THE ROLE OF INFORMATION ON RETIREMENT PLANNING: EVIDENCE FROM A FIELD STUDY ☆

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Abstract

Many households neglect the pivotal task of planning for retirement. Proposals to stimulate employees to save for retirement in the workplace include tax subsidies, which are costly, and using automatic defaults, which may not complement the heterogeneous preferences of savers. This randomized field study shows that an information-based intervention increases reported retirement plan participation, emergency savings, and using a budget. Employees offered access to education increased actual retirement deferrals by $30 per month. These results suggest retirement education programs may be an effective strategy to increase retirement planning and saving behavior.

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I. INTRODUCTION

Modern financial planning is dominated by discussions of one topic: retirement savings. Retirement planning behaviors are widely studied, yet population data show perplexing patterns of savings, especially among households who reasonably should expect to live long and healthy lives after separating from the workforce. Savings choices are increasingly focused on the decisions of individuals, rather than public plans or employer mandated pensions (Poterba, 2014). However, policymakers' attempts to stimulate more individual-level savings have not shown strong effects (Duflo et al., 2007). One problem appears to be related to people failing to fully plan ahead for retirement and neglecting longer-run financial management in general (Ameriks et al., 2003).

According to the Employee Benefit Research Institute (2015), more than one in four workers have less than $1,000 in retirement savings. Fewer employees today have access to defined benefit pensions than they did in the past, and instead rely on employer-based 401(k) savings accounts and non-employer based individual retirement accounts (IRAs) (Munnell, 2006). However, participation rates remain low; 43 percent of private sector workers age 25 to 64 take part in retirement savings programs (Calabrese, 2011). Even among active savers, there are concerns about how well people are able to manage their retirement accounts in ways that reflect optimal planning horizons.

Several policies have been designed to increase participation in retirement plans. First, firm-level programs requiring employees to opt out (versus opt in)

to a 401(k) plan have increased participation in retirement savings plans (Madrian and Shea, 2001). However, as Choi et al. (2014) highlight, since individuals have heterogeneous savings preferences, these default options may be costly to individuals as some might save more in the absence of the default, and others might prefer to save less. Second, government-designed tax breaks for individuals investing in retirement accounts and increases in maximum income deferral limits for these accounts could increase retirement savings. However, income tax deductions and credits can be costly tax expenditures, and individuals, especially lower- and middle-income savers, may not respond to these incentives (Engen et al., 1996). Third, firms can try to help people better understand their savings options and make plans for retirement, effectively lowering the costs of information with workshops and/or counseling. Retirement planning requires information in order to form expectations about lifetime income, years of work, expected investment returns (adjusted for risk) and consumption levels in retirement. People who lack information about these issues may fail to make a plan, or proceed to design a plan based on incomplete information. Educational programs targeted to workers hold promise to help people recalibrate their expectations and shift their savings behavior. Well-targeted financial education might facilitate people to pursue their individual retirement saving preferences in ways that default rules or incentives alone cannot.

This paper studies the effect of financial education on retirement savings offered to employees in an online format. Online information offers several advantages over traditional seminars. For example, online courses can be delivered

to a large audience and at a lower cost per participant than classroom delivery. It also poses relatively low marginal costs to the employee due to the flexibility and convenience of the mode of delivery; it may serve employees who would not attend in-person sessions. While participants in online education do not benefit from group interactions, online delivery provides participants privacy to explore financial issues that they might shy away from in more public settings.

Several studies document that employer-based educational interventions are associated with improvements in employees' financial knowledge (Clark and D'Ambrosio, 2002; Holland et al., 2008). However, which employees attend educational programs is an important caution. Meier and Sprenger (2008) show evidence of selection such that individuals who participate in voluntary financial education tend to be more motivated and future oriented than nonparticipants. Our study addresses this problem by randomly assigning employers to the education program.

This study follows employees at 45 credit unions where access to a 10-unit online financial education course was randomly assigned at the firm level. Employees completed a survey concerning their self-assessed financial knowledge and self-reported behavior before the offer of education. This study also includes actual employer-based retirement account contributions for a sub-sample of employees. The random assignment of credit unions into the education allows us to causally estimate the effect of financial education on financial knowledge and behaviors.

Employees demonstrated high cooperation rates, with more than 90 percent of those offered education completing the online education modules. We find

that employees offered the online education increase their level of self-reported financial knowledge, as expected. We then show that exposure to the education is associated with greater self-reports of individual retirement plan participation. We also show with administrative data a 47 percent increase in employer retirement contribution amounts. Comparing this to the average monthly employer-based retirement contribution, this effect size translates into a monthly increase of $30 per employee at credit unions where the education was offered. At the same time, we find no self-reported declines in education savings or increases in paying late fees on bills, suggesting that individuals are not substituting retirement savings with other uses.

The remainder of this paper provides a brief background on the literature on retirement planning decisions, followed by an overview of the field study and methods used to estimate the effects of the education program. After reviewing these estimates, we conclude with a discussion of financial education in the workplace and its role as a complement to other retirement savings strategies.

II. THE ROLE OF INFORMATION

Prior studies show a positive correlation between financial literacy, planning for retirement, and savings behavior (Hastings and Mitchell (2011); Lusardi and Mitchell (2007); Mandell and Klein (2009)). Employees use information in order to calibrate expectations about their own retirement timing and to determine the amount and method to save. This requires ongoing decisions about current and future consumption, as people attempt to smooth spending over their expected earnings

TABLE 1: Potential Roles of Information to Increase Deferrals into Retirement Savings

Information	Realization
Retirement date	Earlier ages require more savings
Expected returns	Real returns tend to be modest
Lifespan post retirement	Greater longevity requires more savings
Replacement rates	Higher consumption levels require more savings
Value of tax benefits	Reduced current income tax burden

lifecycle.

Table 1 summarizes the role of information in various contexts related to retirement planning. In each case, information may result in employees reconsidering the tradeoffs between consumption in the present and saving for the future. Earlier in their work career, employees will set initial retirement planning goals and then revise them as their income profiles change. Even in the context of stable income expectations, new information can trigger people to revise consumption and saving choices. For example, employees will revise their expectations of savings levels based on their understanding that retirement earlier in life (at a younger versus older age) or retirement with higher levels of income replacement (versus lower consumption in retirement) would both require higher levels of current savings. After revising these expectations, if either retiring early or maintaining a higher standard of living in retirement becomes a driving goal, then savings levels should increase.

Employees who are engaged in retirement planning will also be more likely to take advantage of employer-based benefits, including non-retirement benefits

like life insurance and health insurance coverage. Looking beyond employer-based options, other employees might also open a non-employer based account such as an IRA. These accounts offer additional flexibility and tax benefits, and represent individual efforts to save over and above any employer provided pension or defined contribution account.

Generally, all employees are calibrating expectations about saving over their working years, but some may respond more strongly to new information. People with lower initial levels of financial education, people with lower levels of general education and people at younger ages may be most responsive to retirement education programs. Work by Lusardi et al. (2015) show that the acquisition of financial literacy is likely to have heterogeneous effects on behavior, which is also reflected in other studies (Fernandes et al., 2014; Hastings et al., 2013). People may also fail to plan for retirement due to a number of biases including inertia, perceived transaction costs of dealing with paper work, procrastination and inattention. Employer educational interventions could serve to overcome these biases, as well as provide a perceived endorsement of savings options (Bernheim et al., 2011).

Brown and Weisbenner (2014) find that people often make decisions based on incorrect information about their retirement plan. Clark et al. (2014) show that not understanding benefits is more prevalent among employees with shorter tenures, who also appear less likely to fully use retirement savings programs at work. This evidence is consistent with the idea that, in the absence of information, people may fail to optimally form financial plans. Workers who are not using employer-

based retirement and related benefits may be better off if they learn about and decide to enroll in a plan. The need for information is not just isolated to newly hired employees. Employers who are enrolled may benefit from changing their contribution levels or planned retirement target date Chalmers et al. (2014).

Studies of financial education provided in the workplace generally support the positive role of information for decisions and behavior in a variety of savings. For example, Clark et al. (2012) provide evidence of the effect of financial education for newly hired employees, as well as longer-term employees closer to retirement age. Further, Bayer et al. (2009) find that offering frequent retirement seminars to employees is associated with higher participation in, and contributions to, voluntary employer-based savings plans, especially among employees at lower compensation levels. Other studies suggest one role of information is through the effects of peers (Duflo and Saez, 2003; Chalmers et al., 2014). Other studies of workplace-based seminars are difficult to interpret, however, in large part because firms often simultaneously promote retirement planning seminars while changing other aspects of retirement savings programs.

Educational interventions might also be viewed in the context of other approaches, such as defaults. Benartzi and Thaler (2007) suggest that automatic enrollment and default contribution levels are a powerful strategy to increase employee retirement savings. The tradeoff of these programs is that employees may fail to develop their own financial planning skills and capabilities. It remains to be seen whether people who were 'defaulted into' savings plans will effectively maintain them over time, or manage them as well as more actively engaged

savers post-retirement when crucial decisions about asset allocation and distributions will need to be made (Mitchell et al., 2009). More active decision making may provide for better outcomes especially when there is a heterogeneity in preferred savings rates and risk preferences (Carroll, 2009; Curcuru et al., 2009). The advantage of an information-based approach is the potential to enhance decision-making capability useful over the life course.

Informational strategies may also be valuable when combined with savings incentives. Prior studies show people do respond to economic incentives with respect to retirement savings decisions, although take up is uneven and informational barriers may remain (Saez, 2009; Duflo et al., 2006, 2007). Education may be to help people to understand and optimally respond to tax and other economic incentives.

III. THE FIELD STUDY

In the fall of 2009, the Wisconsin Credit Union League sponsored the REAL Progress & Pathways to Prosperity (RP3) program, an online financial education program developed by Precision Information, LLC. The ten-module program included the following topics: 1) Basics of Finance; 2) Basics of Investing; 3) Basics of Financial Planning; 4) Basics of Retirement; 5) Saving Strategies; 6) Mutual Funds; 7) Saving for College; 8) Understanding Investment Risks; 9) Working with Financial Advisers; and 10) Getting Started. The majority of the content focused on saving for retirement, retirement planning and understanding the tradeoffs of starting later versus earlier with respect to retirement saving. For

the employees, this was a low-cost intervention, as employees were permitted to take the course during work hours on paid time.[3] The program has since been replicated in 13 states with the support of the Investor Protection Trust.

Forty-five credit unions agreed to participate in the program. The average credit union had 6 branches and 48 full-time employees (a median of 20 employees). Participating credit unions were randomly assigned to offer the course to their employees either in the fall of 2009[4] or in the spring of 2010.[5] Employees at the credit unions that offered the program in the fall constitute the 'treatment' group. In turn, employees at the credit unions that offered the program in the spring constitute the 'control' group, based on the assumption that individual financial behaviors are not correlated with a credit union's assignment into the fall or spring cohort. This design allows for the estimation of causal effects.

Employees in both groups completed a mandatory 48-question survey concerning their self-assessed financial knowledge and self-reported behavior in September 2009 and January 2010. All participants completed the same surveys at the same point in time, regardless of whether their employer offered the education program in the fall or spring. Table 1 provides a timeline of the study, including when data on retirement account contributions were collected beginning in January 2009 and continuing through February 2010.[6]

[3]The mean time to complete the education was 8.75 hours, with a median of 4.4 hours based on online login records.

[4]The first employee in the fall cohort began the course September 29th, 2009 and the last completed the course December 28th.

[5]The first employee in the spring cohort began the course January 28th, 2010.

[6]Although the recession was dated from December 2007 to June 2009, unemployment peaked

After assigning each employee a confidential code, the data for this analysis were provided by the online financial education company Precision Information, LLC. The sample includes 1,052 employees who completed both survey waves, including 729 in the control group and 323 in the treatment group. In addition, data on monthly retirement account use was obtained from 10 credit unions, including 5 from each group, covering about 220 employees making regular contributions or moving existing funds between investment options. This provides a means to externally validate the self-reported survey data on retirement behavior. The inclusion of both self-reported data and actual retirement contributions is valuable, as individuals' self reports could suffer from social-desirability bias after exposure to the education (Gustman et al., 2012). Notably, all of the credit unions in these data used the same benefits provider and generally offered the same investment plan and benefits options.

Table 2 shows the distribution of financial assets by the gender of employees in the study overall. The mean of the self-reported level of financial assets is displayed in the first panel, and similar means from the Survey of Consumer Finances by the Federal Reserve Board in the lower panel. Employees in the field experiment generally have lower asset levels than the means in the Survey of Consumer Finances, especially at younger ages. Most of the employees (80 percent) are women, and two-thirds are under age 45.[7] The employee base in these credit

in Wisconsin in December 2009 at 9.2%, slightly below national averages at the time.

[7]The U.S. Department of Labor reports that 75 percent of individuals employed at savings institutions, including credit unions, are female (U.S. Department of Labor Bureau of Labor Statistics, 2009).

unions is skewed towards populations with lower asset levels in general.

IV. METHODS

Assignment to the financial education occurred at the level of the firm. Table 3 shows the means for employees at the baseline in each cohort, with standard errors clustered by credit union (the firm level). The sample appears balanced, with the exception that the treatment group have lower incomes. These differences also are not large in magnitude.

In Column (1) of Table 4, shows that individual-level characteristics do not predict treatment in the baseline period using an OLS regression, again clustered at the credit union level. The only statistically significant difference across the treatment and control groups is whether or not the employee has children. Columns (2)-(5) in Table 4 show that treatment is uncorrelated with baseline IRA savings, forming a budget, having three months of savings, and being enrolled in benefits, all potential dependent variables we would predict would shift at follow-up for those employees who have access to financial education.

We begin by estimating the effects of online financial education on retirement outcomes by comparing treatment and control groups in the post-treatment period as a cross section. Specifically, we estimate Equation (1), where T_i is equal to one if the individual was in the treatment group and zero otherwise. α_1 is therefore the primary coefficient of interest. By including $Y_{i,t-1}$, the dependent variable in the baseline period, this can be interpreted as the change relative to baseline. X_i is a vector of individual level controls including income, assets, age, sex, mi-

nority, college, home ownership, score on a 'financial challenge' 25 question test and a dummy for whether or not the individual has at least one child. $\varepsilon_{i,t}$ is the error term. We cluster our standard errors at the credit union level (the level of treatment), as there may be unobserved differences in the treatment across groups (Pepper, 2002).[8]

$$Y_{i,t} = \alpha_0 + \alpha_1(T_i) + \alpha_2 Y_{i,t-1} + \boldsymbol{\gamma X}_i + \varepsilon_{i,t} \tag{1}$$

Since there can still be unobservable differences across groups that are correlated with the treatment, we further estimate a difference-in-differences specification within individuals over time. This strategy compares individuals to themselves before the education, as well as to the control group, before and after the education occurred. Using a difference-in-differences model allows us to fully use the data as a panel, increasing the power of the estimates, especially since the standard errors are clustered at the credit union level.

We estimate the following regression equation to measure the effects of online financial education:

$$Y_{i,t} = \beta_0 + \beta_1(T_i) + \beta_2(\text{Post}_t) + \beta_3(T_i \times \text{Post}_t) + \boldsymbol{\gamma X}_i + \varepsilon_{i,t} \tag{2}$$

$\text{Post}_{i,t}$ is a dummy variable equal to one if the survey period occurs after the first

[8]We also tested bootstrapped standard errors and wild cluster bootstrapped standard errors (Cameron et al., 2008), as well as clustering by both credit union and time period, with similar results.

group receives the treatment, and $T_i \times \text{Post}_t$ represents the interaction between receiving the education offer and the post period.

The estimates for α_1 in Equation (1) and β_3 in Equation (2) will be of interest, as these represent the causal effect of assignment to the course on financial knowledge and financial behaviors. We consider this to be an intent to treat measure since there may be selection into who actually completes the course. However, takeup of the education was extremely high, near 90 percent at most credit unions.[9] In order for the differences estimator to be valid, we assume that the trends across the treatment and control groups would be parallel in the absence of the policy.[10] We further assume that there are no spillover effects that would contaminate the treatment. For example, this might occur if employees in credit unions that were offered the education talked to those at the credit unions without education. However, a violation of these assumptions would bias against finding significant effects of the education. The results from Equation (1) do not require the parallel trends assumption, though this specification has less power to detect effects.

The dependent variables related to knowledge of credit scores, interest rates, stocks and bonds and investing were measured using five-point scales, where 1=low and 5=high self-reported knowledge. For the analysis, these measures have been re-scaled to be between 0 and 1.[11] The dependent variables related

[9] There are no measurable differences in takeup across credit unions.

[10] We test that this is true in the pre-period for our contributions data in Table 7.

[11] See the Appendix for question wording.

to behavior are generally dichotomous variables (0 or 1, where 1 is "yes") and are estimated in a similar fashion using a linear probability model.[12] The means of these behaviors are shown in Table 3. At the initial period of observation across treatment and control groups, an average of 51.5 percent of employees owned an IRA account. Just under 42 percent of employees reported having a budget or spending plan. Most (78 percent) employees reported fully using employer-sponsored health or life insurance and other benefits. Meanwhile, just under half (48.3 percent) of employees reported having three months of expenses saved for an emergency. When compared to the FINRA Investor Education Foundation's National Financial Capability Study (2009), these rates are comparable, where 55 percent of individuals contribute to retirement accounts, 40 percent have a budget, 81 percent use employer provided benefits, and 37 percent have emergency savings.

We obtain a smaller set of data on 220 employees across 10 credit unions with actual monthly contributions to an employer sponsored retirement account. Here the data are grouped into 5 credit unions in the earlier cohort with an offer of online financial education and then employees at the 5 credit unions offering the same education in the spring of the following year. We also provide results from Equation (1) and Equation (2) in this setup. However, in Equation (1), we now control for the average mean of the dependent variable in the pre-period since we have monthly data for one year prior to the education. These results will pro-

[12] Although not shown, marginal effects from probit models provide similar estimates.

duce an estimate for α_1. The other estimates compare 'within employee', relative to the prior period. We use these data to estimate the logged monthly contribution amount for each employee, with an interaction of the post-education offering time period and treated credit union is again the estimate of interest, similar to β_3 in Equation (2). We log monthly contributions since they are non-normally distributed. Log-transforming this variable also facilitates interpretation as a percent change in contributions for treated employees.

V. RESULTS

We begin with the traditional treatment control setup from Equation (1), where we report α_1. Recall that in these specifications, we only include the post-treatment period and compare the individuals who received access to the education to those who did not, where we also control for individual-level characteristics and the pre-period dependent variable. We then provide the difference-in-difference estimate without any additional controls. Table 5 presents the first of this series of estimates, where the first panel reports that those with assignment into the education intervention reported higher levels of self-assessed knowledge across all categories. Since these dependent variables are on a 0 to 1 scale, they can be interpreted as a percentage point change. The self-assessed score for credit score knowledge, interest rate knowledge, stock and bond knowledge, and investing knowledge all show increases that are statistically different from zero at standard levels. These effects are between a between 5 and 26 percent marginal increase from the overall mean. The middle and bottom panels show similar estimates that

are slightly larger in magnitude when using the difference-in-differences specification from Equation (2), without and with employee-level baseline demographic characteristics, respectively.

Table 6 shows self-reported behaviors. Here the results are from linear probability models and can be interpreted as percentage point changes relative to baseline in the coefficients for Treat and Treat $\times$ Post. The top panel again reports the difference across treatment and control groups, and the bottom panel reports the difference-in-differences results. Column (1) shows that the offer of online education increases IRA participation by 6 percentage points. When compared with mean participation of about 52 percent, this is approximately an 11 percent marginal effect from the mean participation rate. Column (2) of Table 6 shows that education increased the rate of creating a budget by 5 percentage points, which is a 12 percent marginal increase over the baseline mean budgeting rate.

Based on the difference-in-differences results in Columns (3) and (4) of Table 6, the education had measurable effects on self-reported emergency savings and benefits enrollment, where the education increased the probability of having three months expenses saved and making use of employer benefits by 8.7 and 6.8 percentage points, respectively. This corresponds to 18 and 9 percent of the respective mean levels. While the latter is a smaller fraction of baseline mean levels, the high fraction of participation in benefits to begin with (78 percent), suggests that there are few people who are not already making use of employer benefits. The education may have the potential to close the gap given the high fraction of employees using offered benefits.

It should be noted, that the difference-in-differences estimates are more tightly estimated than the simple treatment effect results in the top panel, which are not statistically different from zero. It is reassuring that the sign of the effect remains the same, however. The α_1 coefficients are not statistically different from the β_1 coefficients.

Next, we turn to the monthly retirement contributions data to see if we can reaffirm the survey data with administrative data. Table 7 shows the results of the offer of education on actual contributions (excluding transfers) to employer sponsored accounts. The post period is after December 2009, when the treatment cohort completed the education. The Treat $\times$ Post parameter in Column (3) suggests that the causal effect of education on contributions results in an increase in contributions of 47.4 percent, and slightly smaller (40.4 percent) when estimating the cross sectional difference in means in Column (1). When comparing the difference-in-differences estimate to mean contributions, roughly \$65 per month, this suggests an increase of approximately \$30 per month or \$360 annually per person. This is slightly higher than the findings in Helman et al. (2015), where 69 percent of workers state that they could save \$25 per week more than they currently are for retirement. These results are consistent with a shift in savings behavior, with employees offered the education being more likely to save in employer-sponsored accounts after the education is completed.

Columns (2) and (4) in Table 7 further explores the underlying mechanisms shown in Columns (1) and (3) in terms of contributions to employer-based retirement accounts. The credit unions involved all offered eligible employees a match

of up to 3 percent of annual gross income, such that employees would maximize their match when contributing 6 percent of their annual income, including receiving a full 3 percent employer match. We only observe the total deferral amount, including the match, but can provide a lower bound on when an employee increases her contribution to obtain a larger match from the employer.[13] The lowest full-time equivalent employee in our data earns approximately $25,000 per year. A 6 percent deferral rate (adding in the match) would produce a monthly contribution of $125. Any employee contributing less than $125 per month would not be maximizing his matching benefit—this is admittedly a low threshold since some employees earn two to three times this annual income. Nevertheless, shifting from contributing less than $125 to deferring more than $125 would be a signal of attempting to obtain a larger employer match. Columns (2) and (4) show that the employees in the treatment group show this very pattern.

In Columns (5)-(6) of Table 7, we show that falsely placing the treatment in the four months prior to the education yields no effect. Specifically, we restrict the sample to stop just before the intervention and interact the treatment with the four periods leading up to the education. These results suggest that the trends across the two groups are parallel.

We also include estimates for self-reported behaviors to make sure employees are not increasing savings for retirement at the same time as they substituting away

[13]Credit unions use a common intermediary for pooled benefits, CUNA Mutual. This results in a high degree of standardization. Also, all of the credit unions in the study were based in Wisconsin and tended to offer similar benefits packages.

from other savings or are missing payments on bills. Table 8 shows self-reports of savings for education, paying late fees on bills and using automated deposits for savings. None of these show any impact of the assignment to education.

Next, we see if the average treatment effects estimated above might include better (or worse) outcomes for some observable sub-groups of employees. The response to the offer of the online education might reasonably also differ by demographic characteristics. To test for heterogeneous treatment effects, we restrict the sample to specific subgroups, including education level, gender, financial assets, and the degree to which respondents report learning about personal finances from their parents. Table 9 summarizes each of the four outcomes. Here the primary analysis uses the difference-in-differences specification to compare coefficients across column pairs (1 vs. 2; 3 vs. 4; 5 vs. 6); 7 vs. 8). Although not shown, the results remain consistent but less precise if we instead do a simple comparison of means across the treatment and control groups in the post-education period.

Tests of these coefficients show that the effect of the education assignment on IRA participation and benefits enrollment is higher for those with low education, which is consistent with Lusardi et al. (2015). Likewise, there are statistical differences in formulating a budget or having three months savings set aside across education levels—the lowest education levels respond with a larger magnitude than the highest education group. We observe a general tendency that females have stronger responses, although the sample of males is small (less than one third of the employees were male). Employees having assets under $20,000 are more likely to participate in an IRA after the offer of retirement education at their

workplace. This could be because those with higher wealth are already enrolled at higher rates. People who reported that their parents never or seldom taught them about personal finance appear to have stronger responses to opening an IRA and using a budget when offered the education program. These patterns are not always consistent, but paint a general picture of the intervention having effects among those employees with lower levels of initial financial capability.

VI. Conclusion

Self-assessed financial knowledge, self-reported financial planning, and self-reported savings behaviors appear to be positively affected by online education for employees of credit unions. Intention-to-treat estimates of effects include changes in behavior such as the increased use of IRAs, a 7 percentage point increase. Moreover, the actual average monthly contributions to employer-sponsored savings plans increased by an estimated $30 per month. This is a significant increase per employee from a relatively modest intervention.

These results appear broadly consistent with previous results from Bayer et al. (2009), who found a 12 percent higher rate of participation in retirement plans by non-highly compensated employees. By using longitudinal data, administrative records, and random assignment, our study has several methodological advantages to produce results that complement the conclusions of prior work. Duflo et al. (2007) found that offering economically meaningful financial incentives did not cause individuals to save more in IRA plans. One barrier to the effectiveness of financial incentives could be information. Individuals may fail to respond

to incentives for saving because they do not understand the terms of the savings plan, matches, or how these programs relate to their own personal financial plan (Ameriks et al., 2003). Employees might generally benefit from education programs paired to incentives to save, if the costs of delivery and opportunity costs of attending education can remain relatively modest.

Employees exposed to the educational modules were also more likely to engage in broader financial management activities. The program shows an increase in budgeting (a 5 percentage point increase) and saving three months of expenses (an almost 9 point increase). The use of a budget or spending plan helps individuals to limit consumption in order to allocate income towards savings. Recognizing that retirement plans can be derailed by an emergency or short-term drop in income, designating savings for an emergency might help people preserve their long-run assets. This focus may prove especially valuable as employees separate from their employer and have to manage their accounts independently from their employer.

The marginal effect of the offer of the online education program on opening an IRA is about 25 percent—slightly less than the effects of those found in studies of opt-out or default-option policies—but still quite large. Education-based approaches might complement default or opt-out strategies given the heterogeneous preferences of individuals enrolled in automatic savings programs. With more information, employees may select different savings levels and products. By enhancing people's financial planning, employees with more education may better be able to manage their assets throughout their life course, including upon

retirement.

The costs of this intervention include the direct cost of fees for the online module, provided by a private firm, which is approximately $10 per employee. At an equivalent hourly wage of $20, if all employees spent 10 hours on the course, the total cost was about $210 per employee in terms of lost wages for the employer (not including any worker disutility from the training). The increased savings estimated above is an average of about $360 per year per employee offered the education. Assuming employees maintain that savings pattern for 10 years as their salaries increase, and earn a 3 percent real return, that would result in about $4,800 in additional savings for impacted employees. This is all before considering additional savings in newly opened IRAs, emergency savings or more general improvements in financial management behaviors. Whether this is a welfare-enhancing goal for firms or for society as a whole could be debated, but this study at least shows modest interventions can result in measurable behavioral changes.

According to the 2013 Survey of Consumer Finances by the Federal Reserve Board those households at age 50-64 have on average $59,736 in savings in IRAs, SEPs, Keoghs or other non-employer-based accounts. These accounts offer added flexibility and tax benefits, and are often a supplement to employer-based accounts. If online financial education can facilitate the use of employer and non-employer based retirement accounts, or can be used in conjunction with employer-based automated savings, then similar interventions may have potential to move people towards savings levels that are better calibrated with consumption prefer-

ences in retirement.

The sample in this study constitute credit union employees (mainly bank tellers), who may have a higher baseline of knowledge and a lower opportunity cost of obtaining financial education compared to general population. These estimates arguably could be a lower bound on the effect of workplace financial education in other contexts. However, it could also be the case that a certain baseline level of financial knowledge must exist prior to engaging in workplace financial education, which might suggest these estimates are on the higher end. Because retail financial services at credit unions typically does not involve working with customers on issues of retirement planning, benefits and investing, the topics in this education may not have had much direct application for employees in their work tasks.

The emergence of online and technologically-enhanced education should trigger a closer look at the role of employee education in retirement policies. To the extent employers or policymakers seek to increase the rate at which employees are saving in employer-sponsored retirement plans, other sponsored benefits, or even IRAs, then the offer of relatively modest online financial education programs have the potential to influence financial behaviors at a relatively low cost. For example, one potential policy would be to provide subsidies to firms who provide online education at the workplace as an enhancement of tax incentives or changes in deferral limits. The launch of the U.S. Department of Treasury's low-cost myRA individual retirement account may offer another opportunity to connect employees to education as part of a savings strategy.

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VIII. TABLES

TABLE 2: Gender and Age Self Reported Total Financial Assets: Survey Data vs. Survey of Consumer Finances

	18-35	36-45	46-55	56-64
Survey Data				
Female	18,419	41,214	53,075	54,347
	(21,834)	(26,049)	(21,005)	(19,879)
Male	22,432	50,230	60,757	60,172
	(24,088)	(22,303)	(13,624)	(14,546)
2013 Survey of Consumer Finances				
Female	14,060	27,398	91,615	155,855
	(66,841)	(112,233)	(514,689)	(768,128)
Male	43,703	169,923	278,820	483,588
	(235,303)	(1,164,266)	(2,215,722)	(210,4249)

Means (Std Err); RP3 Survey; Survey of Consumer Finances

TABLE 3: Covariate Balance Check

	Control	Treatment	Total
Married	0.736	0.684	0.720
	(0.0249)	(0.0356)	(0.0207)
Kids	0.703	0.788	0.728
	(0.0535)	(0.0341)	(0.0406)
Own	0.819	0.801	0.814
	(0.0338)	(0.0360)	(0.0258)
College	0.324	0.236	0.297
	(0.0580)	(0.0654)	(0.0471)
Minority	0.175	0.209	0.185
	(0.0495)	(0.0669)	(0.0411)
Female	0.803	0.832	0.812
	(0.0389)	(0.0311)	(0.0290)
Age 18-35	0.404	0.343	0.386
	(0.0554)	(0.0390)	(0.0417)
Age 36-45	0.230	0.246	0.235
	(0.0155)	(0.0248)	(0.0132)
Age 46-55	0.226	0.253	0.234
	(0.0332)	(0.0264)	(0.0252)
Age 56-64	0.125	0.131	0.127
	(0.0219)	(0.0178)	(0.0162)
Income Cat	5.259**	4.795	5.119
	(0.116)	(0.191)	(0.106)
IRA	0.537	0.466	0.515
	(0.0322)	(0.0451)	(0.0268)
Budget	0.410	0.422	0.414
	(0.0364)	(0.0264)	(0.0269)
Benefits	0.798	0.739	0.780
	(0.0130)	(0.0371)	(0.0154)
3 Months Saving	0.501	0.441	0.483
	(0.0142)	(0.0347)	(0.0156)
Observations	700	301	1001

Standard errors clustered at the credit union level in parentheses. Differences in means reported at the * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ reported. Kids=1 if at least one dependent under the age of 18. Income is on an 8-point scale, where the mean for the control group is $51,100 and $45,540 for the treatment group. Source: RP3 Surveys

TABLE 4: Differences in Treatment and Controls at Baseline

	(1) Treatment	(2) IRA	(3) Budget	(4) 3 mos Saving	(5) Benefits
Treatment		-0.0547	0.0199	-0.0534	-0.0427
		(0.0414)	(0.0375)	(0.0325)	(0.0284)
Married	-0.0669	-0.0144	-0.0278	0.0595*	0.0332
	(0.0469)	(0.0474)	(0.0531)	(0.0321)	(0.0346)
Kids	0.124**	-0.0179	0.0508	-0.0665	-0.113***
	(0.0517)	(0.0455)	(0.0362)	(0.0407)	(0.0219)
Owns Home	0.00548	0.00823	-0.0912*	-0.138***	-0.109*
	(0.0586)	(0.0397)	(0.0521)	(0.0410)	(0.0562)
College	-0.0548	0.0775*	0.0799***	0.0469*	0.0596**
	(0.0725)	(0.0404)	(0.0277)	(0.0248)	(0.0268)
Minority	0.00483	-0.0279	0.0128	0.00550	0.0144
	(0.0300)	(0.0180)	(0.0224)	(0.0170)	(0.0199)
Female	-0.0171	-0.000594	0.0420	-0.0455*	-0.0334
	(0.0443)	(0.0295)	(0.0297)	(0.0243)	(0.0321)
Age $18-35$	-0.162	-0.170	0.0219	0.0293	-0.236**
	(0.135)	(0.119)	(0.1000)	(0.109)	(0.100)
Age $36-45$	-0.0950	-0.0591	-0.0582	0.0593	-0.227**
	(0.134)	(0.129)	(0.101)	(0.113)	(0.0895)
Age $46-55$	-0.0823	-0.0634	-0.102	0.0682	-0.0921
	(0.128)	(0.120)	(0.106)	(0.108)	(0.0964)
Age $56-64$	-0.100	0.0551	-0.0389	0.141	-0.0225
	(0.130)	(0.115)	(0.104)	(0.106)	(0.107)
Income \$24k-\$48k	-0.0807	0.0618	0.131***	0.134***	-0.0184
	(0.0807)	(0.0393)	(0.0459)	(0.0444)	(0.0492)
Income \$48k-\$72k	-0.0894	0.0102	0.193***	0.161***	-0.0319
	(0.0870)	(0.0515)	(0.0433)	(0.0480)	(0.0449)
Income $>$ \$72k	-0.123	0.0424	0.221***	0.189***	0.0243
	(0.106)	(0.0517)	(0.0606)	(0.0408)	(0.0495)
Observations	983	975	981	983	983

Robust standard errors clustered at the credit union level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. OLS regressions. The specification also controls for levels of assets categorically, where no group is statistically different from another in Column (1). Source: RP3 Surveys

TABLE 5: Knowledge Changes After Online Education

	Self-Assessed Knowledge Type (scaled between 0 and 1)			
	Credit Score	Interest Rate	Stock & Bond	Investment
Post Period Treatment Versus Control				
Treat	0.0291**	0.0283**	0.156***	0.104***
	(0.0143)	(0.0118)	(0.0162)	(0.0171)
Observations	989	989	989	989
Unconditional Difference-in-Difference				
Treat × Post	0.0430***	0.0425***	0.165***	0.120***
	(0.0144)	(0.0142)	(0.0217)	(0.0187)
Observations	2,178	2,178	2,178	2,178
Same Model With Individual-level Controls				
Treat × Post	0.0467***	0.0378***	0.167***	0.119***
	(0.0140)	(0.0139)	(0.0205)	(0.0199)
Observations	1,972	1,972	1,972	1,972
Mean	0.635	0.652	0.655	0.657

Robust standard errors clustered at the credit union level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Treatment versus control models estimate Equation (1), reporting α_1 estimates. Difference-in-difference models estimate Equation (2), where we report β_3 estimates. Controls include treatment, post, income, assets, age, sex, minority, college, homeownership, test score, children. Treatment versus control models also control for pre-period dependent variables.
Source: RP3 Surveys

TABLE 6: Behavior Changes After Online Education

	IRA	Budget	Enrolled in Benefits	3 Mos Saving
Post Period Treatment Versus Control				
Treat	0.0622***	0.0582**	0.0371	0.0381
	(0.0220)	(0.0230)	(0.0252)	(0.0291)
Observations	973	977	989	989
Difference-in-Difference With Individual-level Controls				
Treat × Post	0.0704***	0.0528*	0.0865***	0.0676*
	(0.0234)	(0.0280)	(0.0292)	(0.0340)
Observations	1,952	1,961	1,972	1,972
Mean	0.516	0.416	0.479	0.779

Robust standard errors clustered at the credit union level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Treatment versus control models estimate Equation (1), reporting α_1 estimates. Difference-in-difference models estimate Equation (2), where we report β_3 estimates. Controls include treatment, post, income, assets, age, sex, minority, college, homeownership, test score, children. Treatment versus control models also control for pre-period dependent variables.
Source: RP3 Surveys

TABLE 7: Retirement Account Contributions Increase After Online Education

	Log(Amt)	Deferral $>$ \$125	Log(Amt)	Deferral $>$ \$125	Log(Amt)	Deferral $>$ \$125
Treat	0.404**	0.0907*				
	(0.0549)	(0.0295)				
Treat x Post			0.474*	0.235*		
			(0.216)	(0.118)		
Treat x T-4					-0.242	-0.190
					(0.262)	(0.160)
Treat x T-3					-0.396	-0.228
					(0.257)	(0.138)
Treat x T-2					-0.253	-0.103
					(0.185)	(0.0946)
Treat x T-1					-0.567	-0.245
					(0.322)	(0.146)
Observations	420	420	2,260	2,260	1,812	1,812
Mean Amount	64.97					
Median Amount	45.49					

Robust standard errors clustered at the credit union level in parentheses. 220 accounts at 10 credit unions (5 control) from January 2009 to April 2010 (16 months) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Treatment versus control models estimate Equation (1), where we report α_1. Difference-in-difference models estimate Equation (2), where we report β_3 estimates with controls for treatment and post. These monthly data cannot be matched to the survey data. In Columns (2), (4), and (6), \$125 would maximize match for lowest paid full-time employee (per month). Columns (5)-(6) interact the four periods leading up to the intervention with the treatment group(T-1 through T-4). Source: CUNA Mutual administrative data

TABLE 8: Treatment Effects for Non-Retirement Outcomes

	Education Saving	Late Fee	Auto Saving
Post Period Treatment Versus Control			
Treat	0.00361	0.0276	0.00605
	(0.0185)	(0.0270)	(0.0322)
Observations	969	978	975
Difference-in-Difference with Individual-level Controls			
Treat × Post	0.00651	-0.00436	0.00132
	(0.0182)	(0.0307)	(0.0294)
Observations	1,953	1,961	1,957

Robust standard errors clustered at the credit union level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Treatment versus control models estimate Equation (1), reporting α_1 estimates. Difference-in-difference models estimate Equation (2), where we report β_3 estimates. Controls include treatment, post, income, assets, age, sex, minority, college, homeownership, test score, children. Treatment versus control models also control for pre-period dependent variables.
Source: RP3 Surveys

TABLE 9: Heterogeneous Effects

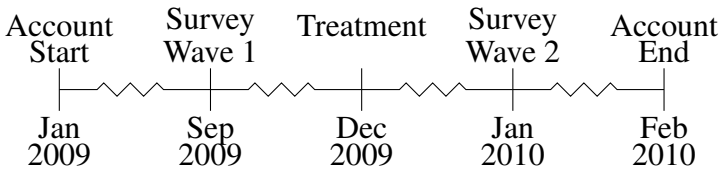
	(1) No College	(2) College	(3) Female	(4) Male	(5) Low Wealth	(6) High Wealth	(7) Low Parent	(8) High Parent
HAVE IRA								
β_3	0.0747**	0.0283	0.0577**	0.0750*	0.0984**	0.0624*	0.0790**	0.0272
	(0.0298)	(0.0294)	(0.0270)	(0.0422)	(0.0388)	(0.0310)	(0.0316)	(0.0374)
USE BUDGET								
β_3	0.0493	0.0105	0.0552*	-0.0242	0.0779	0.0505	0.0559**	0.00708
	(0.0311)	(0.0581)	(0.0298)	(0.0812)	(0.0699)	(0.0439)	(0.0264)	(0.0536)
THREE MONTHS SAVINGS								
β_3	0.0806**	-0.0309	0.0595	0.0666	0.0410	0.0864**	0.0480	0.0781*
	(0.0398)	(0.0496)	(0.0361)	(0.0885)	(0.0677)	(0.0414)	(0.0476)	(0.0432)
ENROLLED IN BENEFITS								
β_3	0.0925***	-0.00191	0.0661**	0.112	0.0913	0.101**	0.0675	0.0780
	(0.0341)	(0.0447)	(0.0327)	(0.0682)	(0.0620)	(0.0379)	(0.0409)	(0.0537)

Robust standard errors cluster at the credit union level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Models estimate Equation (2), where we report β_3 estimates. All models include the following controls: treatment, post, income, minority status, homeownership status, a child indicator and initial score. Low wealth signifies less than $20,000 in assets. High parent denotes that at least some of an individual's financial knowledge came from his/her parents, and low parent denotes that little or no information came from parents.

Source: RP3 Surveys

IX. APPENDIX

FIGURE 1: Timeline



Notes: Account Start and Account End signify the timeframe for which we have information on individuals' credit union accounts. The survey waves describe the time at which individuals filled out the financial surveys, where it was necessary for the individual to complete the survey before obtaining the online education. Treatment describes the group that received the education offer.

Survey Questions

Financial Knowledge:[14]

1. How much do you know about credit scores and credit files?
2. How much do you know about investing for retirement?
3. How much do you know about interest rates and loans?
4. How much do you know about stocks and bonds?

Financial Behaviors:

1. Do you have an IRA retirement savings/investment account?
2. Do you have a weekly or monthly spending plan or budget?
3. I am taking advantage of all my retirement and insurance benefits at work. (1-5 agreement scale; rescaled disagree=0, agree=1)
4. I have at least three months expenses set aside in a readily accessible account (e.g. money market mutual fund). (1-5 agreement scale; rescaled disagree=0, agree=1)

[14] 5-point scales, where 1=low and 5=high self-reported knowledge; re-scaled to be between 0 and 1. Note that Allgood and Walstad (2015) show use of self-assessments is a reasonably valid measure compared to objective quiz questions in surveys.