of loan issuance to a peak of about 2.5 percent of income, then gradually decrease as participants with the shortest repayment schedules begin to pay off their balances. Elective contribution rates show little change during the repayment period. After increasing gradually during the pre-issuance period, the contribution rate peaks during the month of issuance, decreases slightly, then stabilizes. Two years after loan issuance, the contribution rate is roughly the same as its level a few months before issuance.

(*Figure 2 here*)

Figure 3 expands our analysis of post-issuance contribution behavior by considering all loans in the 2021 sample and comparing loan takers' elective contribution rates to those of their matched control participants. Because it makes a comparison to the control group, Figure 3 (along with Figure 4) restricts to the subset of loan takers who were successfully matched to a control participant. Once again, our main empirical finding is evident: loan takers' contribution rates decrease by a small amount relative to the control group. In the six months before issuance, loan takers and control participants follow the same upward trajectory (the result of annual automatic escalation policies and voluntary increases that generally cause contribution rates to trend upward over time). At the time of loan issuance, loan takers' contribution rates show a slight decrease, then flatten out and eventually stabilize just above their initial month -6 level. Control participants maintain their gradual contribution growth through the entire 31-month timeframe. The net result at the end of the two-year post-issuance period is that loan takers' contribution rates have fallen by about 0.8 percentage points relative to the control group. As mean contribution rates begin at

roughly 8 percentage points, this represents a proportional decrease of about 10 percent, but the decline is relatively small compared to the contemporaneous loan repayment amounts.

(*Figure 3 here*)

Figure 4 displays contribution crowd-out separately for four categories of loan size and shows that the stability of loan takers' elective contributions is consistent across the loan size distribution. Contribution crowd-out evolves similarly for all four groups and is modestly increasing in loan size: at 24 months, participants taking loans for $1,000 or less have fallen 0.5 percentage points behind the control group and those taking loans for $10,000 or more have fallen 1.0 percentage point behind. Since the loans in our sample most similar to the new emergency withdrawals are those for $1,000 or less, Figure 4 suggests that our main empirical finding of limited crowd-out is just as relevant for likely emergency withdrawal takers as it is for the full participant population. Appendix Figure A.3 splits the sample by participant income and similarly shows that contribution crowd-out is smaller for those with lower incomes.

(*Figure 4 here*)

We show additional contribution and repayment results in the appendix. Figure A.4 shows that our main crowd-out results are similar for the 2017 pre-pandemic sample. Figure A.5 converts the loan taker-control comparison from Figure 3 into regression form and demonstrates that the crowd-out estimates are precise (the standard error of the loan taker effect is about 2 basis points). Figure A.6 shows that contribution crowd-out is generally larger (though still around 1 percentage point at 24 months) among loan takers whose initial month -6 contribution rate is strictly higher than their employer's matching contribution cap. Since participants above the cap do not lose employer matching contributions when making marginal decreases in their contribution rate, they may have less of an incentive to maintain their elective contributions and the slightly larger crowd-

out they display is intuitive. This relationship holds for larger loans, but among the loans for $1,000 or less that are most comparable to the new emergency withdrawals, participants' placement relative to their employer's match cap does not appear to be a good predictor of contribution crowd-out.

Figure A.7 focuses on the extensive margin (i.e., the share of participants who make any voluntary decrease in their contribution rate). Two years after issuance, the share of loan takers with at least one voluntary decrease is 12 percentage points higher than it is among control participants, indicating that only about half of the voluntary decreases documented in Figure 1 are incremental to the control group. Figure A.8 has the same structure as Figure 3 but shows participants' total deferral rate (elective contributions plus loan repayments). The stability of loan takers' elective contributions as loan repayment begins causes their mean total deferral rate to rise by about 4 percentage points at the time of loan issuance and remain 3 percentage points above the control group after 24 months.

Finding 3: Hardship withdrawal takers maintain their retirement saving and benefit from employer matches when their elective contributions are not suspended.

Next we exploit a recent a policy change concerning hardship withdrawals to better understand the sensitivity of contribution behavior to plan defaults. In 2017, IRS rules required many plan sponsors to suspend employee contributions for the six months following a hardship withdrawal. This requirement was eliminated in 2019. Accordingly, 80 percent of participants who took a hardship withdrawal in the 2017 sample were subject to a mandatory six-month contribution suspension following the withdrawal, compared to nearly 0 percent in the 2021 sample.

Figure 5 shows how contribution rates evolve for participants in our 2017 and 2021 hardship withdrawal samples. The effect of the policy change is clearly visible. Mean employee

contribution rates in the 2017 sample fall by 3.7 percentage points immediately after the withdrawal, then increase at the six-month mark and eventually regain their pre-withdrawal level.

Figure 5 illustrates a crucial additional cost that arises from interruptions in employee contributions: foregone employer matching contributions. For participants in the 2017 sample, the total decrease in retirement saving during the six months following the withdrawal is 6.7 percentage points after accounting for a drop in employer contributions of 3 percentage points.[9]

(*Figure 5 here*)

By contrast, in the 2021 sample which is not subject to mandatory suspensions, employee contribution rates are comparatively stable, decreasing slightly over the 18 months following the withdrawal before flattening out and remaining just below their month -6 level. The 2021 contribution path constitutes additional evidence that participants can maintain elective contributions after taking liquidity-based distributions, when plan rules allow them to do so.

Finding 4: Most participants could pay back a $1,000 withdrawal over the course of two years through a two-percentage-point increase in their contributions.

In light of the SECURE 2.0 provision allowing emergency withdrawals of up to $1,000, we conclude by empirically grounding potential automatic repayment timeframes. Loans for $1,000 or less, which approximate the size of the new SECURE 2.0 emergency withdrawals and may be more likely to arise from short-term liquidity needs, are typically repaid within one to two years.

Observed repayment periods for 401(k) loans, which are often chosen by the loan takers themselves, are useful guides to participants' repayment capacity. IRS rules generally require that loans be repaid within five years. As Figure 6 demonstrates, most of the smaller loans in our sample are repaid well in advance of the five-year limit. For loans of $1,000 or less, 50 percent are fully

repaid within 12 months, 65 percent within 18 months, and 74 percent within 24 months. Among loans between $1,000 and $5,000, 42 percent are repaid within 18 months and 55 percent within 24 months. Most participants taking small and modest-sized loans thus appear willing and able to repay over timelines of one to two years.

(*Figure 6 here*)

The preceding contribution and repayment results suggest that most emergency withdrawal takers would be able to repay the withdrawal while maintaining their previous elective contribution rate. Given that most loans for $1,000 or less are repaid within one to two years, 18 months is a natural time period for emergency withdrawal repayment. One way to administer repayment would be to treat the emergency withdrawal in the same way that recordkeepers currently treat loans: specify a repayment length (e.g., 18 months), calculate the exact amount that must be deferred from each paycheck to repay over the specified timeline, and deduct that amount from future paychecks in addition to the participant's elective contributions. Another option, which might be easier for some recordkeepers to implement, is to increase participants' elective contribution rates by a small amount at the time of the withdrawal.[10] An integer increase in the elective contribution rate (i.e., one or two percentage points) would yield similar repayment profiles as an exact repayment schedule but would not require recordkeepers or participants to calculate the precise payroll deferral amount necessary to repay within a given timeframe.[11]

Figure 6 additionally shows how an integer contribution rate increase would operate given the distribution of incomes in our 2021 loan taker sample. We limit to the income distribution among participants taking loans for $1,000 or less, since this group tends to have smaller incomes and may be a better representation of future emergency withdrawal takers than the full loan taker sample. A two-percentage-point increase appears to be a useful reference point, as it would ensure

that 63 percent of participants repay a $1,000 withdrawal within 18 months and that 82 percent repay within 24 months. A one-percentage-point increase accomplishes only an 11 percent repayment rate at 18 months and may therefore be more appropriate for participants with above-average incomes.

Discussion

We study 401(k) participants taking loans and hardship withdrawals because their contribution behavior provides policy-relevant insights for plan sponsors and recordkeepers. Elective contributions are remarkably stable around and following loans and hardship withdrawals, indicating that participants can maintain their normal retirement saving activity after tapping their 401(k) assets for liquidity purposes. In the case of loans -- where elective contributions occur on top of mandatory repayments -- stable contribution rates imply sharp increases in total deferral rates at the time of loan issuance. Even so, the vast majority of loan takers who remain employed long enough to repay the loan through regular payroll deferrals successfully do so.

For plan sponsors considering the introduction of penalty-free emergency withdrawals under SECURE 2.0, our findings suggest that most participants would be able to repay these withdrawals while maintaining their previous elective contribution rate. Given that most of the smaller loans in our sample are repaid within one to two years, we view repayment over 18 months as a natural starting point for an emergency withdrawal repayment schedule. A two-percentage-point increase in the elective contribution rate, which may be easier for recordkeepers to implement than an exact repayment schedule, would ensure that most participants repay a $1,000 withdrawal within 18 months. Faster repayment schedules ensure that withdrawn funds begin earning market

returns sooner, but circumstances for individual participants may warrant different repayment timelines.

Important technical considerations would accompany the implementation of an automatic repayment feature. First, as noted above, repayment could occur through explicit repayment transactions with an exact amortization schedule or via an increase in the elective contribution rate. These two repayment methods have similar tax consequences for most participants,[12] and both methods reestablish participants' eligibility for future emergency withdrawals.[13] Because the two methods are largely equivalent from participants' perspective, plan sponsors can implement repayment policies using whichever method they find easiest to adopt within their administrative and recordkeeping systems.

The major potential difference between the two repayment methods is that the employer match structure applied to explicitly designated repayments might differ from the match structure applied to elective contributions.[14] However, we recommend that plan sponsors apply a single employer match structure to the sum of explicitly designated repayments and elective contributions. Since the two methods are largely equivalent from participants' perspective, offering an employer match for one type of deferral but not the other would create an essentially dominated alternative and allow participants to make costly financial mistakes. Implementing repayment through incremental elective contributions (which always earn employer matches) would have the benefit of ensuring that participants are not presented with dominated choices.

The presence of employer matching contributions gives rise to another technical consideration for plan sponsors contemplating the introduction of emergency withdrawals: the risk of strategic gaming behavior among participants. If repayments are match-eligible, then participants without true liquidity needs could withdraw and quickly repay funds, earning

additional employer matches without making net contributions to the plan (and without incurring any taxes or penalties). Making explicit repayments match-ineligible would not prevent all such gaming behavior, as participants can also repay with match-eligible elective contributions. Plan sponsors can determine individually whether the risk of undesirable gaming behavior outweighs the liquidity value their participants would derive from the new emergency withdrawals.[15]

Finally, for the substantial number of participants who take new loans each year, our empirical results can justify policy interventions aimed at increasing long-run retirement wealth accumulation. Plan sponsors generally have limited financial information about their participants: age and individual income are usually known, but household-level income, spending needs, total assets, and debt are almost always unknown. As a result, identifying the optimal contribution rate for any given participant is exceedingly difficult, and the default contribution rates embedded in automatic-enrollment plans must be appropriate for wide ranges of participants. Loan repayment provides a unique opportunity to bypass this missing-information problem and directly observe whether participants are capable of increasing their deferral rate for sustained periods of time. Participants who successfully repay loans without decreasing their elective contributions show that they have this capability. By actively encouraging or defaulting these participants into elective contribution increases that make permanent a portion of the additional repayment deferrals, plan sponsors can nudge them toward higher savings rates that are demonstrably within their reach. Even a policy that maintained half of the average loan repayment amount in our sample (6 percent of income) would make a meaningful difference in retirement readiness.

Conclusion

Using administrative data from Vanguard 401(k) plans, we show that participant contribution behavior is remarkably stable around and following loans and hardship withdrawals. The stability of contribution rates likely arises from participants' passive adherence to plan defaults and invites interventions from plan sponsors aimed at increasing long-run retirement saving. Among such interventions, we consider policies that automate the repayment of new penalty-free emergency withdrawals and that raise contribution rates after successful loan repayment.

References

Beshears, J., J. Choi, D. Laibson, and B. Madrian (2012). 'The Availability and Utilization of 401(k) Loans.' In D. A. Wise, ed., *Investigations in the Economics of Aging*, University of Chicago Press, pp. 145–178.

Lu, T., O. S. Mitchell, S. P. Utkus, and J. A. Young (2017). 'Borrowing from the Future? 401(k) Plan Loans and Loan Defaults.' *National Tax Journal*, 70(1): 77–109.

Mitchell, O. S., S. P. Utkus, and S. Yang (2007). 'Turning Workers into Savers? Incentives, Liquidity, and Choice in 401(k) Plan Design.' *National Tax Journal*, 60(3): 469–489.

Wenger, J. B. and C. E. Weller (2014): 'Boon or Bane: 401(k) Loans and Employee Contributions.' *Research on Aging*, 36(5): 527–556.

Endnotes

[1] This calculation restricts to plans offering loans and is based on the Vanguard 401(k) administrative data described in Section 2.

[2] Wenger and Weller (2014) and Mitchell et al. (2007) are notable because they study whether the availability of plan loans increases participation and saving rates in 401(k) plans, but they do not analyze changes in contribution behavior after loan issuance.

[3] Consolidated Appropriations Act of 2023, H.R. 2617, Section 115. In addition to emergency withdrawals, SECURE 2.0 also permitted employers to establish Pension Linked Emergency Savings Accounts (PLESAs) that enable employees to save for short-term needs through Roth payroll deferrals. We focus our policy discussion on the penalty-free emergency withdrawal

feature because it is easier to implement than PLESAs and thus more likely to be taken up by employers in the near term.

[4] As with the coronavirus-related hardship withdrawals introduced in the CARES Act, employers may rely on participants' self-certification that they are experiencing the 'unforeseeable or immediate financial need' that qualifies them for an emergency withdrawal.

[5] For more detailed statistics about the size and composition of Vanguard's recordkeeping population, see *How America Saves 2023*, pp. 5-7, 97-100.

[6] Set either by default values in automatic-enrollment plans or by participants' active choices, the elected contribution rate is the percentage that is multiplied by participants' earnings to determine the 401(k) contribution amounts deferred from each paycheck. Contribution rates can generally be set only in integer percentage increments (1 percent, 2 percent, 3 percent, etc.). To aggregate elected contribution rates to the monthly level, we take day-weighted averages (e.g., if a participant's contribution rate changes from 2 percent to 3 percent on the 15th day of the month, the corresponding monthly contribution rate is 2.5 percent). We sum deferral rates across all contribution types available to the participant (e.g., if a participant contributes 3 percent on a pre-tax basis and 3 percent on a Roth basis, we compute the elected contribution rate as 6 percent). To restrict focus to the payroll deferral burden borne by participants themselves, we consider only employee contributions and exclude all employer contributions.

[7] 401(k) loan default occurs when the participant fails to make the required repayments on time. This can occur during employment if the participant informs the employer that they no longer wish to have repayments deducted from their paycheck (or if repayments were collected through other means, like checks or electronic transfers, and the participant unilaterally ceases those transactions). Employers may also require that the full amount of any outstanding loan balances

be repaid at the time of separation, and defaults can occur when separating participants are unable or unwilling to meet this accelerated repayment requirement. The outstanding balance at the time of default is treated as an early distribution, on which the participant must pay income taxes and a 10 percent penalty.

[8] Contribution suspensions tied to loan issuance are rare in our sample; most of the suspensions in Figure 2 occur because the participant took a hardship withdrawal after loan issuance.

[9] Employer contributions need not decrease by the same amount as employee contributions in Figure 6. This is because: i) match schedules can award employer contributions in ratios other than 1:1 (e.g., 0.5:1 or 2:1), ii) participants who are already receiving the maximum employer match do not lose employer contributions until their contribution rate falls below the maximum-match threshold, and iii) some employer contributions are non-matching contributions that do not depend on the employee's contribution activity.

[10] This increase in the elective contribution rate could be temporary (lasting for 18 months or some other timeframe) or permanent. A temporary increase would ensure that the original withdrawal is repaid (or approximately repaid) within a specified timeframe. A permanent increase could be used to encourage a sustained savings increase among participants who may be likely to take additional liquidity-based distributions in the future (since emergency withdrawals can be taken once per year, and current withdrawal activity may predict future withdrawal activity).

[11] Explicit repayment transactions and incremental elective contributions would have similar tax and eligibility consequences for most participants; see the discussion in Section 4.

[12] Explicit repayments offset the taxable income generated by the original withdrawal. Incremental elective contributions do not erase the withdrawal's income tax liability, but if they are made on a pre-tax basis then they reduce the participant's taxable income by the same amount and thus would

have a similar effect on the participant's ultimate tax bill. One minor difference between the two methods could arise from repayment timing: if an explicit repayment is made in a different tax year than the original withdrawal, the participant may have to amend the prior tax return rather than reducing taxable income in the current tax year. If the participant's marginal tax rate differs between the two tax years, this could cause the tax consequences of an explicit repayment and elective contribution to differ.

[13] In fact, participants are eligible for their next emergency withdrawal if the total amount of elective contributions they have made since the prior withdrawal is at least as large as the prior withdrawal. In other words, participants do not need to make incremental contributions to reestablish eligibility: as long as their initial contribution rate is sufficiently high, they will restore eligibility simply by maintaining their prior contribution activity. For example, participants who take a $1,000 emergency withdrawal and have a 4 percent contribution rate will reestablish eligibility within a year as long as their annual salary is at least $25,000. This means that most participants will reestablish eligibility in the normal course of their contribution activity, and thus makes eligibility considerations relatively unimportant from a plan-design perspective.

[14] Another difference between the two methods is that elective contributions are constrained by the 402(g) limits on annual employee contributions, whereas explicit repayments are not. Because we expect emergency withdrawal usage to be relatively uncommon among participants contributing at the 402(g) limit, this distinction is unlikely to matter in practice.

[15] One important factor to consider when making this determination is the share of participants who are currently contributing at or above the employer match cap (since these participants do not earn matches on marginal contributions and thus would not have gaming incentives).

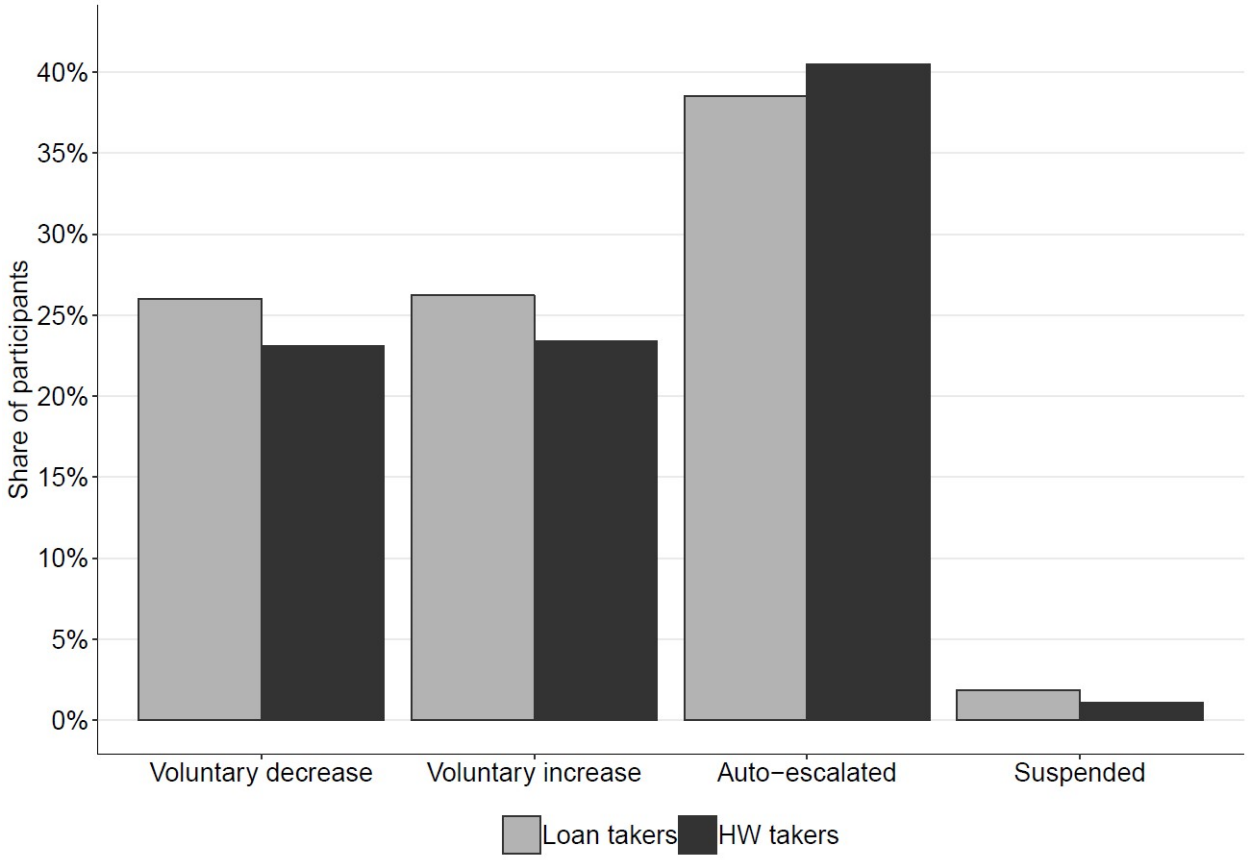

Figure 1. Voluntary contribution decreases following loan issuances and hardship withdrawals are not typical

Note: This plot summarizes contribution rate changes during the two-year period following loan or hardship withdrawal issuance. Voluntary decreases (made at the participant's request) and suspensions (automatic changes that force the contribution rate to zero and are implemented by the plan sponsor) are distinct events. The bars for a given sample may sum to more than 100% because a single participant may exhibit multiple types of contribution rate changes. Results are shown for the 2021 samples of loan and hardship withdrawal takers.

Source: Authors' calculations.

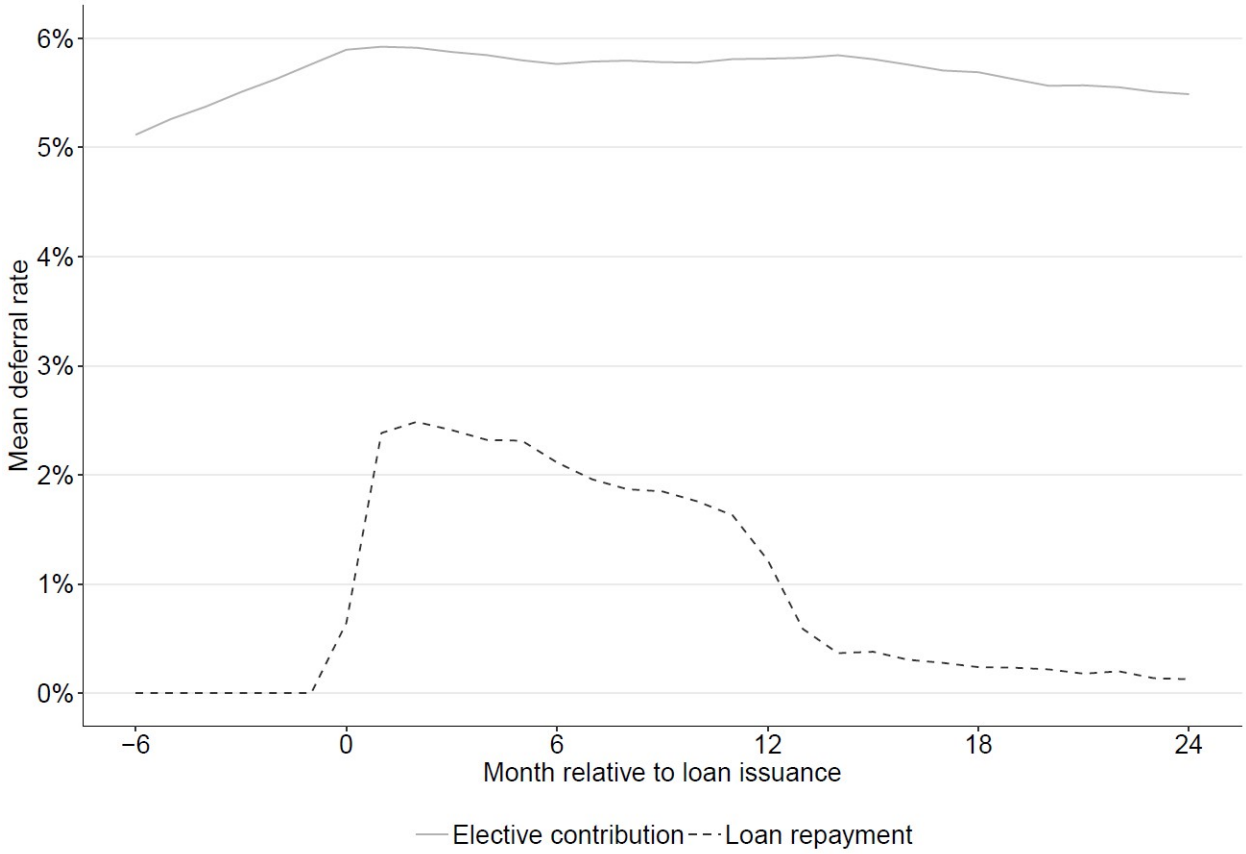

Figure 2. Elective contribution rates are stable during repayment of small loans

Note: We estimate loan repayment rates in the following way. First, we estimate participants' monthly income as (average monthly employee contributions between month -6 and month -1) / (average elective contribution rate between month -6 and month -1). We then divide monthly loan repayment amounts by the monthly income estimate. Loan repayment rates reflect only the loan issued in month 0. Results are shown for participants in the 2021 sample with loan issuances of $1,000 or less.

Source: Authors' calculations.

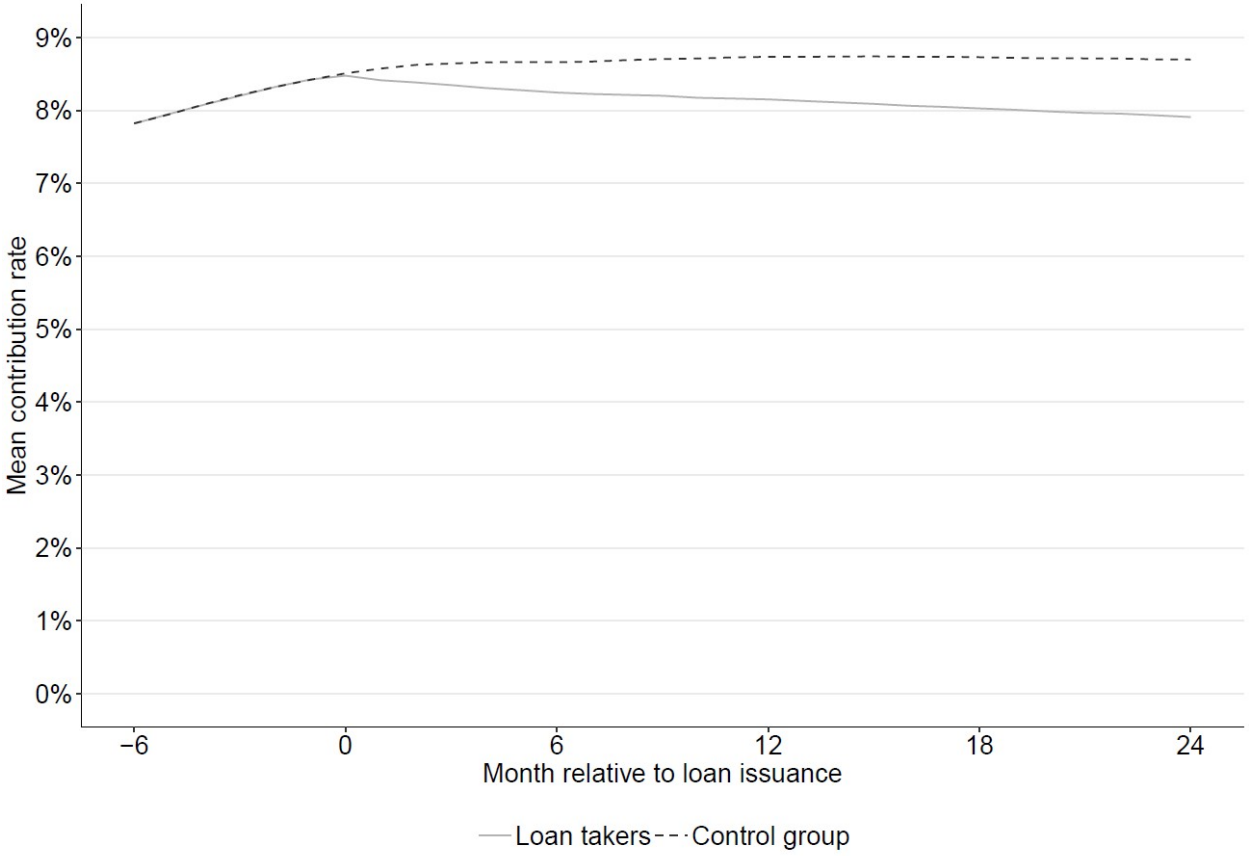

Figure 3. Loan takers show little crowd-out of elective contributions relative to the control group

Note: The control group is selected using the criteria discussed in Section 2. Results are shown for the 2021 sample of loan takers.

Source: Authors' calculations.

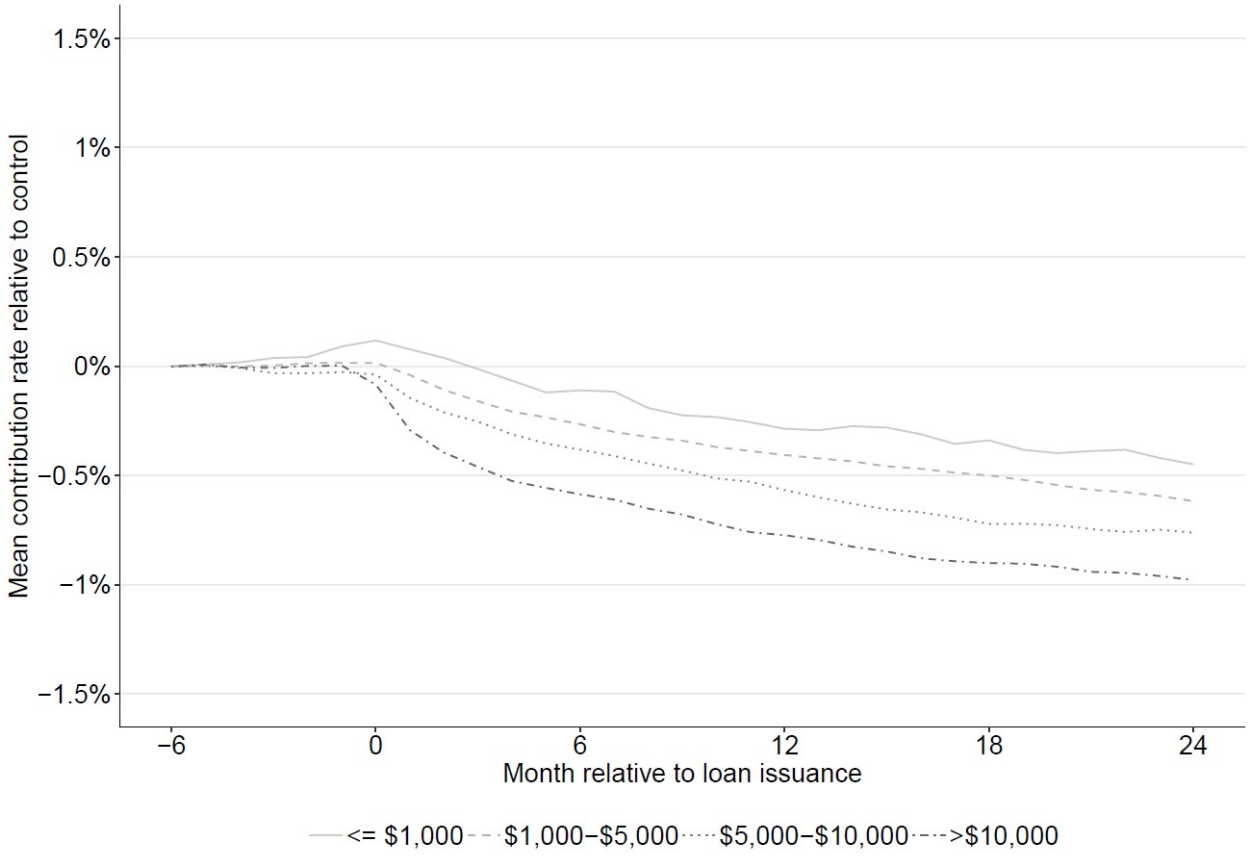

Figure 4. Loan takers' contribution crowd-out is consistently small across the loan size distribution

Note: This plot shows elective contribution rates for loan takers minus the elective contribution rate for their matched control participant. The results are disaggregated by the principal value of the loan issuance. Results are shown for the 2021 sample of loan takers.

Source: Authors' calculations.

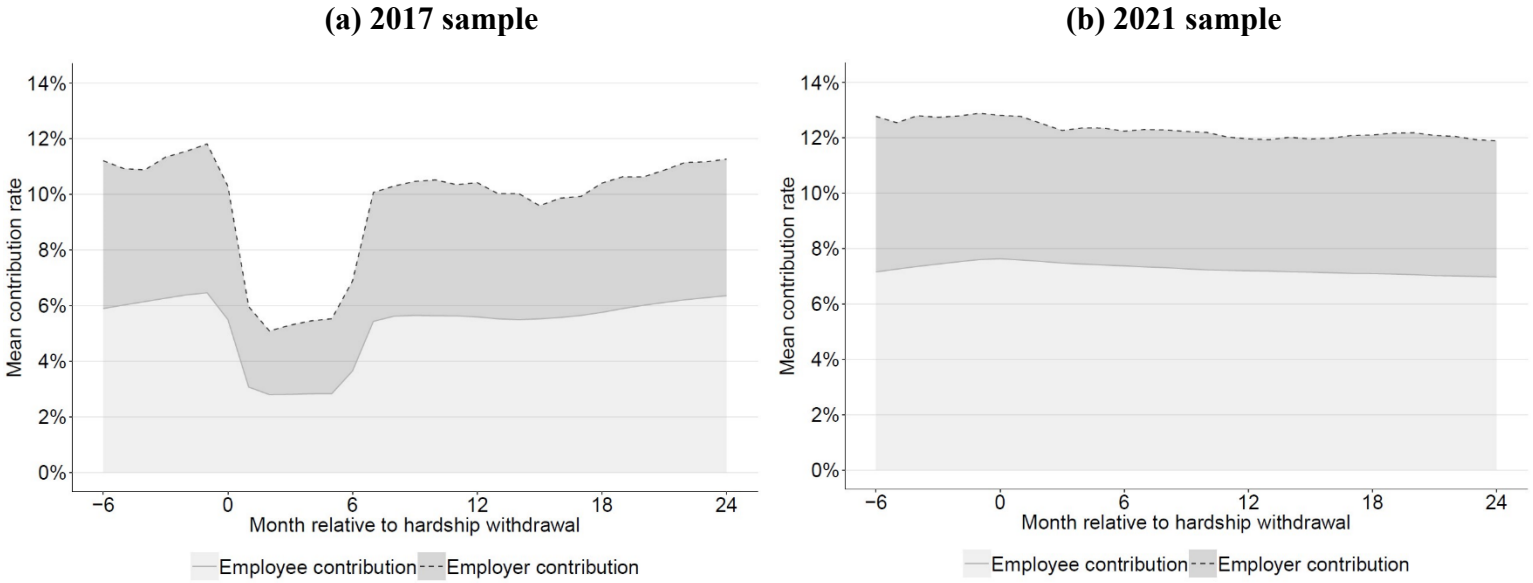

Figure 5. Hardship withdrawal takers have stable contribution rates when they are not subject to mandatory suspensions

Note: The employee contribution series in these plots reflect participants' elective contribution rates. The employer contribution series are computed in the following way. First, we estimate participants' monthly income as (average monthly employee contributions between month -6 and month -1) / (average elective contribution rate between month -6 and month -1). We then divide monthly employer contribution amounts by the monthly income estimate. Because the employer contribution series are derived from an income estimate and reflect monthly transaction totals (which can vary with the number of paychecks in a month, the timing of quarterly or annual employer contributions, and other factors), they are more volatile than the employee contribution series. An IRS rule requiring six-month contribution suspensions for many hardship withdrawal takers applied to the 2017 sample but not the 2021 sample.

Source: Authors' calculations.

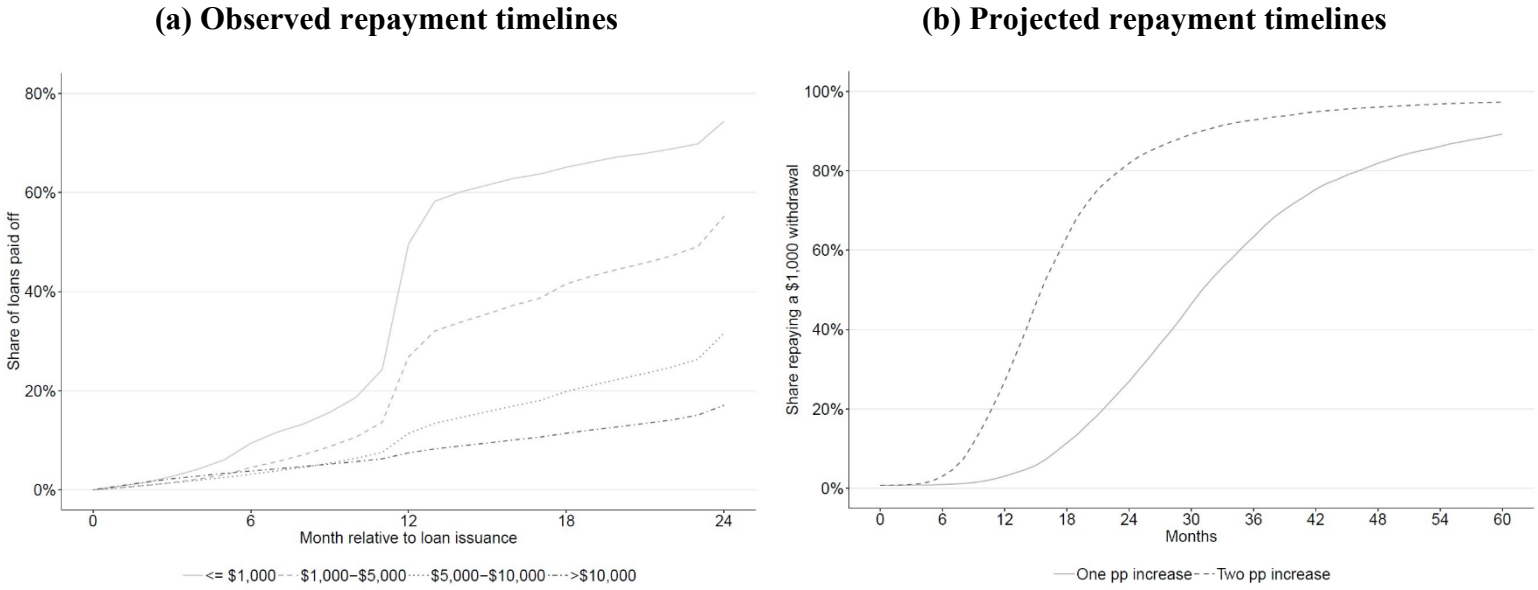

Figure 6. Most loans for $1,000 or less are repaid within one to two years; similar repayment schedules could be implemented for emergency withdrawals with a two-percentage-point contribution rate increase

Note: Observed repayment timelines in panel (a) are disaggregated by the principal value of the loan issuance and are restricted to loan takers in the 2021 sample who were employed at the same plan sponsor 24 months after loan issuance. In panel (b), the projected repayment timeline for a given participant is computed as (1,000)/(X * monthly income), where X is either 1% or 2%. We estimate participants' monthly income as (average monthly employee contributions in the six months before loan issuance) / (average elective contribution rate in the six months before loan issuance). Projected repayment timelines are shown for the income distribution among participants in the 2021 sample with loan issuances of $1,000 or less (approximating the size of the new penalty-free emergency withdrawals, which are capped at $1,000).

Source: Authors' calculations.

Table 1: Summary statistics for loan and hardship withdrawal samples

	Loan issuances		Hardship withdrawals	
	2017	2021	2017	2021
Median age	43	42	42	41
Median plan tenure	5	5	6	5
Estimated income ($)				
Mean	65,669	72,050	52,748	59,999
Percentiles				
10th	23,159	26,320	15,736	22,120
25th	35,870	40,229	28,699	34,992
Median	54,028	59,689	44,865	51,257
75th	80,158	87,098	65,789	73,457
90th	114,840	125,769	93,204	103,593
Loan/HW amount ($)				
Mean	10,385	11,923	6,235	8,206
Percentiles				
10th	1,200	1,419	604	665
25th	2,480	2,988	1,151	1,296
Median	6,000	7,021	2,525	2,985
75th	15,000	17,000	5,965	7,000
90th	26,035	30,000	13,475	17,627
Number of participants	334,406	253,300	56,405	72,118

Note: If multiple loans were issued for a given participant during one of the sample years, only the first loan issuance for that sample year is considered. Similarly, if a participant took multiple hardship withdrawals during one of the sample years, only the first withdrawal for that sample year is considered. Annual participant income is estimated as (average monthly employee contributions in the six months before loan or hardship withdrawal) / (average elective contribution rate in the six months before loan or hardship withdrawal) * 12.

Source: Authors' calculations.

Online appendix

Table A.1: Filtering steps and final sample sizes for event study

Filtering step	2017	2021
Loan issuances	366,711	276,162
Unique participants (use first issuance if multiple)	334,406	253,300
Employed 24 months after issuance	269,219	195,331
In a plan that reports elected contribution rates	249,788	188,686
Matched to control participant	137,698	114,752

Source: Authors' calculations.

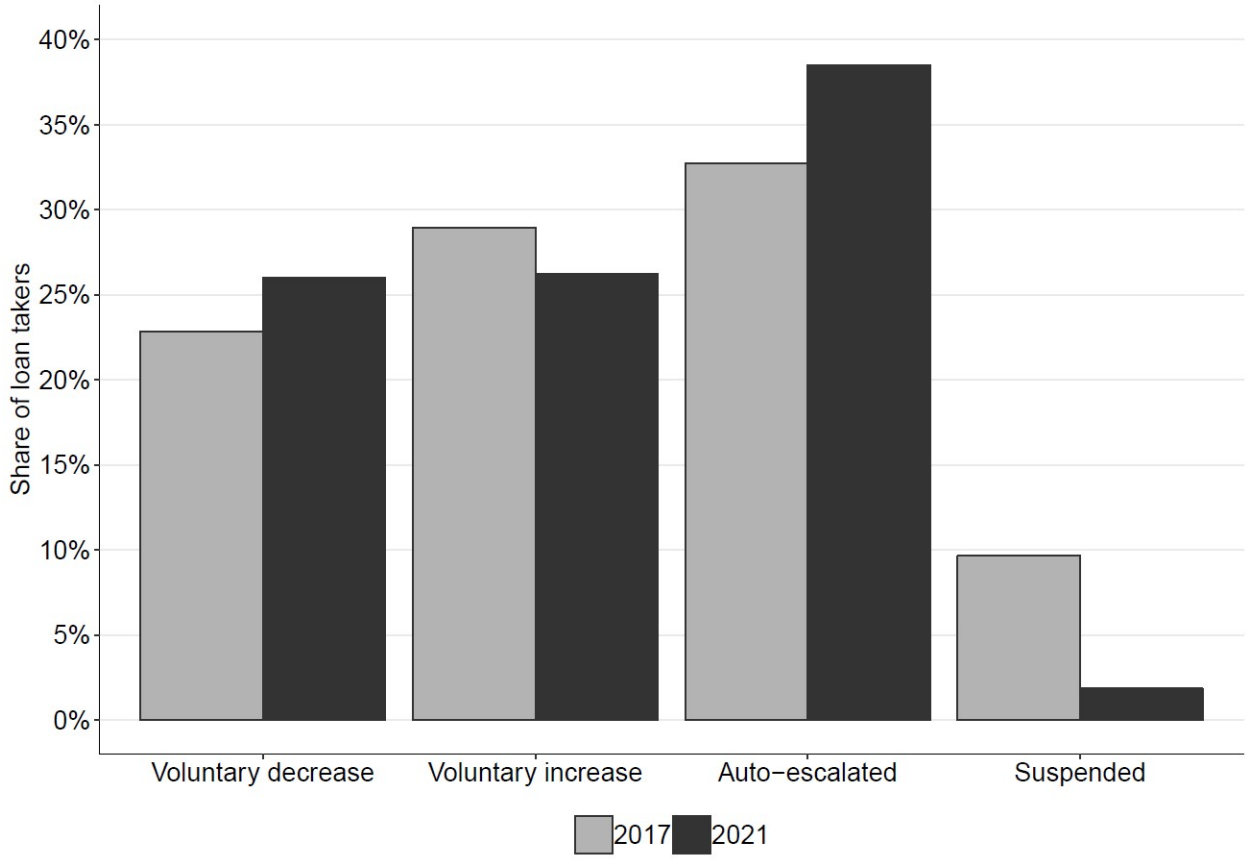

Figure A.1. Contribution changes following loan issuances are similar for the 2017 and 2021 samples

Note: This plot summarizes contribution rate changes during the two-year period following loan issuance. Voluntary decreases (made at the participant's request) and suspensions (automatic changes that force the contribution rate to zero and are implemented by the plan sponsor) are distinct events. The bars for a given sample year may sum to more than 100% because a single participant may exhibit multiple types of contribution rate changes.

Source: Authors' calculations.

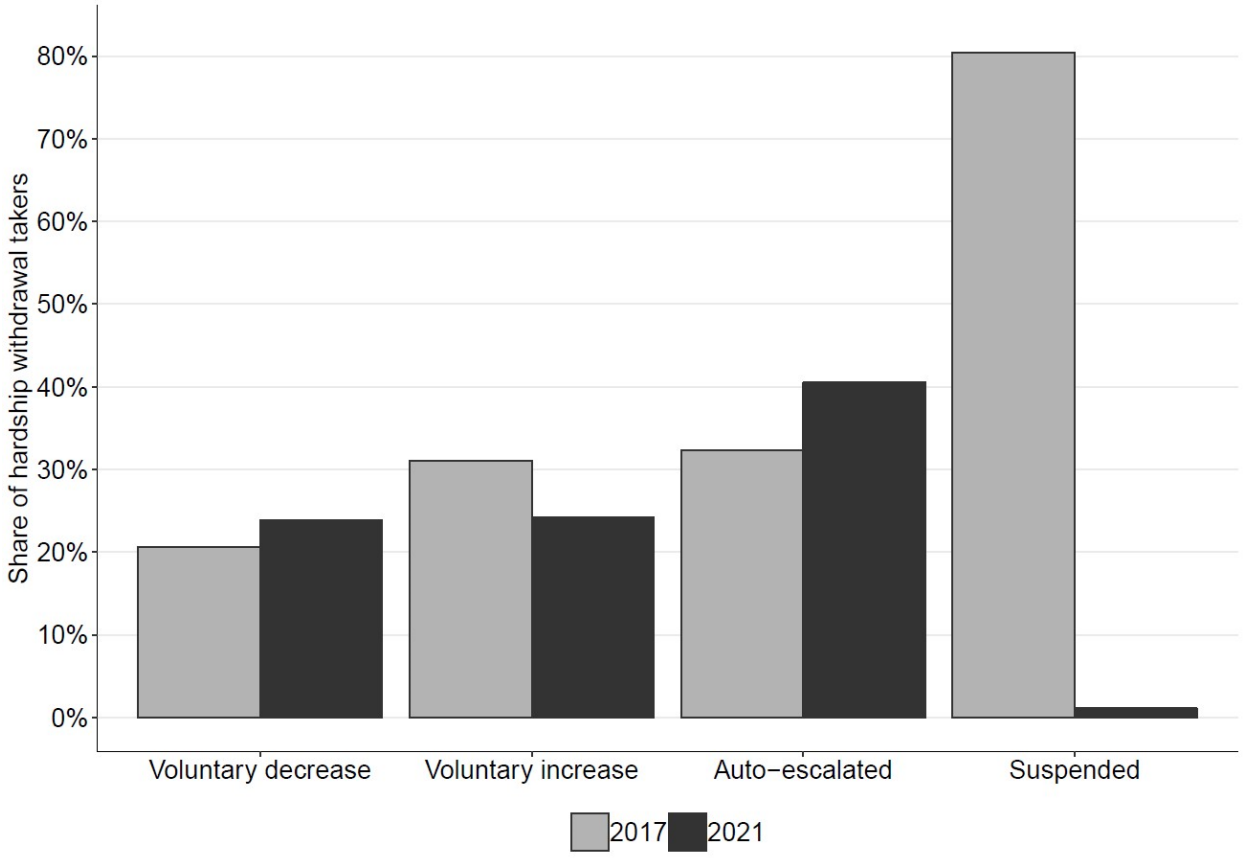

Figure A.2. Contribution suspensions following hardship withdrawals were eliminated in the 2021 sample

Note: This plot summarizes contribution rate changes during the two-year period following hardship withdrawal issuance. Voluntary decreases (made at the participant's request) and suspensions (automatic changes that force the contribution rate to zero and are implemented by the plan sponsor) are distinct events. The bars for a given sample year may sum to more than 100% because a single participant may exhibit multiple types of contribution rate changes. An IRS rule requiring six-month contribution suspensions for many hardship withdrawal takers applied to the 2017 sample but not the 2021 sample.

Source: Authors' calculations.

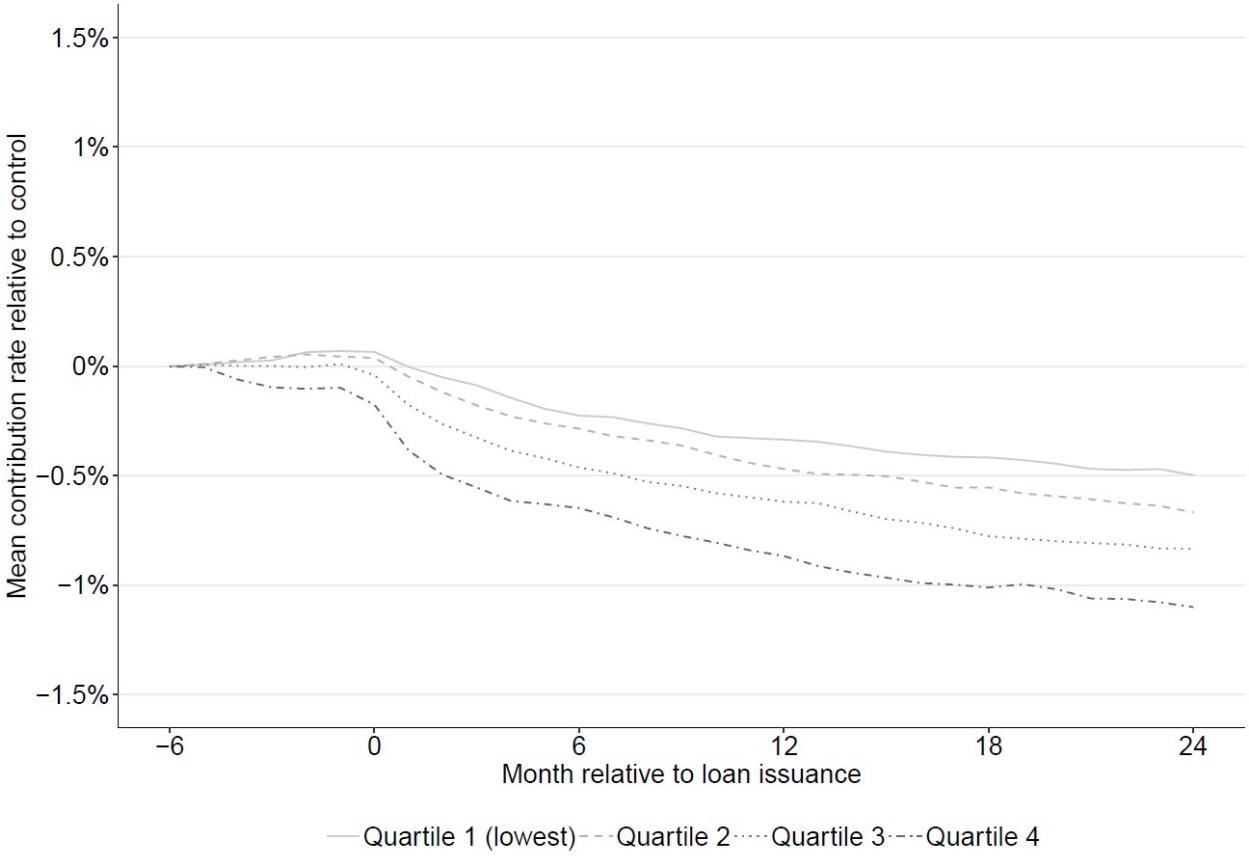

Figure A.3. Loan takers' contribution crowd-out is consistently small across the income distribution

Note: This plot shows elective contribution rates for loan takers minus the elective contribution rate for their matched control participant. The results are disaggregated by estimated loan taker income. We estimate participants' monthly income as (average monthly employee contributions between month -6 and month -1) / (average elective contribution rate between month -6 and month -1). Results are shown for the 2021 sample of loan takers.

Source: Authors' calculations.

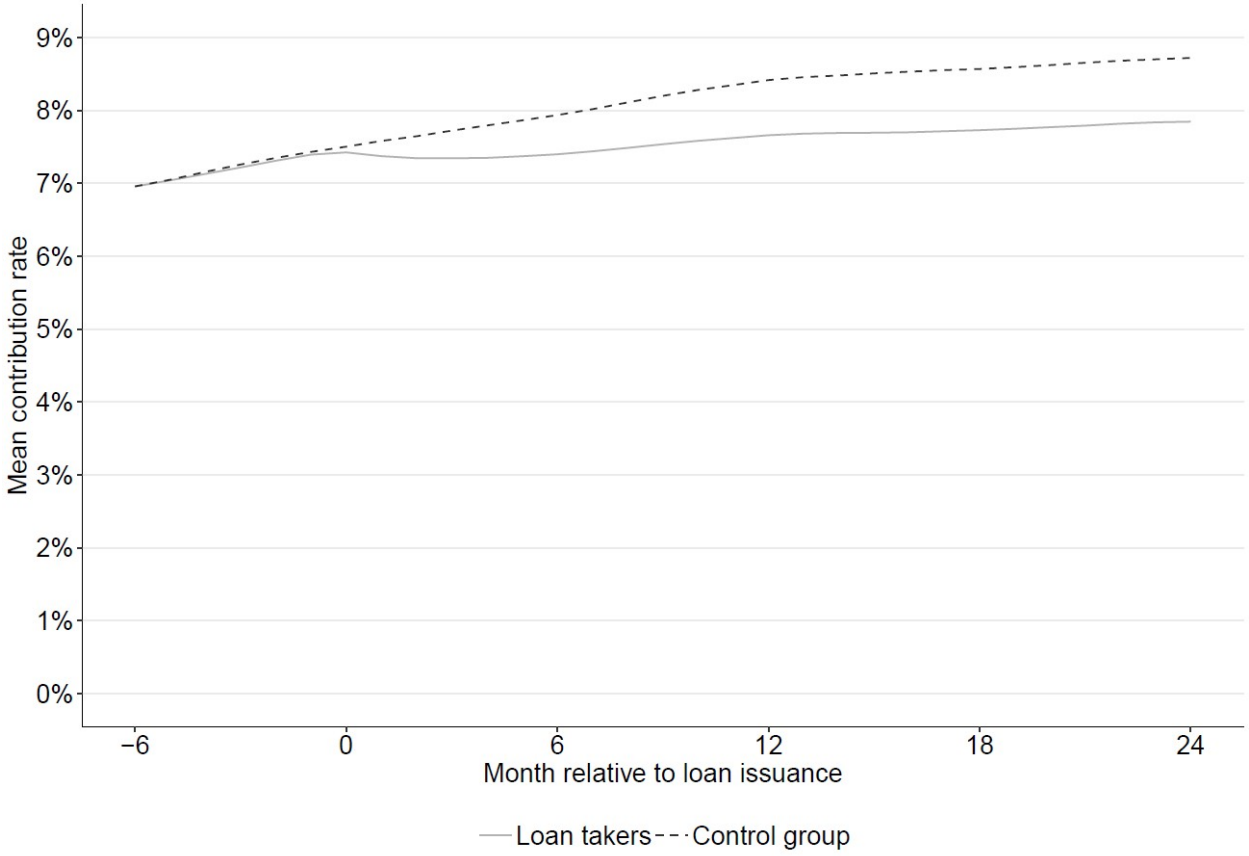

Figure A.4. Loan takers show little crowd-out of elective contributions relative to the control group (2017 sample)

Note: The control group is selected using the criteria discussed in Section 2. Results are shown for the 2017 sample of loan takers.

Source: Authors' calculations.

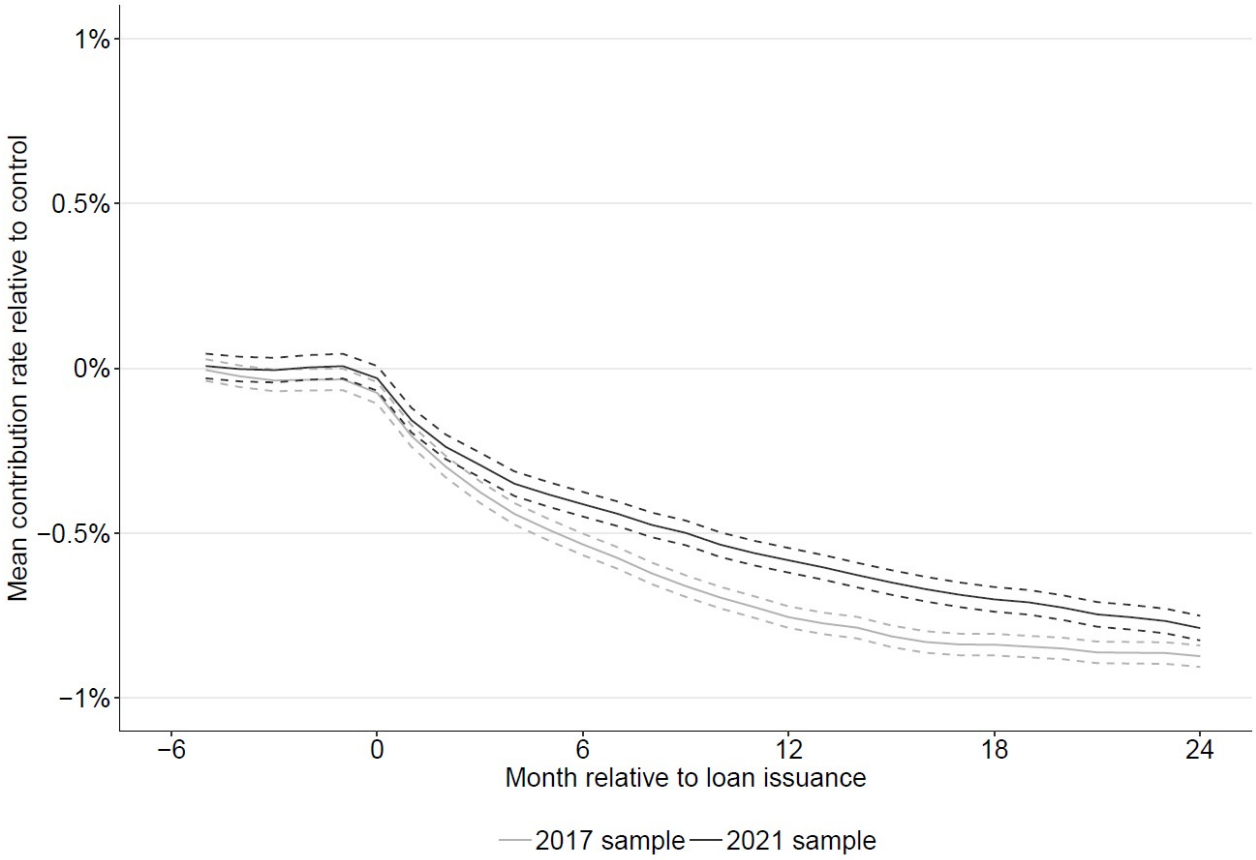

Figure A.5. Regression estimates of contribution crowd-out for loan takers (2017 and 2021 samples)

Note: This plot shows regression estimates that compare changes in loan takers' elective contribution rates to changes in contribution rates for the matched group of control participants, where the base period for measuring changes is relative month -6. We regress monthly contribution rates on i) an indicator for being a loan taker, ii) indicators for relative months -5 through 24, iii) interactions of the loan-taker indicator and the relative-month indicators, and iv) fixed effects for each loan taker-control participant pair. The plot shows the coefficient estimates for the interaction terms, with dashed lines giving 95% confidence intervals.

Source: Authors' calculations.

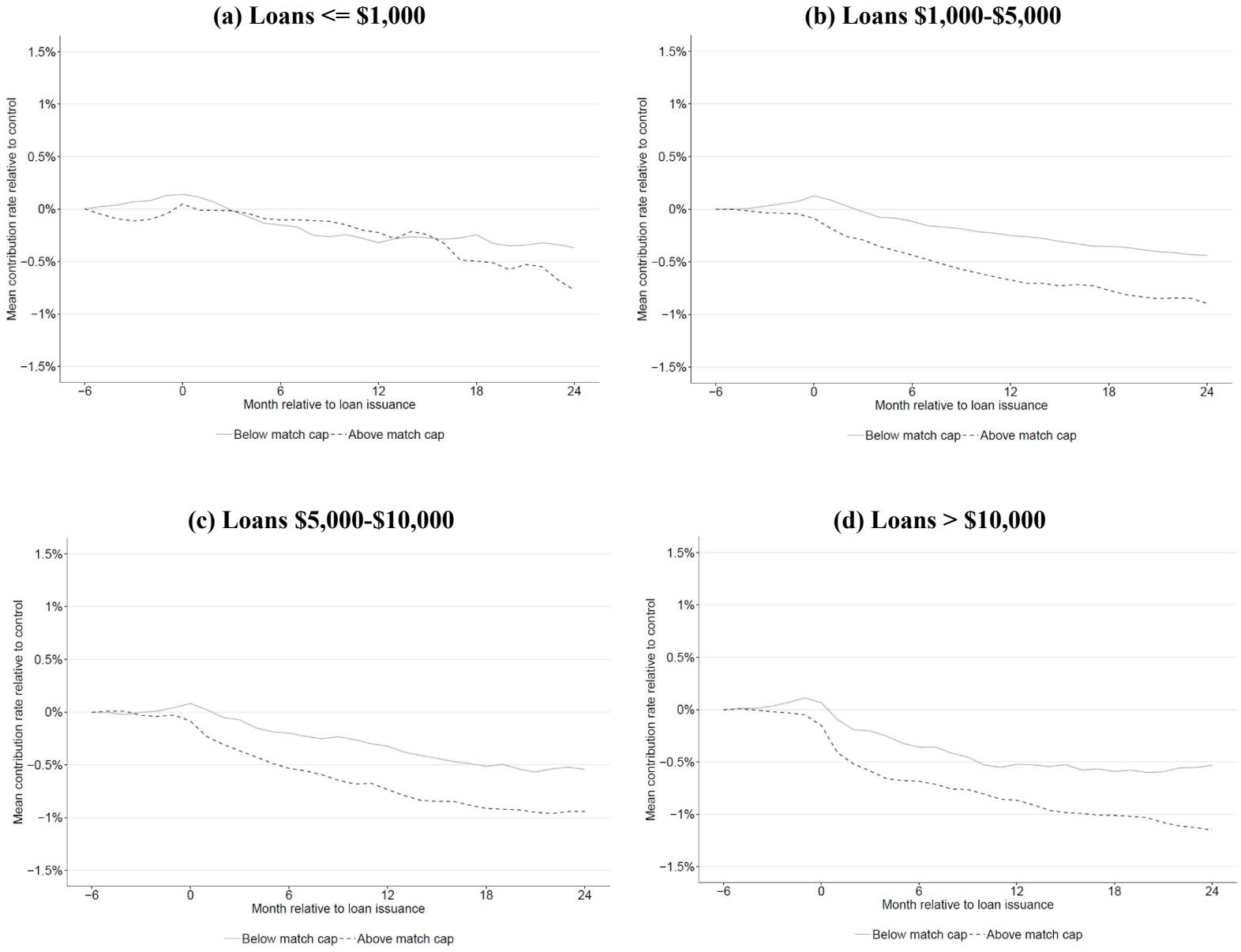

Figure A.6. Loan takers above their employer's match cap show larger contribution crowd-out, particularly for loans larger than $1,000

Note: These plots shows elective contribution rates for loan takers minus the elective contribution rate for their matched control participant. Panels (a)-(d) restrict to loan issuances within a given size category. Each panel then shows contribution crowd-out separately for loan takers whose initial month -6 contribution rate is strictly higher versus weakly lower than their employer's match cap. Loan takers with an initial contribution rate strictly higher than their employer's match cap do not lose employer matching contributions when making a marginal decrease in their elective contribution rate. Results are shown for the 2021 sample of loan takers.

Source: Authors' calculations.

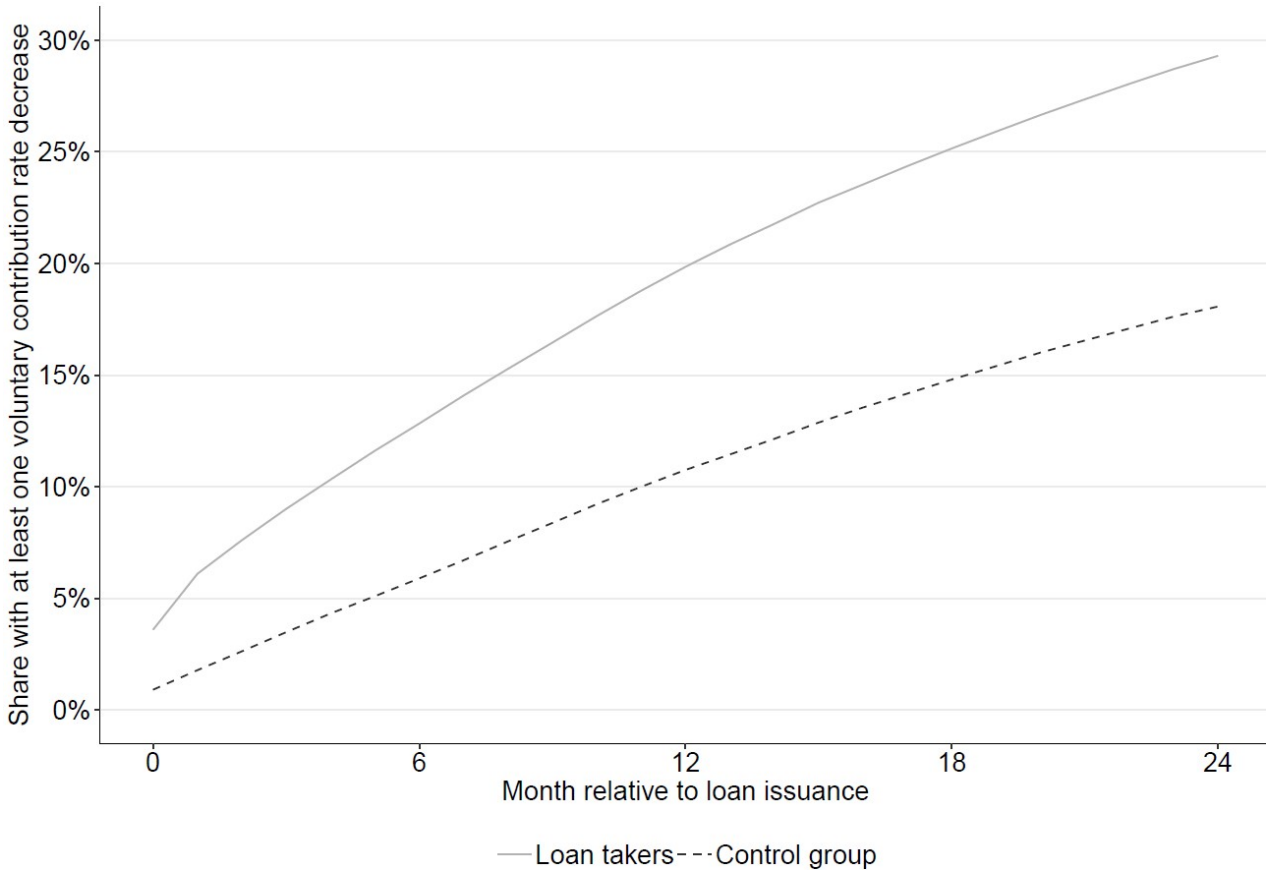

Figure A.7. Loan takers are about twice as likely as the control group to voluntarily decrease their contribution rate in the two years following issuance

Note: Results are shown for the 2021 sample of loan takers. The share of loan takers with at least one voluntary decrease at 24 months need not correspond to the share reported in Figure 2, since this graph restricts to loan takers who were successfully matched to a control participant and Figure 2 does not.

Source: Authors' calculations.

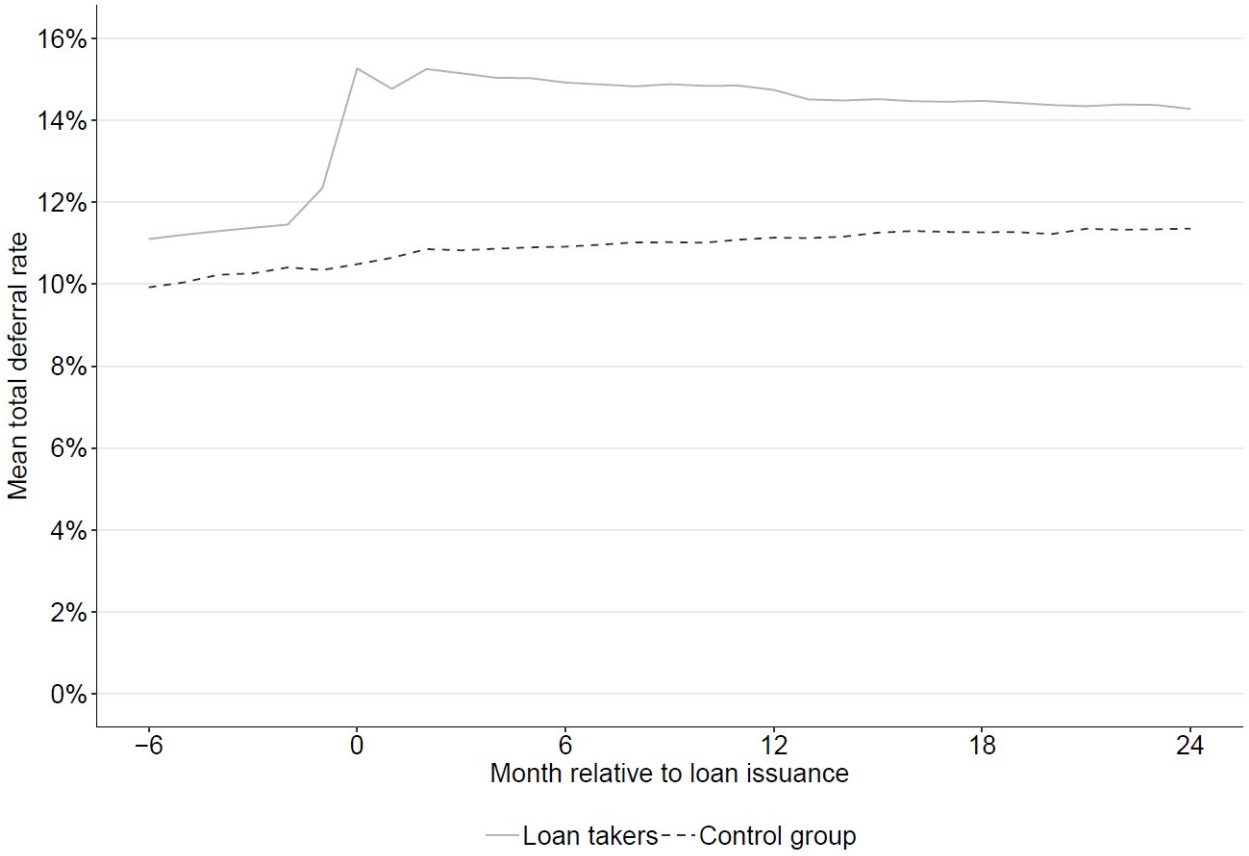

Figure A.8. Loan takers' total deferral rates increase sharply after loan issuance

Note: This plot shows total deferral rates (elective contribution rates plus loan repayment rates) for loan takers and their matched control participants. We estimate loan repayment rates in the following way. First, we estimate participants' monthly income as (average monthly employee contributions between month -6 and month -1) / (average elective contribution rate between month -6 and month -1). We then divide monthly loan repayment amounts by the monthly income estimate. Although we require that control participants do not have any loan issuances between months -6 and 0, the control group may still have nonzero loan repayment rates (arising from loans issued before month -6 or after month 0). Similarly, loan takers' repayment rates may reflect additional loans that were already outstanding before month 0 or were issued after month 0. Results are shown for the 2021 sample of loan takers.

Source: Authors' calculations.