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Short communication

Tax filing and take-up: Experimental evidence on tax preparation outreach and benefit claiming ☆

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ABSTRACT

The U.S. federal government, states, and non-profits all devote substantial resources to increasing take-up of refundable tax credits like the Earned Income Tax Credit (EITC) and Child Tax Credit (CTC) through educational outreach. We study a different approach to increasing take-up: policies that encourage tax filing. In a large field experiment, we find that IRS letters about free tax preparation modestly increased filing, with a large share of the new filers claiming the EITC and the CTC. The results suggest policies that increase filing can be an effective way to increase take-up of tax-administered social benefits, even policies that do not raise awareness of the benefit itself.

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1. Introduction

Incomplete take-up of social benefits is an important concern among policy-makers and advocates. For example, an estimated one in five of the individuals who qualify for the Earned Income Tax Credit (EITC) – one of the largest anti-poverty programs in the United States today – fail to claim it (IRS, 2020). A common strategy for increasing take-up is to conduct informational outreach to eligible but non-participating individuals. Along these lines, governments and non-profits spend millions of dollars annually on informational outreach efforts to encourage EITC participation and a number of states require employers to send notifications about the EITC to their employees each year (Goldin, 2018).

In this paper we consider a different approach to raising benefit take-up that draws on three contemporary features of the United States safety net. First, a large and growing share of income-support programs, such as the EITC and the Child Tax Credit (CTC), are administered through the tax code (Tahk, 2013). Second, a large fraction of individuals who are eligible for, but do not claim, these tax-administered benefits do not file a tax return. For example, approximately two-thirds of those who qualify for but fail to claim the EITC are nonfilers (Census, 2013). Third, in recent years the vast majority of taxpayers have prepared their tax returns with software assistance, either purchased themselves or via a professional preparer (IRS, 2018a). Together, these facts suggest a potential way to increase take-up for a tax-administered program is simply to induce individuals who qualify for the program to file a tax return. In particular, tax preparation software prompts taxpayers to provide all information necessary to determine eligibility for tax-administered benefits and automatically maps their answers into a completed tax return. As a result, filing a return with these methods should typically result in a taxpayer taking up all benefits for which she qualifies, even benefits of which she is unaware.[1]

To shed light on this approach, we analyzed an experimental outreach intervention conducted by the Internal Revenue Service (IRS) directed at individuals who did not file a tax return during the prior year. To induce this group to file a tax return and, specifically, to use an assisted preparation method, the intervention tar-

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[1] Low-income taxpayers tend not to distinguish the EITC from other tax code provisions that contribute to their refund (Tach and Halpern-Meekin, 2014). Despite the outreach described above, awareness of the EITC is far from universal, and is particularly low among Hispanics and among those who have completed fewer years of schooling (Maag et al., 2005).

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geted the perceived financial cost of using these methods – a potentially important barrier to filing. Specifically, the intervention consisted of a one-time letter providing information about free, IRS-sponsored in-person or software-assisted tax preparation methods – filing methods that are available to approximately 70% of taxpayers but that are used by only a very small share of that group.

Our analysis of the intervention yields mixed results. On the one hand, we observe statistically significant but fairly modest effects of the intervention on filing rates (an increase of approximately 1 percentage point), suggesting that the intervention did not substantially increase awareness of the free filing methods or that the financial cost of tax preparation is not the primary barrier to filing. On the other hand, we find that among those who filed a tax return because of the intervention, the vast majority (approximately 80%) claimed a tax refund. We find that these refunds were driven by a large share of the new filers claiming the EITC and the CTC (approximately 43% and 29% of the new filers, respectively). Moreover, the value of the credits claimed among the new filers was substantial, averaging $861 for the EITC and $976 for the CTC. These estimated effects suggest that each dollar spent on the intervention translated into an average of $15 of additional EITC and CTC benefits claimed. Thus, although the specific intervention we study was only moderately effective at causing nonfilers to file a return, our results underscore the potential of policies that increase tax filing as a method for raising the take-up of tax-administered social benefits.

The high take-up rate and large benefit amounts claimed among these new filers raises the question of why these taxpayers were not filing in the first place – and, simultaneously, why more of the taxpayers in our experiment were not induced to file. Indeed, the magnitude of the estimated financial gains from filing suggest that taxpayers over-estimate the financial costs of filing or that the gains from filing are not top of mind. At the same time, the modest effects of the intervention on filing suggests that taxpayers may also be deterred from filing for non-financial reasons, such as hassle costs.[2]

We contribute to an established literature in public economics that studies barriers to social benefit take-up and program participation (Currie, 2006). Evaluations of interventions that aim to increase EITC awareness – the most common approach to increasing take-up – have mostly found zero or small effects on EITC claiming (Jones, 2010; Chetty and Saez, 2013; Guyton et al., 2016; Cranor et al., 2019; Linos et al., 2020). Bhargava and Manoli (2015) and Manoli and Turner (2014) document substantial effects from IRS notices to filers who appear to have missed the EITC; however, those interventions combined promoting awareness with a simplified process for claiming the credit, making it difficult to distinguish which element led to the increased EITC claiming.[3] Outside of the EITC context, evaluations of awareness interventions have yielded mixed results, with a few studies showing substantial effects (e.g., Armour, 2018; Finkelstein and Notowidigdo, 2019),[4] but most finding either no effect or effects that are modest in magnitude (e.g., Bettinger et al., 2012; SBST, 2016; Bergman et al., 2019). In contrast, the indirect approach for increasing EITC take-up that we focus upon does not require instilling awareness of the credit's existence or of its complicated eligibility rules. Few if any studies have estimated the CTC take-up rate; see Dickert-Conlin et al. (2005) for a discussion.

Several prior papers have shed light on specific aspects of the link between tax filing with an assisted preparation method and EITC take-up. Kopczuk and Pop-Eleches (2007) exploit the staggered introduction of state electronic filing programs to study how electronic filing shapes EITC claiming. They find a positive effect of these programs on EITC claiming but cannot distinguish whether the increase in take-up is due to an increase in tax filing or to changes in preparation method among current filers. Gunter (2019) also studies the relationship between electronic filing and EITC claiming, drawing on state and time variation in broadband internet access, and finds that broadband access leads to more electronic filing of tax returns, but no positive effect on EITC participation and observes mixed evidence on tax filing rates. Finally, Ramnath and Tong (2017) study the effects of the 2008 Economic Stimulus Act, which provided an additional one-time financial incentive to file a tax return. They find this policy raised both tax filing and EITC claiming. Although this paper relied on a different identification strategy than ours (quasi-experimental versus random variation) and targeted a different element of the tax filing decision (the financial benefits versus perceived costs of filing a return), its findings are consistent with our hypothesis that policies that raise filing rates can be an effective method for increasing EITC take-up, even when the policy itself has no direct connection to the EITC. On the other hand, whereas Ramnath and Tong (2017) documented a persistent effect on both filing and EITC take-up, we find no evidence that our intervention increased these outcomes in future years.

2. Background

2.1. Take-Up of Refundable Tax Credits

The EITC is among the largest anti-poverty programs in the United States today. Operating through the tax code, it provides a refundable credit to low- and moderate-income taxpayers who have positive earnings from employment or other work. Over 25 million taxpayers claimed the credit in 2018; among those who qualify, the credit amount varies by income and by family size, with maximum benefits ranging from $519 for taxpayers without children to $6,431 for taxpayers with three or more children. In that year, the average benefit amount among EITC-claimants was approximately $2,500 (IRS, 2018b).

Notwithstanding the financial value of claiming the credit, a significant share of those who appear to qualify for the EITC fail to claim it. In recent years, for example, the EITC take-up rate has been estimated to be between 78 and 80% (IRS, 2020).[5] Of the approximately 5 million low-income individuals who appear to qualify for but not claim the EITC each year, approximately two-thirds do not file a tax return. Among filers, the EITC take-up rate is approximately 92% (Census, 2013). The relatively high take-up rate among filers is likely due to both the widespread use of assisted tax preparation methods (discussed below) as well as the success of automated IRS notices that inform apparently eligible but non-claiming filers of the EITC and provide a simplified process for

[2] For example, Benzarti (2020) estimates that taxpayers leave between $200 and $600 on the table by choosing the standard deduction over itemizing and Nathan et al. (2020) estimate hassle costs of over $200 associated with appealing property tax payments.

[3] Relative to our intervention, these studies also focus on a different population – i.e., individuals who have already filed a tax return establishing their likely eligibility for the credit.

[4] For example, Armour (2018) finds that the roll-out of the Social Security Statement, which contains information on potential Disability Insurance (DI) amounts, doubled the DI entry rate among work-limited individuals (an increase of 6 percentage points). Similarly, Finkelstein and Notowidigdo (2019) find that informational outreach about SNAP sent to likely eligible non-claimants doubled participation (an increase of 5 percentage points).

[5] The take-up rate is defined as the share of eligible taxpayers who claim the credit on their return. The share of benefit dollars claimed is estimated to be somewhat larger, approximately 86% in recent years (Census, 2013).

amending one's return to claim it (Bhargava and Manoli, 2015; Manoli and Turner, 2014).

Incomplete take-up of the EITC has been a persistent policy concern, motivating significant investments in outreach by governments and non-profits, such as flyers, social media campaigns, direct mailings, and "street teams" organized to canvas low-income communities (see Goldin (2018) for a summary of such efforts). In addition, certain states and cities (and in some cases, the federal government) require employers to mail annual reminders to their employees about the EITC; Cranor et al. (2019) estimate that in 2016, such requirements covered over 46 million employees. Note that the efforts described in this paragraph aim to increase EITC take-up by increasing awareness of the credit.

Separate from the EITC, the CTC provides a partially refundable tax credit for taxpayers with children. During our sample period, the maximum credit amount was $2,000 per child, but the amount of the credit that is refundable was limited to $1,400 per child, or less for lower-income taxpayers. The American Rescue Plan temporarily increased the CTC amount for 2021 and made the credit fully refundable. To our knowledge, there do not exist high quality estimates of CTC take-up in recent years.

2.2. Tax Filing

In the United States, most individuals who owe an income tax balance due are required to prepare and file an annual income tax return during the subsequent calendar year.[6] In contrast, individuals who are owed a tax refund – because of refundable tax credits like the EITC or the CTC or from over-withholding – generally face no legal consequence from failing to file a return. During the 2018 filing season, approximately 88% of the potential taxpayers appearing on information returns filed a tax return.

Among filers, most taxpayers use one of several methods to file their tax return. First, they may file their tax return by paper, without assistance. The share of individuals preparing their returns in this way has fallen in recent years, to approximately 4% during the 2018 filing season. Second, and much more commonly, taxpayers may file using a professional tax preparer, such as an accountant, lawyer, or other trained professional (e.g., an employee of an H&R Block or Liberty Tax). In 2018, approximately 55% percent of taxpayers used paid preparers to help file their returns. Third, taxpayers may file their own returns using commercial software, such as TurboTax (approximately 41% of returns filed during 2018).

Additionally, the IRS facilitates two free assisted tax preparation services: the Volunteer Income Tax Assistance (VITA) program and the Free File program.[7] VITA offers free in-person tax preparation services from IRS-certified volunteers to taxpayers whose income for the year is less than or equal to an annually adjusted threshold ($55,000 for the 2019 filing season). VITA is available to the vast majority of taxpayers whose incomes fall below this threshold, although certain complicated but uncommon tax situations are excluded from the program's scope, such as taxpayers who claim a net loss from operating a business.[8]

The Free File program is a partnership between the IRS and a consortium of for-profit firms providing specialized commercial tax software such as H&R Block and TurboTax. Through the program, participating companies offer free versions of their online tax preparation software to qualifying individuals. Eligibility for the Free File program is determined based on a taxpayer's income. By agreement, the annual income threshold is set so that 70 percent of the tax filing population will qualify for the program ($66,000 for the 2019 filing season). In addition, each company sets its own (more restrictive) eligibility conditions concerning which taxpayers qualify for its version of the software based on characteristics such as income, age, military status, and EITC eligibility. Depending on the company and the taxpayer's state, the Free File software may also provide a free state income tax return. Taxpayers participate in the Free File program by initiating their return through the IRS's Free File website.

Despite broad eligibility for Free File and VITA, the share of taxpayers using these services has consistently been quite low. For tax year 2018, among taxpayers whose incomes qualified them to participate in Free File, approximately 2% filed their taxes using the program. In the same year, approximately 3% of the taxpayers whose incomes qualified them to participate in VITA prepared their taxes through the program. Because many nonfilers would have qualified for these programs had they chosen to file, the overall take-up rate was even lower than these figures suggest. A potentially important factor driving the low rate of participation in these programs may be a lack of awareness in the programs' existence among qualifying taxpayers (e.g., TIGTA, 2020).

3. Experimental Sample and Design

During early 2019 (i.e., the prescribed time period for filing 2018 tax returns), the IRS conducted an experiment in which certain individuals were mailed informational letters describing the availability of free assisted tax preparation methods.

Our initial sample population is drawn from a random 10% sample of all taxpayers who did not file a tax return for the prior tax year (2017), but who, based upon information returns filed with the IRS, appeared to have 2017 income above zero and below $55,000 - the maximum threshold to qualify for free assistance through both Free File and VITA.[9] In addition, we restricted the sample to individuals who lived within 30 miles of at least two VITA sites. Finally, because the intervention could not have affected their behavior, we excluded from the sample individuals who filed a 2018 tax return before the experimental letters were sent (i.e., returns posted to the IRS database prior to mid-March, 2019).[10] After imposing these restrictions, the final experimental sample consisted of 1,804,420 individuals.

The experimental intervention consisted of a one-time letter from IRS addressed to the taxpayer. A sample letter is contained in Fig. 1 (see Appendix Figs. A.1–A.4 for treatment letter variants). The letters contained information about free tax preparation programs – either Free File, VITA, or both – including a description of the program, benefits of assisted preparation, eligibility criteria,

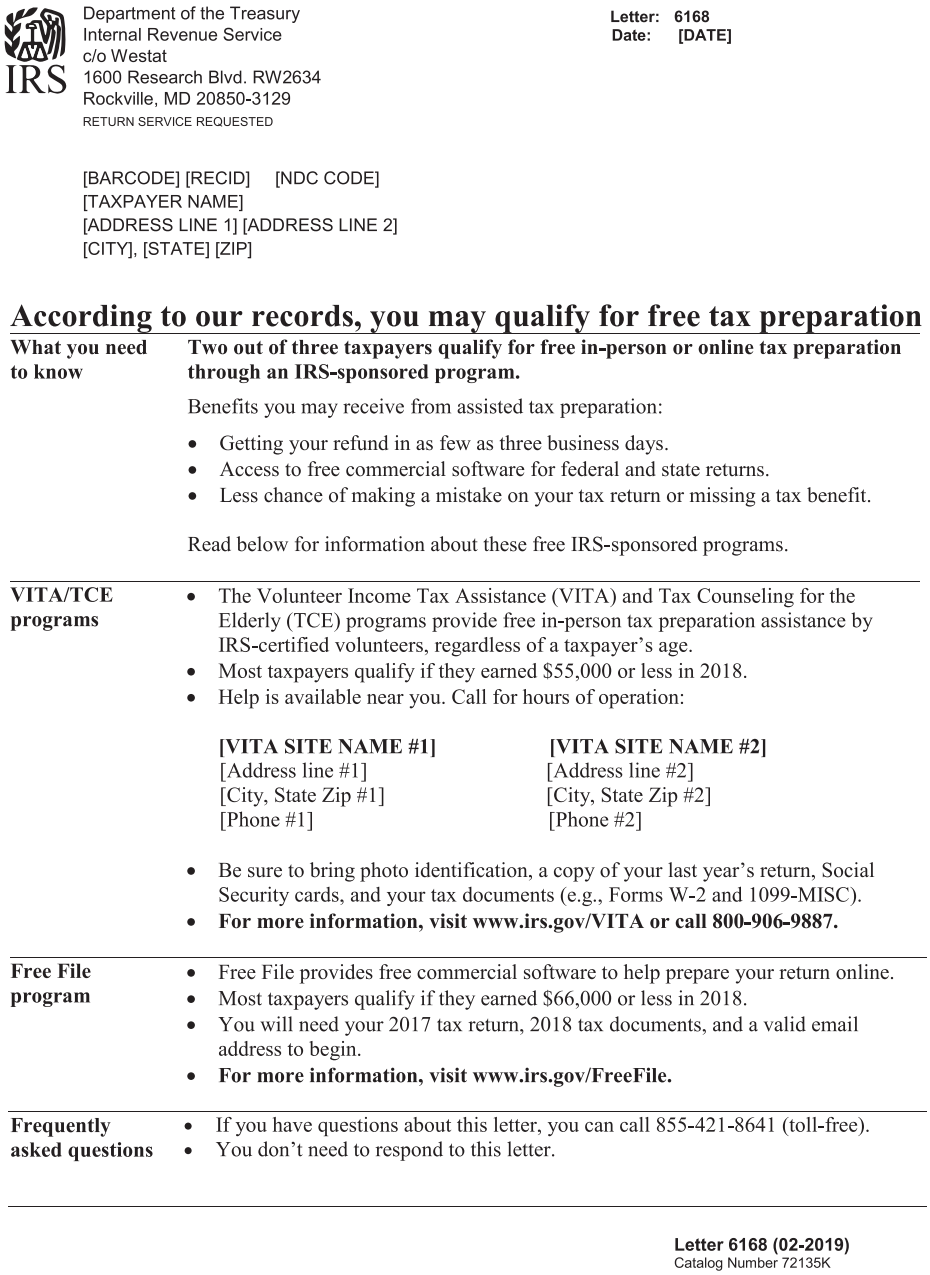
[6] Taxpayers are not required to file a return if their income falls below the applicable standard deduction based on their filing status; e.g., $24,400 for married individuals in tax year 2018.

[7] In addition to VITA and Free File, the IRS operates the Tax Counseling for the Elderly (TCE) program, which provides free tax preparation assistance targeted at taxpayers aged 60 and above. Other than the difference in eligibility requirements, TCE sites resemble VITA sites, and there is significant overlap in the administration of the two programs. In our empirical analysis, we treat taxpayers who prepare their return at a TCE site as if they had used a VITA site.

[8] A full list of included services as well as excluded services can be found in IRS Publication 3676-B.

[9] Specifically, the information returns used to construct our measure of income include those reporting wages, interest, dividends, capital gains, pension distributions, unemployment, and social security.

[10] Although we intended for the IRS to mail the letters at the start of the 2019 filing season (late-January), the government shutdown that occurred during that time period delayed the mailings until the second week of March, 2019.



Department of the Treasury
Internal Revenue Service
c/o Westat
1600 Research Blvd. RW2634
Rockville, MD 20850-3129
RETURN SERVICE REQUESTED

Letter: 6168
Date: [DATE]

[BARCODE] [RECID] [NDC CODE]
[TAXPAYER NAME]
[ADDRESS LINE 1] [ADDRESS LINE 2]
[CITY], [STATE] [ZIP]

According to our records, you may qualify for free tax preparation

What you need to know

Two out of three taxpayers qualify for free in-person or online tax preparation through an IRS-sponsored program.

Benefits you may receive from assisted tax preparation:

- Getting your refund in as few as three business days.
- Access to free commercial software for federal and state returns.
- Less chance of making a mistake on your tax return or missing a tax benefit.

Read below for information about these free IRS-sponsored programs.

VITA/TCE programs

- The Volunteer Income Tax Assistance (VITA) and Tax Counseling for the Elderly (TCE) programs provide free in-person tax preparation assistance by IRS-certified volunteers, regardless of a taxpayer's age.
- Most taxpayers qualify if they earned $55,000 or less in 2018.
- Help is available near you. Call for hours of operation:

[VITA SITE NAME #1]	**[VITA SITE NAME #2]**
[Address line #1]	[Address line #2]
[City, State Zip #1]	[City, State Zip #2]
[Phone #1]	[Phone #2]

- Be sure to bring photo identification, a copy of your last year's return, Social Security cards, and your tax documents (e.g., Forms W-2 and 1099-MISC).
- **For more information, visit www.irs.gov/VITA or call 800-906-9887.**

Free File program

- Free File provides free commercial software to help prepare your return online.
- Most taxpayers qualify if they earned $66,000 or less in 2018.
- You will need your 2017 tax return, 2018 tax documents, and a valid email address to begin.
- **For more information, visit www.irs.gov/FreeFile.**

Frequently asked questions

- If you have questions about this letter, you can call 855-421-8641 (toll-free).
- You don't need to respond to this letter.

Letter 6168 (02-2019)
Catalog Number 72135K

Fig. 1. Sample Treatment Letter. Sample treatment letter (Treatment 1) including information on VITA and Free File with a link to the general IRS landing website.

and information on how to access the program.[11] The language used to describe the documents taxpayers were required to provide was drawn from the Free File and VITA websites.[12] The letters were designed to highlight the likely eligibility of the specific recipient ("According to our records, you may qualify") as well as the broad eligibility of the program ("Two out of three taxpayers qualify"). Possible mechanisms through which the letters could increase tax filing and the take-up of free methods include: providing new information about the financial cost of assisted tax preparation or about eligibility to use such methods; increasing the salience of free methods of which individuals were previously aware; reducing stigma relating to the use of means-tested free preparation methods by highlighting broad eligibility; or simply reminding taxpayers to file a return. Importantly, the letters did not contain information about the EITC or other refundable credits. The IRS-designed letters were not designed to test between competing mechanisms but rather were intended to identify the most effective communications for increasing program take-up and tax filing. As such, to maximize statistical power, for the most part we pool the letter variants into a single treatment group in our analyses below.

[11] Treatment letters containing information on Free File directed taxpayers to either the main Free File website or to an "eligibility wizard" page to assess eligibility. The VITA treatment letters included addresses and contact information for two VITA sites closest to the taxpayer's address.

[12] Depending on the letter variant, these items included photo identification or valid email address, the current year's tax documents, and a copy of their prior-year return. Notably, this last item may have confused our population of non-filers who (by definition) did not have a prior-year return.

Individuals in the experimental sample were randomly assigned across letter variants (collectively, 56,015 letters) or to a control group that did not receive a letter (see Appendix Table A.1 for more details).[13]

Our data come from administrative tax records housed at the IRS. For each individual in our experimental sample, we observe tax filing, return preparation method, filed returns, and third-party information reports for tax years 2017 through 2019. To reduce the influence of outliers, we winsorized the non-categorical variables used in our analysis at the 1% and 99% levels. We supplemented this administrative data with information about undeliverable letters from the contractor hired by IRS to conduct the mailing.

4. Results

Table 1 provides summary statistics and balance checks for the experimental sample of nonfilers. Column 1 provides characteristics for the full experimental sample. Individuals in the sample tended to be relatively young (with a mean age of 36), disproportionately male (59% of the sample), and low income (approximately $13,850) during 2017. As shown in Columns 2–4, these characteristics appear balanced across the treatment and control groups.[14]

4.1. Main Filing Outcomes

We next investigate the effect of the intervention on tax filing behaviors. To account for the fact that not all letters were successfully delivered to the intended recipient, and that we do not know which individuals in the control group would have had their letters returned as undeliverable had they (counterfactually) been assigned to the treatment group, we report specifications that instrument for successful delivery with treatment status. Appendix Table A.3 reports the first stage of this specification; approximately 38% percent of letters were returned to the IRS as undeliverable.

Table 2 reports the effect of the intervention on decisions relating to tax return filing.[15] Column 1 shows the overall effect on tax filing (across all filing methods).[16] Individuals who received the letters were 0.74 percentage points more likely to file a 2018 tax return – a 3.5% increase relative to the control group mean. Panel A of Fig. 2 investigates the timing of this effect and shows that it is concentrated in the first few weeks following treatment, and, to a lesser extent, the weeks shortly after the tax filing deadline (when most returns filed around the deadline post to the IRS database).

We next explore the effect of the intervention on filing method. Column 2 shows that the letters increased the share of individuals using a free tax preparation method by 0.39 percentage points – an effect that is modest in absolute magnitude but that represents a 33% increase relative to the control group of mean. Panel B of Fig. 2 shows that the increase in free filing methods appears largest in the first few weeks after the treatment was sent.[17] Columns 1 and 2 of Appendix Table A.6 show that the increase in free filing methods was driven by roughly equal increases in Free File and VITA.[18]

Importantly, the results in Columns 1 and 2 suggest that the effect of the intervention was not limited to increasing the use of free methods – the point estimate on filing was twice as large as the point estimate on the use of free preparation methods. In principle, the letters could reduce the use of other filing methods by prompting individuals to substitute to free methods or, alternatively, could increase the use of other methods by preventing taxpayers from forgetting to file a return or by channelling individuals who intend to use Free File toward commercial software (Elliott and Waldron, 2019). Columns 3 and 4 of Appendix Table A.6 investigate these possibilities; we find positive, but statistically insignificant, effects on the use of commercial software and paid in-person preparers. Similarly, Column 5 of Appendix Table A.6 shows no effect of the letters on the share of individuals who file a tax return without computer or professional assistance. These findings suggest that the observed increase in the use of free preparation methods is not driven by a shift away from other filing methods; consequently, any effects of the intervention on benefit claiming are unlikely to be attributable to existing filers switching to the filing methods highlighted in the letters.

Columns 3 and 4 of Table 2 turns to the effect of the letters on EITC and CTC claiming, respectively. We estimate the letters increased the share of individuals claiming the EITC by 0.32 percentage points, a 7% increase relative to the control group mean and the share of individuals claiming the CTC by 0.22 percentage points, also a 7% increase off the mean.[19] Again, we observe that the increase in claims of these credits appears in the first few weeks following the mailing of the letters (Panel C of Fig. 2), consistent with the hypothesized link between filing and benefit claiming. In addition, apart from EITC and CTC claims, filing a return may yield a refund because of other refundable credits or over-withholding, or alternatively, may generate a balance due because of other tax liabilities. To assess the overall effect of the intervention on taxpayer refunds, Column 5 of Table 2 and Panel D of Fig. 2 investigate the effect of the intervention on the likelihood of filing a return that generates a refund. We estimate an effect of 0.60 percentage points - a 4% increase relative to the control group mean.

Although our estimates account for the unsuccessful delivery of some letters, they do not account for the possibility that not all successfully delivered letters were actually read. Hence, the results in Table 2 likely under-state the effect of the information in the letters on filing. Estimates of read-rates reported in the literature vary somewhat by setting, from 22% for an informational letter identified as originating from academic researchers (Perez-Truglia and Cruces, 2017) to more than two-thirds for one sent by a government agency (Armour, 2018). If we use the latter estimate (since our letters were sent by the IRS) as a benchmark for the share of recipients who read the letter in our study, the estimates in Table 2 would need to be inflated by 50% to capture the effect of the information in the letter on taxpayer behavior. For example, this adjustment would imply that the letter's information increased filing by $\frac{1}{2/3} \times 0.742 \approx 1.11$ percentage points.

[13] In conducting random assignment, individuals were stratified based on whether they: lived within 5 miles of at least one VITA site; had withheld income in 2017; were over 30 years old; and had apparent income of at least $25,000.

[14] Appendix Table A.2 shows that these characteristics appear balanced across treatment variants as well.

[15] Appendix Table A.4 shows the reduced form effect of the intervention on these outcomes. We observe similar effects when controlling for randomization strata indicators (Appendix Table A.5).

[16] Throughout, we treat a taxpayer as having filed a return for a tax year if she filed a tax return for that year by the tax filing deadline or if she filed a late return by the end of the subsequent calendar year.

[17] Many VITA sites close after the April 15 filing deadline, which may help explain why we observe treatment effects that are consolidated within the first month post-intervention.

[18] Appendix Table A.7 repeats this analysis separately for each of the five treatment letters; for the most part, treatments focusing on a particular free method were associated with larger increases in use of that method although we do observe that directing taxpayers to Free File did result in some spillovers to VITA use. To increase precision, Appendix Table A.8 explores these effects by pooling letters that highlighted the same method (Free File, VITA, or both); here too, treatments focusing on a particular free method were associated with larger increases in use of that method.

[19] Appendix Table A.9 repeats this analysis in Column 3 separately for EITC claims with and without qualifying children and finds that the overall effect on EITC claiming is roughly evenly split across the two.

Table 1
Summary Statistics and Balance Checks.

	(1)	(2)	(3)	(4)
	Overall Sample	Treatment	Control	Difference p-value
Age	36.2	36.3	36.2	0.231
Female	0.411	0.412	0.411	0.482
Income	13,853	13,843	13,853	0.878
Any Wages	0.899	0.898	0.899	0.424
Any Withholding	0.731	0.731	0.731	0.833
Closest VITA Site (Miles)	3.61	3.61	3.61	0.987
Observations	1,804,420	56,015	1,748,405	
Joint test (*p-value*)				0.774

The table presents summary statistics for individuals in the full sample of 2017 nonfilers (Column 1), the pooled treatment group (Column 2), and the control group (Column 3). Column 4 presents the p-value for a test of equality between the treatment and control group means. All characteristics are based on data for tax year 2017 (the pre-intervention year). Age and sex are derived from Social Security Administration records housed by the IRS. Income is derived from information returns such as Form W-2 and 1099-Misc. "Any Wages" indicates the presence of income reported on Form W-2. "Any Withholding" indicates the presence of withheld income on one or more of the individual's information returns. The joint test p-value is derived from a test of the null hypothesis that each characteristic listed in the table is equal between the treatment and control groups.

Table 2
Effect of Intervention on Tax Filing Outcomes.

	(1)	(2)	(3)	(4)	(5)
	Filed	Free Method	Claimed EITC	Claimed CTC	Claimed Refund
Received Letter	0.742***	0.385***	0.322**	0.215*	0.595**
	(0.286)	(0.081)	(0.148)	(0.118)	(0.259)
Control Mean	21.489	1.164	4.611	2.882	16.562
Observations	1,804,420	1,804,420	1,804,420	1,804,420	1,804,420

The table reports the estimated effect of receiving one of the experimental letters on tax filing outcomes for tax year 2018. Units are percentage points (0–100). Each column is derived from a two-stage least-squares specification in which an indicator for successful letter delivery is instrumented for by an indicator for treatment status. The outcome variables are as follows: whether the individual filed a tax return (Column 1); whether the individual filed a tax return through the VITA or Free File program (Column 2); whether the individual claimed the EITC (Column 3); whether the individual claimed the CTC (Column 4); whether the individual filed a return claiming a refund (Column 5). Parentheses contain heteroskedasticity robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Given that the intervention appears to increase the number of EITC and CTC claims as well as returns filed for refund, we next investigate more formally the characteristics of the returns that were filed because of the intervention. To do so, we use the intervention to instrument for the effect of filing on EITC, CTC, and refund claiming. Our interpretation of this analysis requires that the effect of the intervention on tax filing was monotonic (i.e., that the letters did not cause anyone to choose not to file a return) and that the intervention did not affect credit or refund claiming among those who would have filed even absent the intervention.[20]

Table 3 contains the results of this analysis. We find that approximately 43% of the individuals who filed a return because of the intervention claimed the EITC (Column 1) and that the average amount of EITC claimed among these marginal filers was $861 (Column 2). Columns 3 and 4 present similar results for CTC claims: 29% of those induced to file as a result of the intervention claimed the CTC with an average amount claimed of $976.[21] In addition, we estimate that approximately 80% of the returns filed because of the intervention generated an overall refund (Column 5), with an average refund amount of approximately $2,100 (Column 6). The magnitude of this refund is substantial, suggesting that the new filers benefited by claiming other refundable credits or a refund from over-withholding, although we caution that the point estimate for the overall refund amount is imprecisely estimated.

To the extent that the intervention provided new information about free filing methods, we may expect to see effects on filing and benefit claiming in subsequent years as well. Similarly, if the intervention served as a reminder to file, that reminder may have had persistent effects. Appendix Table A.11 investigates the effect of the intervention on tax filing outcomes for 2019, the second year following the intervention. We find positive, but small and statistically insignificant effects of receiving a letter on subsequent year use of free tax preparation, filing, and benefit claiming. These findings are consistent with Guyton et al. (2016) and Manoli and Turner (2014), which report that increases in EITC claiming due to EITC informational outreach do not persist in subsequent years.[22] This suggests that even when the benefits from filing are quite large, as was the case for the taxpayers induced by our intervention to file, outreach may need to be repeated each year in order for the increases in filing rates to persist.

We next conduct several exploratory analyses to better understand the population affected by the intervention.[23] Specifically, Appendix Table A.12 investigates heterogeneous treatment effects

[20] Although neither of these assumptions is directly testable, both seem likely to hold within our setting. With respect to monotonicity, there is little reason to expect a letter about free tax preparation methods would discourage someone from filing. With respect to the exclusion restriction, the assumption could be violated if the intervention caused current filers to switch to a filing method for which they are more or less likely to claim the EITC or CTC or receive a refund, such as by substituting from paid to free methods. Although we cannot rule out this possibility, we observe an absolute increase in the share of individuals using paid methods following the intervention, rather than the reduction one might expect if such substitution was significant.

[21] Appendix Table A.10 shows that, on average, each letter increased EITC and CTC claims by a combined total of $8.46. At a printing and mailing cost of $0.58 per letter, this estimate implies that each dollar spent on the intervention translated into an average of $14.60 of additional EITC and CTC taken up.

[22] In contrast, Ramnath and Tong (2017) studies the effect of a one-time stimulus check and finds a persistent effect of filing on future year EITC claims. Note that in our setting, the control group's 2019 filing rate was twice as high in 2019 compared to 2018, likely due to the filing requirement contained in the Coronavirus Aid, Relief, and Economic Security Act. This increase may have swamped any persistence in our intervention's effects.

[23] We view these analyses as exploratory since they were not our planned focus and observed differences may appear significant due to multiple hypothesis testing.

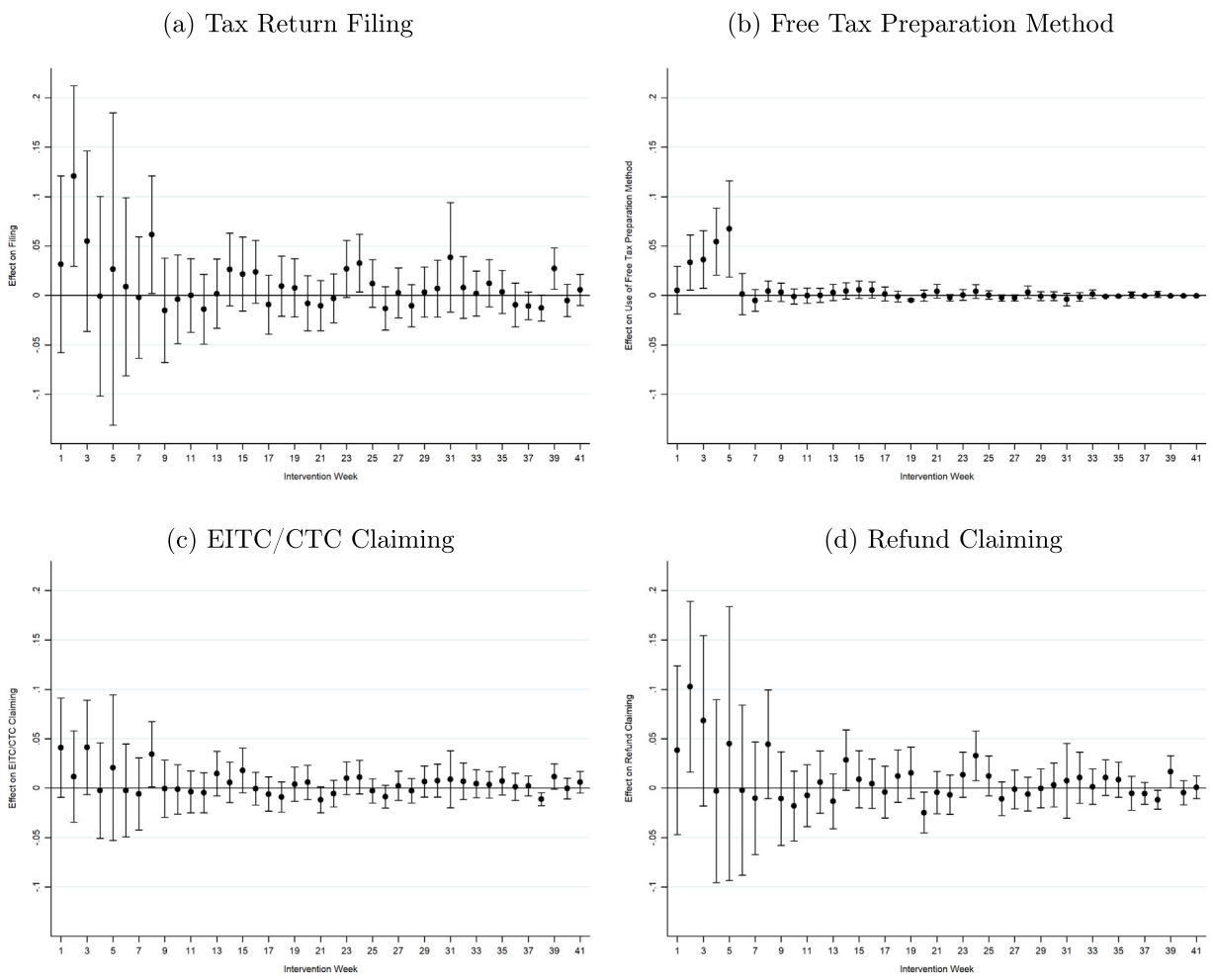


Fig. 2. Effect of Intervention on Tax Filing Outcomes by Week. The Figure displays the estimated effect of receiving one of the experimental letters on tax filing outcomes for tax year 2018 during the specified week following the intervention. The tax filing outcomes shown in each panel are as follows: whether the individual filed a tax return (Panel A); whether the individual filed a tax return through the VITA or Free File program (Panel B); whether the individual claimed the EITC or the CTC (Panel C); whether the individual filed a return claiming a refund (Panel D). Units are percentage points (0–100). In each panel, week 1 refers to the 12th week of the year, beginning on March 18, 2019. The listed week corresponds to the date that a return posts to the IRS system. Each estimate is derived from a two-stage least-squares specification in which an indicator for successful letter delivery is instrumented for by an indicator for treatment status. Bars denote the 95% confidence interval derived from heteroskedasticity robust standard errors. .

Table 3
Characteristics of Intervention-Induced Tax Returns.

	(1)	(2)	(3)	(4)	(5)	(6)
	Claimed EITC	EITC Amount ($)	Claimed CTC	CTC Amount ($)	Claimed Refund	Refund Amount ($)
Filed	0.434**	861.320*	0.290*	976.260**	0.802***	2111.779
	(0.199)	(486.678)	(0.161)	(462.379)	(0.184)	(1476.177)
Control Mean	0.046	68.403	0.029	53.926	0.166	124.433
Observations	1,804,420	1,804,420	1,804,420	1,804,420	1,804,420	1,804,420

The table reports average characteristics of the tax returns that were filed as a result of the intervention. Each column is derived from a two-stage least-squares specification in which an indicator for filing a 2018 return is instrumented for by an indicator for treatment status. The outcome variables are as follows: whether the return claimed the EITC (Column 1); the average EITC claim in dollars (Column 2); whether the return claimed the CTC (Column 3); the average CTC claim in dollars (Column 4); whether the return claimed a refund (Column 5); and the average refund claim in dollars (Column 6). Parentheses contain heteroskedasticity robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

based on the variables upon which randomization was stratified: age, income, withholding, and distance to a VITA site. With the exception of the latter, we found no such evidence. In contrast, the intervention did appear more effective at increasing the use of free preparation methods for individuals living within five miles of a VITA site.

Finally, we report results from several additional analyses to assess the validity and robustness of our results. Appendix Fig. A.5 presents results from a permutation test for the reduced form effect of the intervention for our main filing outcomes; the resulting p-values are comparable to those reported in Table 2. Appendix Table A.13 replicates the analyses in Table 2, but uses

each treatment variant as a distinct instrument for a successful letter delivery. The results are nearly identical to those in our main specification. Last, as a placebo test, Appendix Table A.14 investigates the effect of the letters on tax returns filed during the early weeks of 2018, prior to the intervention being sent out.[24] As expected, we observe no statistically significant differences in the treatment and control group means for use of free filing, benefit claiming, or refund claiming among this set of individuals.

5. Discussion

We evaluate an informational letter sent by the IRS to nonfilers describing the availability of free tax preparation methods. We estimate that this intervention led to modest increases in tax filing, EITC and CTC claiming, and the use of free tax preparation methods. We interpret the results as evidence that policies that increase tax filing can be an effective way to increase take-up of refundable credits – even policies that do not increase awareness of the credit or directly target the credit in other ways.

Focusing on raising benefit take-up through tax filing offers advantages and disadvantages relative to traditional awareness-based outreach campaigns. One advantage is that, when an intervention successfully induces someone to file a return, that person tends to receive each tax-administered benefit for which they qualify, in addition to over-withheld taxes on earnings, rather than one specific benefit. On the other hand, shifting away from awareness-based interventions may undermine intended effects of the benefit on behavior by reducing the salience of certain incentives, such as the connection between EITC eligibility and work.

Although our results suggest a strong link between tax filing and benefit take-up, the specific intervention we studied was only modestly successful at increasing filing, and therefore, yielded only a small (absolute) increase in EITC and CTC participation.[25] Thus, although interventions like the one we studied do not appear to be a silver bullet for raising take-up of refundable credits, our findings suggest that policies that do succeed at significantly raising filing rates among eligible individuals could be quite effective at achieving this goal. The challenge of course is identifying which policies those would be, and whether the complier population induced to file would be similarly likely to claim substantial benefits. One set of possibilities includes policies that would more drastically reduce the financial and non-financial costs of tax filing, such as if the IRS were to mail tax returns that were pre-populated with the taxpayer's information from administrative records and prior tax years (Bankman, 2008). A different alternative for increasing filing would be to adopt policies that make filing more beneficial, such as by expanding refundable credits, adjusting withholding schedules (Jones, 2012), or administering additional social benefit programs through the tax code (Alm et al., 2012).

Finally, when designing a new safety net program, an important (and often controversial) question is whether the new program should be administered through the tax code.[26] Our results can inform this debate: new benefits can raise the incentive to file a return, thereby promoting the receipt of existing benefits, and similarly, existing benefits can help induce those eligible for the new benefit to receive it by filing a tax return. In this way, the benefits of running safety net program through the tax code may be increasing in the number of programs administered in this way.

[24] As described above, individuals who filed during this time period were initially assigned to either the treatment or control group but were ultimately excluded from the sample after a government shutdown delayed the mailing.

[25] In this regard, our main conclusion concerning the link between filing and take-up is consistent with the findings of another recent paper, Linos et al. (2020), which studies a similar intervention conducted in parallel with our own, and with prior studies in the literature such as Gunter (2019) and Cranor et al. (2019), all of which find no positive effects on either filing or, potentially as a result, on EITC take-up. More broadly, the magnitude of the estimated filing effects are comparable to other large-scale government nudges that have been studied in the United States (DellaVigna and Linos, 2020).

[26] See, for example, the debate on this issue surrounding the currently proposed expansion to the CTC, summarized in Matthews (2021).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.jpubeco.2021.104550.

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