



# Can behavioral nudges and incentives help lower-income households build emergency savings with tax refunds? Evidence from field and survey experiments

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## Abstract

Tax refunds are an opportunity for lower-income households to accumulate emergency savings so they have cash on hand to cover expenses when income is insufficient. Our field experiments testing different behavioral interventions to encourage refund saving via online tax filing show small effect sizes (0.12–0.14) and a low aggregate savings rate (12%) that might be increased were filers to receive financial incentives. We test a key provision of the Refund to Rainy Day Saving and Financial Security Credit Acts using a survey experiment, finding that hypothetical refund saving jumps from 16% with no financial incentive, to 71% and 80% with 25% and 50% matches, respectively, findings which are mostly insensitive to refund size. Our results suggest that public policies to provide greater financial support—including stronger income supports—will better prepare lower-income households for financial emergencies than behavioral interventions to nudge refund saving.

## KEYWORDS

lower-income, saving, tax refunds

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## 1 | INTRODUCTION

Nearly half of US households and three-quarters of lower-income households lack emergency savings to cover 3 months of household expenses (Lin et al., 2019). A growing interest in helping consumers build emergency savings is reflected in efforts such as the \$50 million Blackrock Emergency Savings Initiative, the Consumer Financial Protection Bureau's "Start Small, Save Up" initiative and the Compliance Assistance Sandbox Template for automatic enrollment in workplace savings programs, and the AARP Policy Institute's Emergency Savings initiative.

The interest in this topic is warranted as emergency savings reduces risk for material hardship (e.g., difficulty making rent payments; Gjertson, 2016), including in the aftermath of financial shocks (Despard, Grinstein-Weiss, et al., 2018; Despard, Guo, et al., 2018; McKernan et al., 2009; Valdes & Mottola, 2021) such as job or income losses, which 24% of US households experienced in the first several weeks of the COVID-19 pandemic (Despard, Grinstein-Weiss, et al., 2020). Having emergency savings can also lessen demand for high-cost credit products such as payday loans (Consumer Financial Protection Bureau, 2013; Despard et al., 2017) and mitigate family stress (Rothwell & Han, 2010).

Lower-income consumers are less likely than higher-income consumers to have emergency savings (Despard, Friedline, & Martin-West, 2020; Federal Deposit Insurance Corporation, 2020) which renders them more vulnerable to financial shocks such as pandemic-related job and income losses. To set aside money for emergencies, income needs to at least occasionally exceed expenses (Barr, 2012; Mullainathan & Shafir, 2009). Yet lower-income households are less able than higher-income households to cover their regular household expenses (Lin et al., 2019), whereas the ability to cover expenses is associated with saving behaviors and an increased likelihood of having emergency savings associated with saving (Morduch & Siwicki, 2017; Pew Charitable Trusts, 2016) and the likelihood of having emergency savings (Despard, Friedline, & Martin-West, 2020).

Bank account ownership also plays an important role. Rates of setting aside money for emergencies were 66% and 26% among households with and without checking and/or savings accounts, respectively (Federal Deposit Insurance Corporation, 2020) while savings account ownership is associated with a 28% greater probability of having emergency savings, controlling for age, income, and other household characteristics (Despard, Friedline, & Martin-West, 2020). Yet 24% of U.S. households (Lin et al., 2019) and 29% of lower-income tax filers lack savings accounts (Roll et al., 2018).

Receiving tax refunds is an opportunity for lower-income households to build emergency savings (Jones, 2012; Rhine et al., 2006). Saved refunds can be drawn down to smooth consumption in the months following tax filing and to help cope with income volatility (Morduch & Siwicki, 2017), reducing risk for material hardships such as difficulty paying bills (Gallagher & Sabat, 2017; Grinstein-Weiss et al., 2016). However, lower-income households experience other challenges such as a lack of retirement savings, debt, and income volatility (Valdes & Mottola, 2021), cash flow problems (Rothwell & Sultana, 2013) and expense shocks (Tach et al., 2019). These households use their refunds not just to save but to catch up on rent and other bills, reduce debt, and make large purchases (Barrow & McGranahan, 2000; Halpern-MeeKin et al., 2015; Shaefer et al., 2013; Sykes et al., 2015).

The fact that many low-income households opt to use their refund to catch up on past-due bills or pay down debt they have accumulated throughout the year further indicates that a fundamental challenge for these households is that their incomes are too low to support both consumption needs and savings. At the same time, these households may also struggle to save



because more immediate needs such as emergency expenses or managing an array of payment obligations demand their attention and drain their cognitive resources (Shah et al., 2012). This results in households focusing more on immediate, salient needs, and less on the types of future needs that savings can address (e.g., covering the costs of a financial shock). These two savings barriers—budget constraints and inattention to future needs—indicate that lower-income households may benefit from interventions that either incentivize savings or make savings decisions more salient to motivate their executive functioning (Spears, 2011) concerning the need to build precautionary savings (Lusardi, 1998).

To consider whether lower-income households might be encouraged to save their tax refunds, we examine the outcomes of a field experiment among a sample of lower-income tax filers ( $N = 284,125$ ) testing three different behavioral interventions embedded in tax filing software meant to encourage refund saving. All three interventions resulted in higher refund savings rates compared to a control group, yet effect sizes were modest (0.12–0.14) and the aggregate refund saving rate was low (12%). Thus, we also conducted a survey experiment to hypothetically assess whether lower-income tax filers could be better encouraged to save refunds with the use of incentives, mirroring key provisions of two policy proposals: the Refund to Rainy Day Savings (Halpern-Meekin et al., 2018) and Financial Security Credit Acts. Our findings can inform public policies to promote emergency savings and to offer greater economic support to lower-income households so they have the net income needed to save for emergencies and address other financial needs and challenges.

## 2 | TAX-TIME SAVINGS: STRATEGIES AND LIMITATIONS

Difficulty covering expenses with income is a major reason households—especially those with lower incomes—lack emergency savings (Despard, Friedline, & Martin-West, 2020). This is intuitive; households need for income to exceed expenses in some months to have an opportunity to accumulate emergency savings. Tax refunds are irregular windfalls (Epley & Gneezy, 2007) which lower-income households can use to increase savings (Mammen & Lawrence, 2006; Romich & Weisner, 2000).

Tax time savings interventions aim to encourage lower-income tax filers to save all or part of their refunds. The Extra Credit Savings Program offered lower-income tax filers in Chicago free filing assistance and the opportunity to open savings accounts and receive a 10% bonus (up to \$100) on saved refunds. A fifth of filers offered the program opened savings accounts (Beverly et al., 2004). Through the Refund to Assets program, lower-income filers were offered the opportunity to open a savings account on site and encouraged to split their refund between checking and savings accounts. More than a quarter of filers opened accounts and participants saved an average of \$606—nearly half of the total refund received (Beverly et al., 2006).

The SaveNYC initiative offered lower-income tax filers in New York City a 50% match up to \$250 on saved refunds, resulting in a refund saving rate of 9% and average savings of \$391. The treatment group had \$294 more in savings and a 27-percentage point greater likelihood of having at least 1 month of usual expenses in savings than the comparison group (Tucker et al., 2014). In 2010, the refund saving rate was 10% with the same match rate but a higher contribution ceiling (\$1000 vs. \$500). There was no difference between the treatment and comparison group in average savings several months after tax filing, but the treatment group was less likely than the comparison group to have skipped bills or taken out a loan (Key et al., 2015). Offering the same incentives as the SaveNYC initiative, a 42-month follow-up evaluation of the

SaveUSA experiment found an 8-percentage point increase in the proportion of filers with any non-retirement savings and \$522 more in savings among treatment compared to control group participants. However, the program did not impact the incidence of material hardship (Azurdia & Freedman, 2016).

The findings above indicate that some lower-income tax filers can be encouraged to save their refunds. The amounts participants in these interventions save are modest, which may reflect the competing demands lower-income households navigate for refund use (Halpern-Meekin et al., 2015). Still, even modest amounts of emergency savings are associated with lower risk for material hardship (Brobeck, 2008) including food insecurity (Sabat & Gallagher, 2019). Moreover, many lower-income individuals file their taxes online whereas the studies above concerned in-person tax filing, such as through Volunteer Income Tax Assistance (VITA) sites. In an online tax filing environment, it may be possible to further encourage refund saving.

### 3 | CURRENT STUDY

The current study was conducted as part of the Refund-to-Savings initiative, a partnership of Washington University in St. Louis, Duke University, and Intuit Corporation to use behavioral interventions embedded in TurboTax Freedom Edition software to encourage lower-income tax filers to save all or part of their tax refunds. TurboTax Freedom Edition is a free version of TurboTax available to lower-income tax filers through the Internal Revenue Service's Free File Alliance.

In previous field experiments conducted during the 2012, 2013, and 2015 tax seasons, we tested a variety of behavioral interventions to motivate refund saving. Anchors were suggestions to save a percentage of one's refund or a fixed amount (Tversky & Kahneman, 1974) and prompts suggested filers split refunds into checking and savings accounts. We also tested persuasive messages to save for emergencies or family needs (Wiener & Doescher, 2008), and choice architecture—changing the order of the refund options such that by listing saving first, it becomes the default (Johnson et al., 2012; Levav et al., 2010; Thaler et al., 2013), as well as various combinations of these interventions.

#### 3.1 | Tax preparation field experiment

Our current study was conducted during the 2016 tax season. After TurboTax Freedom Edition users reached the point in the online tax filing process where they were prompted to decide how to receive their tax refund (“Choose how you'd like your refund”), they were randomly assigned to the control condition or one of three intervention conditions: (1) choice architecture only; (2) choice architecture plus a passive emergency saving prompt; and (3) choice architecture plus an interactive emergency savings prompt.

In the control group, participants received the usual TurboTax Freedom Edition online tax filing experience. In the choice architecture only intervention, depositing one's entire refund into a savings account appeared as the first option. In the choice architecture plus passive emergency saving condition, a message persuading filers to save their refunds for emergencies was added before the refund allocation screen. In the choice architecture plus interactive emergency savings condition, filers received a persuasive message plus an invitation to click on icons representing reasons for having emergency savings: car repairs, job loss, medical bills, legal fees,



home repairs before the refund allocation screen, which displayed their icon selections from the previous screen. In the control group, filers' refund allocation choices included direct deposit into a checking or savings account, a direct deposit split between a checking and a savings account, paper check, or the purchase of a savings bond. In the three intervention groups, the choice architecture modification listed depositing into a savings account specifically as the first option, followed by the other options.

With our research design, we evaluate the sole contribution of a choice architecture modification whereas in prior experiments it was used in combination with other behavioral interventions. We also assess the marginal effects of persuasive messages concerning emergency savings whereas in a previous experiment these messages were used in tandem with the choice architecture modification. In using both active and passive emergency savings messages, we compare higher and lower levels of executive functioning (Spears, 2011), respectively, concerning a precautionary savings motive (Lusardi, 1998) amidst competing demands and preferences (e.g., Halpern-Meehin et al., 2015). Thus, our design framework allows us to compare ways of presenting information about refund saving in ascending levels of intended tax filer attention and interaction with this information. Perhaps drawing tax filers further into considering their refund allocation choices will encourage saving. Alternatively, making saving the default option may be a sufficient nudge.

### 3.2 | Survey experiment: Refund savings incentives

The refund saving rate has never exceeded 15% in our behavioral experiments (Grinstein-Weiss et al., 2015; Grinstein-Weiss, Cryder, et al., 2017; Grinstein-Weiss, Russell, et al., 2017; Key et al., 2013; Roll et al., 2018, 2019, 2020), indicating that most filers chose not to save their refunds. In addition to testing whether three differently designed behavioral interventions might have more of an impact than interventions from prior studies, we added a survey experiment to assess hypothetical responses of tax filers to refund savings incentives reflected in two policy proposals to determine if incentives may boost refund saving to a greater extent than behavioral nudges.

To assess filers' interest in refund saving incentives reflected in the Refund to Rainy Day Savings Act (S.1018), we embedded a survey experiment in an online household financial survey that tax filers were invited to complete after they filed their taxes. In the survey, we randomly assigned filers to receive one of three questions concerning the likelihood they would save 20% of their refund for a period of 6 months if given no match, a 25% match, or a 50% match. In the no match condition, participants were asked: "Many people get a financial boost from tax refunds but find themselves short on funds later in the year. Imagine a program that allows you to put off a portion of your refund and receive it 6 months later. You just completed your taxes and expect a \$(amount) refund. If you had the following options today, which would you choose to do?" The federal tax refund amount they reported earlier in the survey populated the refund amount field in this question. Response choices included to receive their full refund at tax time or to receive 80% of their expected refund at tax time and the remaining 20% 6 months later. In addition, participants in the 25% and 50% match conditions received a hypothetical offer of "one bonus dollar for every four/two dollars of your refund if you wait 6 months to receive it."

## 4 | STUDY PURPOSE

Saving refunds is a way lower-income tax filers can build emergency savings to have on hand during the year when income falls short of expenses, especially planned or unplanned large expenditures. As outlined above, modifications in the choice architecture of the refund allocation screen, a persuasive message framed around saving for emergencies, and an opportunity for filers to interact with the emergency savings message may boost refund saving. Yet because most lower-income tax filers choose not to save their refunds, financial incentives might further encourage refund saving. The Refund to Rainy Day Savings and Financial Security Credit Acts would offer meaningful incentives, but whether this might compel lower-income filers to respond is an untested assumption. Further, it is possible that responses to financial incentives depend on the size of the refund, as the nominal dollar value of a savings match scales with the amount of the refund (20%) eligible for a match. As such, tax filers with larger refunds may be more sensitive to refund savings incentives, both because a larger refund may allow them more flexibility to defer a portion of it, and because they stand to gain more in dollar terms from the match.

To test the assumptions described above, our research questions are:

RQ1: Do tax filers in each of the three behavioral intervention conditions have greater refund saving responses compared to a control group?

RQ2: Is one behavioral intervention more effective than the others regarding refund saving responses?

RQ3: How likely might lower-income tax filers be to save their refunds if offered financial incentives proposed in the Refund to Rainy Day Savings and Financial Security Credit Acts? Does this response depend on the size of the refund?

## 5 | METHODS

### 5.1 | Sample

The study sample included 284,125 lower-income tax filers who filed their federal income taxes using TurboTax Freedom Edition during the 2016 tax season and expected to receive a refund. To be eligible for TurboTax Freedom Edition, a tax household must have had an adjusted gross income (AGI) below \$31,000, received the Earned Income Tax Credit (EITC), or had a member of the household who was active-duty military and an AGI below \$61,000. Most filers who used (program) qualified due to the general AGI or EITC criteria. TurboTax Freedom Edition users who were not due a refund were not part of the study. To answer RQ3 regarding the survey experiment, we used a smaller sample of 9955 tax filers who elected to complete a household financial survey after they filed their taxes.

Table 1 presents the characteristics of the study sample by intervention condition. Mean differences across conditions were small and not statistically significant, indicating that randomization was successful in balancing the groups. Annual income was low—an average of around \$14,000. Average refunds were substantial, comprising nearly 15% of annual income. More than two-thirds of participants filed as Single while less than a quarter filed as Heads of Household.

Table 2 presents the characteristics of the participants in the survey experiment. Overall, the randomization resulted in strongly balanced treatment groups. There was only one significant

TABLE 1 Sample description: 2016 experiment

Intervention group	Control	Choice architecture (CA) only	CA + passive emergency prompt	CA + interactive emergency prompt
Age <sup>a</sup>	35.23 (16.17)	35.22 (16.1)	35.15 (16.17)	35.27 (16.24)
<i>Filing status</i>				
Single	68.5%	68.8%	68.6%	68.5%
Head of household	22.3%	22.1%	22.1%	22.1%
Married, filing jointly	8.3%	8.2%	8.5%	8.5%
Any dependents	29.6%	29.3%	29.5%	29.4%
Number of dependents	0.50 (0.91)	0.50 (0.91)	0.50 (0.9)	0.50 (0.91)
Adjusted gross income	\$14,433 (\$9922)	\$14,344 (\$9877)	\$14,432 (\$9915)	\$14,428 (\$9848)
Amount of federal tax refund	\$1959 (\$2377)	\$1952 (\$2377)	\$1956 (\$2375)	\$1952 (\$2373)
Federal tax liability	\$426 (\$708)	\$420 (\$707)	\$424 (\$710)	\$422 (\$702)
Amount withheld	\$1079 (\$1144)	\$1077 (\$1142)	\$1080 (\$1134)	\$1077 (\$1133)
Percent receiving EITC	39.6%	39.6%	39.6%	39.7%
Amount EITC	\$2375 (\$1923)	\$2347 (\$1920)	\$2362 (\$1925)	\$2344 (\$1923)
Observations	70,978	70,928	71,306	70,913

<sup>a</sup>Calculated based on the difference between the weighted means of birthdate at tax filing and filing date. Standard deviation in parentheses. No significant differences between the control and treatment groups at the 5% level were found concerning any tax filer characteristics.

difference—participants in the 25% match group were on average 0.8 years younger than those in the control ( $p < 0.05$ ). This table also allows us to compare participants in the survey experiment with those in the tax filing experiment. There were some differences between the two study samples.<sup>1</sup> Participants in the survey experiment were more likely to have Single tax filing status and, commensurately, fewer of these participants reported dependents in their household. Survey experiment participants also had average incomes roughly \$1500 higher than those in the tax filing experiment and, while EITC receipt rates were similar between the groups, the amount received from the EITC was lower among survey experiment participants (which is likely due to being more likely to file as Single and having fewer dependents). From this, we can infer that the tax filing experiment participants who select into the survey differ somewhat from those who do not on several observable characteristics, and caution is therefore warranted when considering the generalizability of survey experiment results to the broader lower-income tax filing population.

TABLE 2 Sample description: Refund deferral survey experiment

Intervention group	Control	25% match	50% match	Full survey sample
Age <sup>a</sup>	35.43 (13.82)	34.67* (13.42)	35.52 (13.70)	35.21 (13.65)
<i>Filing status</i>				
Single	73.13	73.77	73.12	73.34
Married, filing jointly	14.15	13.43	14.34	13.97
Other (head of household, married filing single, widower)	12.73	12.80	12.53	12.69
Any dependents	23.67	22.78	23.17	23.20
Adjusted gross income (\$)	15915.33 (10484.34)	15842.13 (10492.85)	15692.07 (10292.42)	15816.42 (10422.97)
Amount of federal tax refund (\$)	1756.61 (2104.21)	1751.36 (2136.98)	1746.38 (2097.36)	1751.44 (2112.74)
Federal tax liability (\$)	502.31 (813.49)	504.03 (785.61)	497.05 (774.93)	501.13 (791.41)
Amount withheld	1199.68 (1174.34)	1225.21 (1195.47)	1210.91 (1165.12)	1211.96 (1178.33)
Percent receiving EITC	41.05	38.88	39.98	39.97
Amount EITC (\$)	1764.63 (1780.62)	1770.55 (1828.71)	1744.04 (1798.98)	1762.84 (1803.74)
Observations	3308	3328	3319	9955

<sup>a</sup>Calculated based on the difference between the weighted means of birthdate at tax filing and filing date. Standard deviation in parentheses. \* $p < 0.05$ .

## 5.2 | Measures and analysis

Data for the study are from 2016 federal income tax data collected through TurboTax Freedom Edition and made available by Intuit Corporation, sub-aggregated by intervention condition. These data included the number of tax filers assigned to each condition, their tax characteristics (e.g., AGI, refund amount, filing status), and refund allocation decisions and amounts.

The independent variable was the intervention condition—whether the filer was in the control group or in one of the three intervention groups. We used two dependent variables to answer RQ1 and RQ2: (1) the proportion of participants who allocated any part of their refund to a savings account; and (2) the amount of refund allocated to a savings account. These variables were measured using aggregated income tax data provided by Intuit Corporation, representing tax filers' directly observed refund behaviors. These refund saving choices were only observed among participants who owned a savings account and entered their savings account number on the refund allocation screen.

To answer RQ1, we used an intent-to-treat (ITT) approach that captures the average impact of the intervention for each intervention group relative to the control:





$$ITT = \bar{Y}_T - \bar{Y}_C$$

where  $Y_T$  is the average outcome for the group exposed to a given savings intervention, and  $Y_C$  is the average outcome for the control group who did not receive an intervention, compared using chi-square tests and  $t$ -tests. ITT analysis was chosen to estimate intervention effects for the entire population of lower-income online tax filers, including those without savings accounts to reflect a set of real-world conditions. Bivariate tests were used because we analyzed aggregate data and samples were balanced through random assignment as reflected in Table 1. To answer RQ2, we used  $t$ -tests and chi-square tests to estimate differences in outcomes among the three intervention groups. For refund saving rates, we calculated effect size using a binomial effect size display, the resulting percentage of which we transformed into Cohen's  $d$  (Lenhard & Lenhard, 2016; Rosenthal & Rubin, 1982). For refund savings amount, we calculated Cohen's  $d$  using standardized mean differences between the intervention and control group.

To answer RQ3, we used linear probability modeling to examine refund savings intentions (Hellevik, 2009) across the three groups (no match, 25% match, and 50% match), assigning a value of "1" to defer 20% of the expected refund, and "0" to receive the entire refund at tax time. We estimated three models: (1) an unadjusted model examining the relationship between match rate and deferral preferences; (2) a model in which we control for refund quantile, age, income, filing status, number of dependents, race/ethnicity, gender, home, credit card, and bank account ownership, taxes withheld, budgeting habits, ability to come up with \$2000 in an emergency, material hardship and financial shocks in the prior 6 months, and health insurance status; and (3) a model that explores the interaction between refund quantile and match rate, controlling for the above demographic and financial characteristics.

## 6 | RESULTS

Concerning RQ1, the refund saving rate was 9.2% among the control group compared to refund saving rates for the three intervention conditions of 12.9%–13.4% ( $p < 0.001$ ), with effect sizes ranging from 0.12 to 0.14. The control group saved an average of \$162 compared to between \$214 and \$222 in the three intervention groups ( $p < 0.001$ ), with effect sizes ranging from 0.06 to 0.07.<sup>2</sup>

Concerning RQ2, differences in the refund saving rate were 0.23% higher and 0.29% lower in the passive and interactive emergency saving groups, respectively, compared to the choice architecture only condition. Neither difference was statistically significant. The average amount saved was \$6.90 and \$7.30 higher in the passive and interactive emergency saving groups, respectively, compared to the choice architecture only condition. Neither difference was statistically significant. Also, the refund savings rate was 0.51% higher in the passive compared to the interactive emergency saving prompt group ( $p < 0.001$ ), though the difference in average refund amount saved between the two groups was less than \$1. Filers showed a strong preference for depositing their entire refund into a savings account, rather than splitting the refund between a savings account and another account. This preference is reflected in the over-dispersion of data on refund amounts saved with the standard deviation in each intervention condition exceeding the mean by more than four times. For example, in the Choice Architecture condition, 96% of people who saved did so using the entirety of their refund (Table 3).

## 6.1 | Survey experiment results

Overall, 16.08% of survey participants said they would defer 20% of their refund for 6 months without the offer of a match. With a 25% and 50% match, these hypothetical refund savings take-up rates rose to 70.55% and 79.72%, respectively. Table 4 presents linear probability model estimates of refund saving preferences based on hypothetical match rates. Model 1 includes estimates absent controls, Model 2 includes controls for the quantile of the refund amount as well as an array of other demographic and financial controls, and Model 3 incorporates an interaction between the refund quantile and the match rate. In all three models, 25 and 50% matches are associated with statistically significant greater likelihoods of refund saving compared to no match. For example, in Model 2, participants who received a hypothetical offer of a 25% match had a 54.5 percentage point greater likelihood of saving their refunds compared to no match ( $p < 0.001$ ; Table 4).

Results from Model 2 show that participants with higher refunds had significantly greater hypothetical refund saving rates. Compared to participants in the first quantile for refund amount, participants in the second, third, fourth, and fifth quantiles had 5.4, 6.0, 9.0, and 16.1 percentage point greater likelihoods of refund saving ( $p < 0.001$ ). This indicates that as refund size increases, individuals may be more willing to defer a portion of their refund as savings. Interestingly, however, the coefficients on the treatment conditions offering savings matches are functionally unchanged from their Model 1 values once we account for refund size in Model 2, which may indicate that the appeal of the savings match is insensitive to the nominal dollar value of the savings match, which scales with refund size.

This pattern is further validated in Model 3, in which we incorporated interaction terms between refund quantile and the refund saving match rate to assess the degree to which refund size moderates participants' response to hypothetical match rates. Results for six out of eight of these interactions were not statistically significant, indicating that the response to different refund match rates is generally not sensitive to refund size.

Figure 1 incorporates the Model 3 estimates to illustrate the predicted probabilities of refund deferral as a function of refund savings match rate and refund quantile. The patterns in predicted probabilities reflect the findings reported above: reported refund savings rates increase as both match rate and refund size increase. This figure also indicates that a 50% match rate may be more effective at incentivizing refund saving among those with lower refunds and

TABLE 3 Average treatment effects: 2016 interventions

Treatment group	Saved any of refund			Amount of refund saved			
	%	$\chi^2$	Effect size ( <i>d</i> )	<i>M</i>	<i>SD</i>	<i>t</i>	Effect size ( <i>d</i> )
Control ( $n = 70,798$ )	9.17			\$162	\$858		
Choice architecture (CA) only ( $n = 70,928$ )	13.21***	582.69	0.13	\$214***	\$957	10.96	0.06
CA + passive emergency prompt ( $n = 71,306$ )	13.44***	646.57	0.14	\$221***	\$975	12.29	0.07
CA + interactive emergency prompt ( $n = 70,913$ )	12.93***	510.26	0.12	\$222***	\$991	12.24	0.07

Note: \*\*\* $p < 0.001$ . *d* = Cohen's *d* effect size estimation.

TABLE 4 Linear probability model results: Refund saving responses to hypothetical incentives

Outcome	Would defer 20% of refund		
	1	2	3
Refund deferral match (Ref. = No Match)			
25% Match	0.545*** (0.010)	0.545*** (0.010)	0.509*** (0.022)
50% Match	0.636*** (0.010)	0.636*** (0.010)	0.608*** (0.022)
Refund quantile (Ref. = 1st Quantile)			
2nd (\$383–\$696)		0.054*** (0.013)	0.020 (0.022)
3rd (\$697–\$1163)		0.060*** (0.013)	0.035 (0.023)
4th (\$1164–\$2651)		0.090*** (0.014)	0.029 (0.023)
5th (Over \$2651)		0.161*** (0.020)	0.174*** (0.027)
Refund Deferral Match*Refund Quantile			
25% Match*2nd Quantile			0.041 (0.031)
25% Match*3rd Quantile			0.044 (0.031)
25% Match*4th Quantile			0.099** (0.031)
25% Match*5th Quantile			–0.001 (0.031)
50% Match*2nd Quantile			0.000 (0.000)
50% Match*3rd Quantile			0.061 (0.031)
50% Match*4th Quantile			0.029 (0.031)
50% Match*5th Quantile			0.085** (0.031)
Constant	0.161*** (0.007)	0.022 (0.029)	0.045 (0.032)
Demographic/financial controls	No	Yes	Yes
R-squared	0.319	0.341	0.342
Observations	9955	9955	9955

\*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

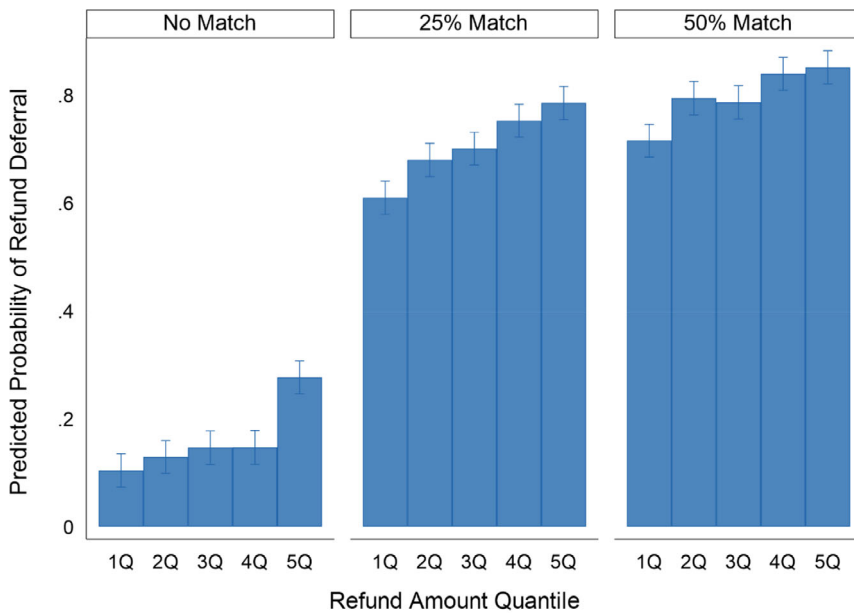


FIGURE 1 Predicted probabilities of refund saving by hypothetical match rate and refund amount

that those with higher refunds are less responsive to the shift from a 25% match to a 50% match.

## 7 | DISCUSSION

In this paper, we report results from a field experiment conducted during the 2016 tax season concerning impacts on tax refund saving of behavioral interventions delivered through online tax filing software among a sample of over 250,000 lower-income tax filers. We also report results from a survey experiment among these filers testing hypothetical refund saving responses to incentives reflected in key provisions of two policy proposals.

Concerning our first research question, we find statistically significant treatment effects on refund saving responses for all three behavioral interventions, yet effect sizes were small. Regarding our second research question, however, there was little difference among the three interventions concerning refund saving outcomes. The idea that stimulating tax filers' executive functioning (Spears, 2011) around a precautionary savings motive (Lusardi, 1998) might result in greater refund saving take-up was not supported. It may be that tax filers already knew how they were going to spend their refunds, for example, to catch up on bills, buy clothing for their children, and pay down debt (Halpern-Meekin et al., 2015).

Among those who choose to save their refunds, nearly all did so for the entirety of their refund. This finding is consistent with our prior studies which show very low rates of refund splitting (1.3% and below; Grinstein-Weiss, Russell, et al., 2017)—allocating one's refund to more than one bank account. It may take too much effort for tax filers toward the end of their filing session to look up and enter more than one bank account number. Filers may only use their checking account number as it is usually easier to find and might transfer part of their



refund to a savings account at a later point, which means the actual refund saving take-up rate may be higher than what we observed.

While it might help to give tax filers an anchor—a default suggestion about how much to save (e.g., 25% of the refund or a flat amount like \$250)—in recognition of the fact that most filers wish to use their refunds for other purposes (Tach et al., 2019), our prior research shows that anchors increase the split rate only to 3% (Roll et al., 2019). It may be that anchors are insufficient to overcome the inconvenience of looking up bank account numbers toward the end of a tax filing session and/or that the overall refund saving rate we observe is confined to a sub-group of filers who do not need to use their refunds for other reasons such as catching up on bills.

Concerning our third research question, we find an elevated level of interest in both a 25% and 50% hypothetical refund savings match among lower-income tax filers. This finding suggests that policy proposals such as the Refund to Rainy Day Savings Act and Financial Security Credit Act, which include these incentives, may be a more effective way to encourage lower-income tax filers build emergency savings than behavioral nudges.

Though refund saving preferences in response to hypothetical savings matches rise with refund amount, our tests for moderation indicate that these preferences are largely insensitive to refund size. In other words, a tax filer offered a 50% savings match to defer a portion of their \$1000 refund and a tax filer offered a 50% match to defer a portion of their \$5000 refund appear to respond to that match in similar ways. This may indicate that the savings match opportunity is similarly attractive regardless of the amount offered through the match, which is a function of the size of the refund.

Nonetheless, filers in the highest refund quantile (\$2652 and higher) were more likely to say they would save their refunds across incentive conditions. Perhaps filers with larger refunds have less risk tolerance (i.e., the possibility of owing taxes versus getting a refund) and thus have higher withholding as a form of forced savings (Tach & Halpern-Meekin, 2014) compared to filers with smaller refunds. However, the gap between filers in the highest refund quantile and those with lower refunds narrows when incentives are introduced. Filers with lower refunds may feel like saving is more “affordable” given other financial needs if they have an outside boost. Also, Jones (2012) finds that over-withholding among lower-income tax filers is due far more to inertia than actively adjusting withholding relative to anticipated refunds. Differences in saving motivation among those with larger and smaller refunds might be due less to differences in risk tolerance and more to decisions about whether the size of the refund is large enough to put some in savings after meeting other needs. Or it may be that those with larger refunds simply have more to gain from matches—potential explanations that could be explored in future research.

There are important caveats to note concerning findings from the survey experiment. We did not randomize participants' refund amounts and, therefore, the nominal dollar value of the savings match. Instead, we used the value of the tax refund for which they qualified at tax filing as a proxy for the potential dollar value of the savings match. Tax filers may respond differently to the savings match incentives when offered a match at the same time they learn what their refund will be in a given tax filing year. In addition, prior research shows a gap between intended and actual refund saving among lower-income households (Mendenhall et al., 2012), reflected in the finding the survey experiment group offered no hypothetical incentives had a higher rate of intended refund saving than the observed refund saving rate in the control group from the field experiment. Lower-income tax filers may know it is prudent and socially desirable to save, but real-world circumstances (e.g., owing back rent) may intervene to make it hard to save refunds.

Prior research also indicates that the effects of incentives on refund saving and other financial outcomes are modest (Azurdia & Freedman, 2016; Beverly et al., 2004, 2006; Key et al., 2015; Tucker et al., 2014). Yet, there is an important feature of the incentive structure of Refund to Rainy Day Savings and Financial Security Credit Acts to note. Tax filers would receive a match on up to 20% of their refund that they agree to save for 6 months which may offer a reference point for how much of the refund to save that may seem feasible among most filers who will use their refunds for other purposes such as catching up on bills.

Our results show that a small proportion of lower-income tax filers choose to save their refunds and that behavioral interventions—with none being more effective than others—can push this take-up rate higher, but with low effect sizes—findings consistent with our prior studies. Yet when these same tax filers are offered hypothetical incentives, interest in saving refunds rises dramatically. Taken together, these results suggest that lower-income tax filers may already be motivated to save but need a compelling financial reason to do so with respect to other needs for which they use tax refunds. Thus, structural (i.e., changes in public policy) approaches will be more effective than behavioral approaches in helping lower-income tax filers build emergency savings.

Still, a broader question remains: is refund saving something policy makers should encourage? As noted earlier, lower-income tax filers use their refunds for a variety of reasons that may make more financial sense or that reflect families' preferences for how they wish to manage scarce resources. For example, paying back rent to avoid an eviction would be better than saving, especially if there are children in the household. If this tax filer considers their refund the result of “forced savings” (Tach & Halpern-Meehin, 2014) and uses it toward back rent after they file taxes, then they are doing exactly what is intended in having emergency savings—to use liquid assets to avoid material hardship. Using this example, the tax filer uses their refund to address a present and known emergency rather than to prospectively address a future and unknown emergency.

Similarly, buying non-perishable food in bulk may be a better hedge against food insecurity (Tach et al., 2019) as refund amounts in saving could be dissaved at a later point for reasons other than purchasing food or if food prices may rise. Furthermore, lower-income tax filers may be understandably reluctant to engage in “double saving,” having deferred consumption until they filed taxes. It may be too much to suggest they defer consumption for an even longer period.

If having emergency savings is meant to help smooth consumption, especially amidst financial shocks, there are other policy options to consider. An administrative policy alternative to refund saving is periodic payment, wherein tax filers eligible for the EITC would receive up to half of their expected refundable credit in quarterly payments during the year (Holt, 2015) rather than making households wait until tax filing to access refunds. However, prior research suggests that lower-income tax filers prefer receiving lump sum refunds at tax time as a form of forced saving (Jones, 2010, 2012; Romich & Weisner, 2000; Tach & Halpern-Meehin, 2014) and take-up for a prior version of periodic payment—the Advance EITC—was low, which led to its repeal in 2010.

Ultimately, most lower-income households need greater financial slack—income that exceeds expenses at least part of the time so disposable income can be saved. For this to happen, policies such as universal childcare, paid leave, raising the minimum wage, expanding the EITC, and making the expanded Child Tax Credit (CTC) permanent (Hamilton et al., 2021) are needed to confront persistently low earnings (Hardy et al., 2018). In fact, 44% and 47% of households with annual income under \$25,000 and from \$25,000 to \$49,999 said they used expanded CTC payments offered from July 2021 through December 2021 for emergency savings (Hamilton et al., 2022). This result suggests that lower-income households will save for emergencies if they have the additional income to do so.



Nonetheless, with additional income supports, it may still be important to help lower-income households set aside money for emergencies in months where income exceeds expenses, however modestly. Savings account ownership is associated with a greater probability of having emergency savings (Despard, Friedline, & Martin-West, 2020; Federal Deposit Insurance Corporation, 2020) as consumers are less likely to withdraw savings deposits (Sikkel & Van Meer, 2015) than amounts held in checking accounts or cash that are considered “saved”. Furthermore, refund amounts allocated to savings accounts reduce the likelihood of material hardship in the months following tax filing (Grinstein-Weiss et al., 2016).

Lower-income households are less likely than higher-income households to own savings accounts (Despard, Friedline, & Martin-West, 2020) and thus need greater access to these accounts to enable refund saving (Friedline et al., 2019) when it makes financial sense. Under the Financial Security Credit Act, in addition to refund saving incentives, lower-income tax filers would have the opportunity to open a savings account when they file their federal income tax returns. To ensure accounts are affordable, banks can follow BankOn National Account Standards, which mirror those of the Federal Deposit Insurance Corporation's Model Safe Accounts template (Federal Deposit Insurance Corporation, 2012). However, voluntary take-up of BankOn standards is low (Faber & Friedline, 2020); it may take amending the service test of the community Reinvestment Act (CRA) to compel banks to ensure access to affordable accounts as part of the current CRA modernization effort. Consumers can open checking and savings accounts online using “branchless” platforms, though financial technology may not overcome inherent problems within the financial services system that work against lower-income consumers (Friedline, 2020; Friedline & Chen, 2021).

There are important limitations of our study to note. First, our findings may not generalize to the entire lower-income tax filing population. TurboTax Freedom Edition users and online tax filers in general may differ in important but unobserved ways from filers who complete paper returns, or use paid or volunteer preparers. A different study leveraging survey data from TurboTax Freedom Edition compared the survey sample to American Community Survey data on lower-income U.S. households and found that survey respondents were younger, had higher educational attainment, were more likely to be white, more likely to be single, more likely to be employed, more likely to be students, and had fewer dependents in the household (Gallagher et al., 2019). Therefore, while randomization in both the tax filing and survey experiments ensured strong internal validity, caution is warranted when generalizing these results to lower-income households more generally. Second, we cannot observe whether tax filers saved outside of savings accounts. For example, Thompson et al. (2020) found that a third of online tax filers reported saving their refund in checking accounts. Third, we do not observe whether participants who saved their refunds might have increased their borrowing, nor how long participants held onto their saved refunds. However, using self-reported survey responses, we found that participants who received a behavioral intervention in 2013 had retained a greater proportion of their refund in savings (Roll et al., 2019) and had a lower rate of material hardship (Grinstein-Weiss et al., 2016) 6 months after tax filing compared to the control group.

## 8 | CONCLUSION

In this study, we find that behavioral interventions delivered through TurboTax Freedom Edition, an online tax filing platform for lower-income tax filers, resulted in statistically significant impacts on the refund saving take-up rate and average amounts saved among filers, though

effect sizes were small. As in our prior research, no intervention stood out as more effective than others. The overall refund saving take-up rate was low, suggesting the need for meaningful financial incentives for saving refunds, which our survey experiment results indicated may be an effective policy solution. Still, for many lower-income households, other uses of tax refunds may be better, such as catching up on past due rent to avoid an eviction. Broader and more economically meaningful policy changes like expanding refundable tax credits and raising the minimum wage are needed so lower-income households have the financial slack to meet their basic needs with money left over to save for emergencies.

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## ENDNOTES

<sup>1</sup> Due to data limitations, we cannot assess the extent to which these differences are significant. Per federal regulations, we cannot receive individual-level tax data unless the tax filer consents to sharing that data. Thus, for the tax filing experiment, we rely on data aggregated by treatment group, while for the survey experiment participants consented to share their individual-level tax data. Given this, we can only compare the summary statistics from the two groups descriptively.

<sup>2</sup> To account for the increased risk of committing a Type 1 Error across the multiple hypothesis tests we conducted, we calculated the false discovery rate-adjusted p-values for the statistical tests conducted on the tax filing experiment treatment groups (Anderson, 2008). Adjusting for the false discovery rate across these tests did not lead to any loss of statistical significance. Results available upon request.

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