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**ABSTRACT**

Can one-time informational interventions cause permanent changes in benefit take-up? In the context of the Earned Income Tax Credit, we find evidence that reminding individuals of their eligibility has meaningful effects. Reminder notices have the largest effect among taxpayers without kids, persuading nearly 80 percent of taxpayers in the notice year to claim the credit. The effect of the notice quickly attenuates to roughly 22 percent only one year later. We find that this pattern holds across two experimental settings, one that tests the effect of being sent a notice and one that tests variations in the content of the notices.

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## I. Introduction

Do informational interventions create short-lived effects or permanent effects? The answer to this question has important implications for theories of incomplete take-up of social benefit programs (Currie, 2006) and for interpreting the impacts of outreach efforts in a variety of contexts. If providing individuals with benefit information results in permanent changes in behavior, then a single intervention may be sufficient to increase take-up permanently, and ignoring the longer-term effects would understate the true impact of the intervention. On the other hand, if an informational intervention only has short-lived effects, then repeated interventions may be necessary to increase take-up permanently.

Many studies examine short-term effects of informational interventions, but few consider the longer-term effects.<sup>1</sup> In this paper, we examine both short-term and longer-term effects of informational outreaches by the United States Internal Revenue Service (IRS). The IRS sends notices to all taxpayers who appear eligible for the Earned Income Tax Credit (EITC) but who fail to claim it on their tax return. The goal of the IRS notices is to increase take-up of the EITC among eligible taxpayers.<sup>2</sup> While EITC take-up rates among tax filers are generally high, there is still considerable scope for IRS notices to affect EITC claiming among notice recipients. By construction, taxpayers are only sent notices when they fail to claim EITC benefits on their tax returns, so the entire sample of notice recipients could potentially respond to the notices and claim benefits.<sup>3</sup> Furthermore, as we discuss more in the analysis below, taxpayers who receive notices in a given year also appear to have relatively higher incomplete take-up in other years compared to the national average, so there is also scope for IRS notices to have longer-term learning effects on notice recipients.

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<sup>1</sup> For examples, see Madrian and Shea (2001), Choi, Laibson, Madrian and Metrick (2002) and Thaler and Benartzi (2004), Hastings and Weinstein (2008), Brown, Kapteyn and Mitchell (2011), Chetty and Saez (2013), Bettinger, Long, Oreopoulos and Sanbonmatsu, (2012), Hoxby and Turner (2013).

<sup>2</sup> The IRS intervention is designed specifically to increase take-up of the Earned Income Tax Credit, a goal we take as given. We discuss prior work that suggests that incomplete take-up may be optimal and result from rational behavior in Section II.

<sup>3</sup> Roughly 90% of EITC-eligible taxpayers claim EITC benefits on their tax returns. The remaining EITC eligible taxpayers are sent notices. Thus, there is considerable scope for notices to affect these taxpayers' behaviors since, in theory, all of the notice recipients could respond to the notices. In practice, in 2003 through 2007 (excluding 2005 because of a glitch), notice response rates are 55% and 37% for taxpayers without and with kids respectively.

Exploiting two unique experimental settings, we quantify the impact of being sent a notice as well as the effects of different information content in the notices. We distinguish between inattention and unawareness by examining both short-term effects which we term “nudge effects” separately from longer-term effects which we call “learning effects.” To our knowledge, this analysis is the first to focus on longer-term effects of an informational intervention designed to increase benefit take-up.<sup>4</sup>

To estimate the causal effects of IRS notices on EITC take-up, we exploit a national natural experiment that resulted from a computer glitch. In 2005, some taxpayers who should have been mailed a notice were not sent notices because of a computer glitch. While the glitch was corrected after 2005, it allows us to distinguish between a treatment group of taxpayers who were sent a notice in 2005 and a control group of taxpayers who were not sent a notice but should have been. Using a difference-in-differences research design, we compare outcomes across these groups over time. We note that both groups could receive notices in subsequent years, so we distinguish our setting from one in which treated individuals receive a treatment only in a single year.<sup>5</sup>

The results from the glitch analysis indicate that the IRS notices have meaningful short-term nudge effects that quickly dissipate over the longer-term, and that the notices persuade some eligible taxpayers to claim EITC benefits on their tax returns as opposed to responding to post-filing notices to claim their benefits. For both taxpayers without kids and with kids, the IRS notices increase EITC claiming in 2005 for the treatment group relative to the control group. Among taxpayers without kids, we find that the notices persuade nearly 80 percent of the treatment group to claim the credit, and among taxpayers with kids, this effect is just over 45 percent. After 2005, taxpayers without kids show some evidence of longer-term learning effects. In 2006, treated taxpayers without kids are more likely to claim EITC benefits on their tax

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<sup>4</sup> Prior work examines the longer-run impacts of interventions targeted at impacting behavior, such as electricity and water use (Allcott and Rogers 2012; Ferraro and Price 2013), academic performance (Levitt, List and Sadoff 2011) and smoking (Gine, Karlan and Zinman 2010), though not specifically take-up of a benefit program. Gallagher (2014) studies the take-up of flood insurance in a setting where prior floods serve as a key piece of information that affects agents’ take-up behaviors.

<sup>5</sup> Guyton, Manoli, Schafer and Sebastiani (2016) study nonfilers in an experimental setting in which treated individuals receive reminders in a given year and control individuals do not, and individuals from both groups do not receive subsequent reminders.

returns than control taxpayers without kids, though the effect is roughly one-quarter the magnitude of the 2005 nudge effect. However, because the IRS sends notices in each year, control taxpayers are more likely to receive notices in 2006 and many control group taxpayers respond to these subsequent notices. Thus, we find that, in 2006 and later years, total EITC claiming (i.e. claiming on tax returns or through notices) is similar across treatment and control taxpayers. Given that the IRS notices appear to teach taxpayers without kids to claim benefits on their tax returns rather than through post-filing notices, we note that this could represent significant welfare and efficiency gains from the IRS notices. In terms of welfare gains, claiming benefits on tax returns instead of through notices leads to low-income, potentially credit constrained taxpayers getting their benefits sooner rather than later. In terms of efficiency gains, claiming benefits on tax returns instead of through notices leads to lower tax administration costs since costs associated with sending and processing the notices can be saved.

In contrast to the results for taxpayers without kids, among taxpayers with kids, we find little evidence of longer-term learning effects as the EITC claiming rates for the treatment and control groups are similar in later years. The lack of persistence or longer-term learning among taxpayers with kids is interesting given the potential benefit are relatively larger compared to the EITC benefits for taxpayers without kids who do exhibit some evidence of learning effects.<sup>6</sup>

We also present results from a randomized experiment where the IRS sent different types of notices to EITC-eligible taxpayers in California.<sup>7</sup> This sample includes individuals who did not respond to an initial IRS notice, and therefore may be relatively more inert compared to the taxpayers in the glitch analysis. This experimental setting allows us to quantify nudge effects and learning effects from notices that vary in their informational content. Bhargava and Manoli (2015) examine short-run responses to the different notices in this setting, and we build on this work by quantifying longer-term learning effects from the different notices. Like Bhargava and Manoli (2015) we find that there are meaningful short-term nudge effects for notices that make

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<sup>6</sup> In 2005, EITC benefits could be as high as \$2,662 or 34% ( $=2662/7830$ ) of earned income for households with one qualifying child and \$4,400 or 40% ( $=4400/11000$ ) of earned income for households with two or more qualifying children.

<sup>7</sup> In addition to these research designs, we also present results based on an event study research design in Appendix C. The event study is based on looking at EITC claiming among taxpayers who did not claim the EITC on their tax returns but were later found to be eligible for EITC benefits when they were selected for audit. The event study results do not indicate signs of long-term learning effects from the audit.

benefit amounts salient. Though imprecise in later years, the empirical results suggest that the short-term effects fade out relatively quickly. Overall, the findings from this experiment imply that the content of the message can have meaningful short-term effects, but the differential content has limited longer-term learning effects.

The remainder of this paper is organized as follows. Section II describes institutional background of the notification letters sent by the IRS and the administrative tax data used in the empirical analysis. Section III presents the empirical analysis of the effects of notices on taxpayers' outcomes, using both quasi-experimental and experimental research designs. Section IV concludes.

## **II. Institutional Background & Data**

### **A. Literature Review**

One view of incomplete take-up is that it results from rational behavior. Individuals may optimally decline their benefits due to stigma or transaction costs (Moffitt, 1983, Currie and Grogger, 2001, Hernanz, Malherbet, Pellizzari 2004, and Currie 2006). Kleven and Kopczuk (2011) suggest that policymakers may enact complex program rules and difficult enrollment procedures to balance rejecting illegitimate claims with legitimate program use. These theories generally assume that agents are both perfectly rational and have complete information about their potential benefits.

There is also a large and growing literature on the effects of informational interventions on benefit take-up across a wide variety of settings, which relaxes the assumption of complete information. Intuitively, if individuals are not perfectly informed about their benefits then we would expect the informational interventions to impact take-up. Consistent with this idea, many studies find that relatively low-cost informational interventions have meaningful effects on outcomes such as applying for federal student aid and enrolling in college (Bettinger, Long, Oreopoulos and Sanbonmatsu, 2012), applying to more selective colleges (Hoxby and Turner 2013), parents' decisions to send their children to higher-achieving schools (Hastings and Weinstein 2008), labor supply and earnings (Chetty and Saez, 2013, and social security claiming (Brown, Kapteyn and Mitchell 2011). There is also strong evidence that individuals are unaware

of important retirement savings benefits (Madrian and Shea, 2001; Choi, Laibson, Madrian and Metrick, 2002; Thaler and Benartzi, 2004). In this paper, we build on this strand in the literature by quantifying the impact of IRS notices that inform taxpayers of the eligibility for the EITC on take-up in the notice year. We also measure the extent to which the notices teach individuals about the EITC generally by examining take-up in subsequent years.

Additionally, this paper relates to the literature on persuasive communication (see DellaVigna and Gentzkow 2010). Previous studies in this area typically focus on shorter-term responses in a variety of setting that include consumers (Bertrand et al. 2010), voters (DellaVigna and Kaplan 2007; Gentzkow, Shapiro and Sinkinson 2011), or donors (Falk, 2007). Compared to the persuasion rates reported across these other areas, we find short-term effects that are much larger. One obvious reason for the larger effects is that we quantify the behavioral response to a meaningful financial benefit, whereas earlier work typically considers environments that do not involve material financial benefits.

## B. The EITC & IRS Notices

The EITC is the largest cash assistance, anti-poverty program in the United States. Prior research finds that the EITC has positive impacts in many areas including labor force participation (Eissa and Hoynes 2006), earnings (Chetty Friedman and Saez 2013), consumption and food expenditures (Patel 2011, Goodman-Bacon and McGranahan 2008, and McGranahan and Schanzenbach 2013), infant health (Hoynes, Miller and Simon 2012), and education (Dahl and Lochner 2012 and Manoli and Turner 2014).<sup>8</sup> These findings suggest that increasing take-up of the EITC among eligible taxpayers could have meaningful welfare effects.

The EITC provides income support to millions of working families. For tax year 2015, eligible taxpayers without kids and with kids could qualify for as much as \$503 and \$6,242 of EITC benefits respectively. Eligibility is determined based on taxpayers' earned income, adjusted gross income, age, filing status and the number of qualifying children. Appendix Figure 1 shows the corresponding EITC benefit schedules for two key tax years that we study, 2005 and 2009.

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<sup>8</sup> Previous work also reports small or negligible effects on marriage and fertility (Ellwood 2000, Dickert-Conlin and Houser 2002, and Baughman and Dickert-Conlin 2003).

EITC benefits phase in as earned income increases up to the first kink point, where taxpayers realize the maximum credit for the minimum amount of earned income. As earned income increases beyond the first kink point, the EITC amount stays constant until the second kink point. This second kink point is determined by filing status and number of qualifying children. As earned income increases beyond the second kink point, benefits phase out.<sup>9</sup>

To claim the EITC, taxpayers must file a tax return (and taxpayers with qualifying kids must complete a Schedule EIC as part of their tax return). If a taxpayer appears eligible for the EITC yet fails to claim credit, then the IRS mails a notice to the taxpayer.<sup>10</sup> These notices are sent within three to four months after receiving an eligible tax return. To determine the notice population each tax year, the IRS applies a series of filters to ensure that the tax returns meet the EITC eligibility criteria. Plueger (2009) provides details on the filters applied by the IRS. Generally, IRS filters based on taxpayer and dependent ages, filing status and income eligibility criteria, as well as criteria such as having a valid SSN and having no prior disallowance of the EITC. Appendix Table 1 outlines the filters. We refer to taxpayers who appear eligible based on these filters as “eligible taxpayers,” even though some taxpayers who pass the screening filters may not be eligible.

The IRS mailings consist of a letter to inform taxpayers of the EITC and a worksheet to confirm the taxpayers’ eligibility for the credit. (Appendix Figures 2 and 3 present examples of notices for taxpayers without kids and with kids respectively.) This additional information helps the IRS to accurately determine that individuals are truly eligible for the EITC. Eligible taxpayers can complete the worksheet and return it to the IRS to claim their EITC. Taxpayers do not need to file an amended return to receive their benefits. For returns without kids, information on the tax return is almost sufficient to determine EITC eligibility completely, but the IRS still sends notices to these taxpayers, in part to have taxpayers validate the information on the tax form in order to reduce non-compliant credits and to verify residence requirements. For taxpayers with

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<sup>9</sup> The EITC is a function of both earned income (generally W2 earnings and self-employment income) and adjusted gross income. The EITC phases out once taxpayers have AGI above the second kink point; for these taxpayers the EITC is calculated as the minimum of the credit determined by AGI and the credit determined by earned income.

<sup>10</sup> Using tax data matched to data from the CPS, Plueger (2009) estimates that EITC take-up is roughly 75 percent. Of the 25 percent that fails to claim the credit, Plueger (2009) estimates that 9 percent are individuals who file taxes but do not claim the EITC.



kids, the IRS requires verification through the notice and worksheet that children pass the residency test to qualify as EITC qualifying children.

Claiming the EITC in response to the notice may result both from the reminder nudge by the IRS and also from reduced transaction costs. After filling in the notice, taxpayers effectively have the IRS determine their EITC. This can save taxpayers a significant amount of time as they can potentially avoid possibly up to 25 steps compared to claiming the credit on the tax return and figuring the value of the credit themselves.<sup>11</sup> In order to increase EITC take-up in subsequent years, the IRS also provides taxpayers with a lower transaction cost strategy for claiming the EITC on the tax return.<sup>12</sup> As described in the “what you can do next year” section of the notices, the IRS advises taxpayers that they can fill in schedule EIC and then write “EIC” on the tax return line. This strategy equalizes the transaction costs in claiming the EITC on the tax return or in response to the IRS notice—effectively saving the taxpayers the same steps as the notice. To the extent that taxpayers adopt and understand this strategy, differences in EITC claiming in the notice year versus following years would be attributable to the reminder nudge of the notice.

Figure 1 presents EITC take-up rates among taxpayers across potential benefit amounts (Panels A & B) and earned income (Panels C & D).<sup>13</sup> In all cases, the figures show total EITC claiming as well as the components of this total that consist of EITC claiming on the tax return and EITC claiming in response to a reminder notice. When constructing these figures, EITC eligible taxpayers include both taxpayers filing a tax return and claiming the EITC and taxpayers who were sent a notice after failing to claim the EITC on their tax returns. Panels A & B indicate that the likelihood of claiming EITC benefits on the 1040 increases slightly with potential benefits, both for taxpayers without kids as well as for taxpayers with kids. Panels C & D indicate that the likelihood of claiming EITC benefits on the 1040 has a subtle hump-shape with earned income. Overall take-up of EITC benefits among taxpayers based on tax return claims or responses to

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<sup>11</sup> The number of necessary steps to calculate EIC benefits is based on the 1040 Instructions and EIC Worksheets A and B, and it varies with or without self-employment income and with income above or below the second EITC kink point. These documents are available at: <http://www.irs.gov/pub/irs-pdf/i1040gi.pdf>

<sup>12</sup> The IRS also provides this guidance on the instructions for the 1040 form.

<sup>13</sup> The EITC benefit depends on both the number of qualifying children and marital status, in addition to earned income and AGI. For simplicity in Figure 1, we show take-up rates for head of household returns with one child. As shown in Appendix Figures 4 and 5, the overall take-up patterns by benefit amount and earnings are similar for other types of filers with dependent children.

notice is over 90% (roughly 95% for taxpayers without kids, and 92% for taxpayers with kids). Even though EITC take-up among eligible taxpayers is relatively high, the scope for notices to affect behavior is high because all notice recipients could respond to the notices. Conditional on receiving a notice, the response rates are roughly 55% and 37% for taxpayers without and with kids respectively (as with Figure 1, these statistics are based on data from 2003 through 2007, excluding 2005 because of the glitch).

### C. 2005 Glitch

To quantify the impact of being sent a notice, we exploit an inadvertent error by the IRS that omitted some returns from the notice population. Due to this error, we are able to address selection into the notice population by examining the impact of being sent a notice *among returns that actually were mailed a notice, or that should have been mailed a notice absent the error*. The inadvertent error by IRS occurred only in 2005 and was the result of a computer glitch. In this year, taxpayers who used computer software to generate their returns but then mailed in paper versions of the return were omitted from the notice population. We refer to this filing method as “computer-paper.” Taxpayers file computer-paper returns to utilize the benefits of tax software but avoid e-filing fees.<sup>14</sup> In a typical year, roughly 10 percent of returns are filed this way. Based on the 2005 computer glitch, we create a treatment group of taxpayers who received notices and a control group of computer-paper taxpayers who did not receive notices but who would have absent the glitch. We identify the causal effects of being sent a notice based on comparing outcomes across the treatment and control groups over time.

### D. 2009 CA Experiment

We also study the impact of being sent different information in the IRS notification by exploiting an experiment set up by the IRS (see Bhargava and Manoli 2015). Typically, taxpayers in the notice population receive only a single notice from the IRS each tax year. In this experiment, the IRS sent second notices to taxpayers in California who were sent an initial IRS notice for 2009 but did not respond. This analysis includes the following treatments: (1) simplified notices

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<sup>14</sup> Taxpayers commonly move into and out of computer-paper filing over time, though taxpayers who used computer-paper filing in 2005 are generally more likely to file in this way in other years. Among returns without kids using computer-paper in 2005 these shares were 44 percent in 2004 and 43 percent in 2006. By comparison, among returns with no kids who did not file computer computer-paper in 2005, 7 percent used computer-paper in 2004 and 6 percent used computer-paper in 2006.

which aimed to reduce complexity by clarifying eligibility conditions and making response worksheets shorter and easier to read, (2) benefit notices which aimed to increase the salience of maximum credit amounts, (3) social influence notices which aimed to use information on peer take-up to influence responses, and (4) claiming time notices which aimed to reduce perceptions of the necessary time to respond to the notices.<sup>15</sup> Bhargava and Manoli (2015) discuss the experimental design in greater detail and analyze the short-term effects of the experimental notices. We extend this analysis by considering additional years and by differentiating between EITC claiming on the tax return and EITC claiming in response to IRS notices.

#### E. Data

We use population level administrative income tax data from the United States Internal Revenue Service for the empirical analysis of the national natural experiment and the randomized experiment in California. For the national-level experiment, we construct the 2005 Analysis Sample by identifying individuals who were sent an IRS notice for tax year 2005. Next, we add individuals who filed computer-generated but paper-filed returns for tax year 2005 *who would have been sent a notice absent the glitch*. We identify just over 130,000 omitted tax returns, which is close to the estimate by the IRS that between 100,000 and 140,000 taxpayers were omitted as a result of the glitch (Plueger 2009). For this Analysis Sample, we construct a balanced nine-year panel from 2001 through 2009 based on each primary taxpayer in the 2005 sample.

Table 1 presents summary statistics for the Analysis Sample and the population of taxpayers in 2005 who claimed the EITC on their tax returns. Among returns without kids, taxpayers in the Analysis Sample have slightly lower wage income (reported on Form 1040) but slightly higher AGI, are much less likely to use a paid tax preparer, and are less likely to have computer-prepared but paper-filed tax returns relative to the 2005 EITC Sample. For returns with kids, the Analysis sample has both higher wages and higher AGI, more likely to file jointly and less likely to use a tax preparer, compared to the 2005 EITC Sample.

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<sup>15</sup> The treatment notices involved variations in the notice headlines. The simple notice headline was “You may be eligible for a refund”; the benefit notice headline was “You may be eligible for a refund up to \$5,657”; the social influence notice was “You may be eligible for a refund. Usually, 4 out of every 5 people claim their refunds”; the claiming time notice headline was “You may be eligible for a refund. Claiming your refund usually takes less than 10 minutes.”

Table 2 divides the Analysis Sample into the treatment and control groups and presents summary statistics. Columns (1) and (2) report summary statistics for the treatment and control groups among returns without kids and Columns (5) and (6) report these statistics for returns with kids. In both cases, the treatment group and control groups are significantly different in many ways. For example, among returns without kids, those in the treatment group have higher wage income and are more likely to report wage income, are less likely to be married and are far less likely to use a paid preparer. In some cases, the differences across treatment and control groups are substantively large, such as the differences in AGI or in the probability of using a paid tax preparer.

To explicitly account for these differences in observables between the treatment and control groups, we re-weight observations in the treatment and control groups based on observable demographic characteristics and earnings variables from 2005. (We discuss this method in detail in Appendix A.) Columns (3) and (4) show the weighted means for returns without kids, and Columns (7) and (8) show the weighted statistics for returns with kids.<sup>16</sup> Among both returns with kids and returns without kids, after weighting the treatment and control groups have similar observables. For example, the significant differences in AGI and use of paid tax preparers in the un-weighted samples are now insignificant in the weighted samples. In the empirical results, we focus on the results for the weighted sample to ensure that we are comparing outcomes of observationally similar individuals across the treatment and control groups. We have verified that we find qualitatively similar results using the unweighted sample as shown in the Appendix Tables.

To construct the sample for the 2009 California experiment, we pull the panel of tax returns for 2005-2011 for each taxpayer in the experiment. Table 1 presents summary statistics from tax year 2009 for the California Experiment Sample and for taxpayers in California who received an initial IRS notice in 2009. As noted in Bhargava and Manoli (2015), these groups were

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<sup>16</sup> We re-scale the weights so that the original frequencies of treatment and control observations in each tax year are preserved.

randomly selected and appear roughly comparable. Therefore, we do not implement the weighting procedure on this sample.

### III. Empirical Analysis

#### A. Effects of Getting a Notice

##### 1. Identification Strategy & Regression Specification

To identify the causal effects of being sent a notice on taxpayer behavior, we use a difference-in-differences identification strategy and data from the 2005 glitch sample. We define the treatment group as individuals who were sent notices for 2005 and the control group as individuals who should have been sent notices for 2005 but were not (taxpayers with computer-paper returns).

We estimate the following regression specification

$$y_{it} = \beta_0 + \beta_1 Treat_i + \sum_{k=2005}^{2009} \beta_{2k} [1(Year_t = k)] + \sum_{k=2005}^{2009} \beta_{3k} [1(Year_t = k) * Treat_i] + \varepsilon_{it}$$

in which  $Treat_i$  is an indicator equal to 1 if taxpayer  $i$  is in the treatment group (defined by 2005 return method) and  $1(Year_t = k)$  is an indicator equal to 1 if  $Year_t$  is equal to  $k$ . We focus on the binary take-up outcome to test for nudge and learning effects based on the extensive margin,<sup>17</sup> so the dependent variable  $y_{it}$  is an indicator variable equal to 1 if individual  $i$  claims EITC benefits in year  $t$ . We also quantify the likelihood that taxpayer receive a notice in each year, also coded as a binary dependent variable.

The sample includes data from 2004 through 2009 so that differences in outcomes between the treatment and control groups in 2005 through 2009 are measured relative to the difference in outcomes in 2004. We adopt this approach because 2004 is the year immediately preceding the notice treatment. As discussed in the Appendix, the baseline nudge effects from this approach are robust to the inclusion of additional years in the pre-treatment period.

The coefficients  $\beta_{3k}$  are the coefficients of interest as they capture the difference between the treatment and control groups in 2005 and later years, relative to the difference between the

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<sup>17</sup> However, we also present results based on using EITC amounts claimed as the dependent variable in Appendix Table 5.

treatment and control groups in 2004. These differential effects in 2005 quantify the immediate impact of the notice, which we refer to as the “nudge” effect. Intuitively, the notice directly informs taxpayers of their eligibility in that year and allows them to claim the EITC simply by responding to the notice. Beyond giving the taxpayer information on their eligibility for the EITC in 2005, the notice tries to teach the taxpayer about the EITC more generally and provides taxpayers with a strategy to make EITC claiming on the tax return easier. The differential effects in 2006 through 2009 test whether taxpayers adopt this proposed strategy and/or whether the notice translates into learning about the EITC generally, which we refer to as “learning” effects.

We estimate the above regression specification using only the sample of observations that are eligible for EITC benefits. Our definition of EITC eligibility is exactly the IRS definition. We use filters the IRS imposes to determine if a filed tax return is eligible for EITC benefits. Appendix Table 1 lists these filters. In general, the filters are based on taxpayer and dependent ages, filing status and income eligibility criteria, as well as criteria such as having a valid SSN and having no prior disallowance of the EITC. By conditioning on EITC eligibility, we test if eligible individuals take up EITC benefits. Before conditioning on EITC eligibility, we verify that (1) the treatment and control groups have parallel trends in eligibility and notice receipt prior to the treatment in 2005, and (2) the treatment in 2005 did not differentially affect EITC eligibility of the treatment and control groups. Appendix Table 6 presents the parallel trends tests. Specifically, this table presents the results from regressing an indicator for eligibility or receiving a notice on a treatment indicator, a time trend and an interaction between the time trend and treatment indicator using the pre-2005 data for the glitch analysis. The coefficients on the interaction are small and statistically insignificant, so we conclude that there are parallel trends in eligibility and notice receipt for the treatment and control groups. Appendix Table 7 presents the results from estimating the above regression specification with indicators and eligibility and notice receipt as dependent variables. These regressions are estimated using the full glitch analysis sample. While we discuss the notice receipt results in more detail below, the eligibility results show that the coefficients on the interactions of the year indicators and treatment indicators are statistically insignificant.<sup>18</sup> The plots in Figure 2 present graphical evidence that

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<sup>18</sup> One exception the differential effects on eligibility among returns with kids in 2006, where we find an economically meaningful effect that is also statistically significant in the unweighted case, but not statistically

verifies these regression results. The figures plot EITC eligibility over time for the treatment and control groups, there does not appear to be differential patterns in eligibility before or after 2005.<sup>19</sup>

Treatment and control groups also appear to have comparable patterns in the likelihood of being sent a notice over time in the years prior to the glitch, allowing us to attribute the effects in 2005 and later years as resulting from the glitch-induced difference in being sent a notice. Panels C and D in Figure 2 show the fraction of each group sent a notice in each year, conditional on being EITC eligible. In 2005, individuals in the treatment group were all sent notices by the IRS, while none of the individuals in the control group were sent a notice. Among returns with no kids, the trends in being sent notices appear to be parallel for the treatment and control groups in the years 2001-04. This lends support to interpreting changes in behavior for the treatment group relative to the control group after 2005 as being driven by the differences in being sent notices in 2005. We find support for this interpretation in Appendix Tables A6 that finds evidence of comparable trends in the likelihood of being sent a notice in the years prior to 2005.

We account for differences in observables between individuals in the treatment and control groups by re-weighting based on observables. We focus on re-weighting rather than controlling for covariates in the regression specification because we aim to examine outcomes for observationally similar individuals (which favors re-weighting) and we are not concerned about treatment status being correlated with observables (which would favor controlling for covariates) since treatment status was mechanically assigned. We follow standard re-weighting techniques, and the details are presented in the Appendix. To summarize, we re-weight separately for returns with and without kids in 2005 based on gender, age, filing status and a variety of income measures in 2005. The re-weighting explicitly ensures that the treatment and control groups are observationally similar along these dimensions. While we present results based on the re-weighted data in the main text below, Appendix Table 3 presents the results using the un-

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significant after weighting. Because we fail to find a comparable effect on EITC take-up in that year, it seems unlikely that the eligibility pattern results from a behavioral response to the notice.

<sup>19</sup> In addition to checking trends in eligibility and notice receipt, we have also checked trends in key determinants of EITC eligibility, namely earnings and the presence of kids. Appendix Figure 6 presents plots of these variables for the treatment and control groups. Overall, we find similar trends in these variables for the treatment and control groups.

weighted data. This Table suggests that the un-weighted and re-weighted results do not differ substantively in terms of the main conclusions regarding nudge effects and learning effects.<sup>20</sup>

## 2. 2005 Glitch Estimation Results

Mean differences in take-up over time across the treatment and control groups suggest that the notice has a large nudge effect. Figure 3 illustrates time series of re-weighted take-up rates conditional on EITC eligibility for the treatment and control groups. (Appendix Figure 7 presents the corresponding plots of unweighted take-up rates.) Panels A and B present plots of the take-up rates for taxpayers without and with kids respectively who claim the credit on their tax return in 2001-04 and 2006-09 and for responding to the notice in 2005. Panels C and D in Figure 3 presents total take-up rates, which includes both notice responses and tax return claiming, in all years. In all cases, the control group has a zero response in 2005 by construction since individuals in the control group were not sent notices. Among returns without kids, the take-up rates suggest minimal long-term learning effects after 2005 in both Panels A and C, as the gap between treatment and control groups narrows slightly in the post-2005 years relative to the pre-2005 period. For returns with kids the implications for learning effects are less clear.

Figure 3 also highlights the intuition for limiting the regression analysis to the years 2004-09. Especially for the case of returns with kids, the difference between the treatment and control group is smaller in the year just before the treatment year compared to other earlier years. By choosing to use only the year 2004 as the pre-period, our analysis highlights how behavior changes in the year of the computer glitch and later years, relative to the year immediately preceding the glitch. As shown in Appendix Tables 4 A & B, the choice of pre-treatment years does not substantively affect our main conclusions about nudge effects and longer-term learning effects.

Table 3 presents the baseline regression estimates which are consistent with Figure 3. We show the results for three separate outcomes: (1) claiming EITC on a tax return or responding to the 2005 notice; (2) being sent an IRS notice; (3) claiming EITC on a tax return or in response to an

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<sup>20</sup> We have also verified that the results are robust to controlling for a rich set of covariates based on demographic and income history variables.



IRS notice in any year. The first and last outcomes are shown in Figure 3. In all cases, we restrict the sample in each year to taxpayers who are eligible for the EITC.

The results in Table 3 show that the notices have strong nudge effects in 2005 for both taxpayers without kids and taxpayers with kids. For taxpayers without and with kids respectively, the estimates in the first and fourth columns indicate that the notices increased EITC claiming by 80 percentage points and 40 percentage points. The strong nudge effects in 2005 are also present when we use total EITC claiming, either on the tax return or in response to an IRS notice, as the outcome variable (the third and sixth columns). In this case, the nudge effect is about 66 percentage points for returns without kids and about 36 percentage points among returns with kids, relative to total EITC claiming in 2004.

Next we turn to the longer-term learning effects after 2005. The results for taxpayers without kids suggest that there are some statistically significant differences between the treatment and control groups. The results for claiming EITC benefits on a tax return show that treated individuals were more likely to claim EITC benefits on their tax returns after 2005 than control individuals. The results in 2006 are statistically significant, while the results in subsequent years are slightly smaller and not statistically significant. The 2006 results for claiming EITC benefit on a tax return are perhaps the cleanest test of learning effects. As shown in the second column in Table 3, control individuals were more likely to receive notices after 2005 than treated individuals. In particular, treated individuals mechanically have a probability of one for being sent a notice in 2005, but after 2005, treated individuals are about 10 percentage points less likely to receive notices than control individuals, and these differences are statistically significant. Intuitively, some taxpayers without kids who received notices in 2005 may have learned to claim EITC benefits on their tax returns in 2006. Yet because the IRS sends out notices each year some individuals in the control group may have claimed EITC benefits through these subsequent notices.<sup>21</sup> When looking at the longer-term learning effects based on total claiming of EITC benefits (on tax returns or through notices), there are no statistically significant differences between the treatment and control groups after 2005. These results are in

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<sup>21</sup> The negative differential effects on the likelihood of being sent a notice in later years also suggests that members of the treatment group do not on average learn to wait for a notice in later years in order to claim the EITC.

the third Column of Table 3. In contrast, the results for taxpayers with kids show no consistent statistically significant differences between the treatment and control groups after 2005. Thus, there is little to no evidence of longer-term learning effect for these taxpayers. Overall, based on the regression results in Table 3, we conclude that some taxpayers do learn to claim EITC benefits on their tax returns, but this learning is smaller than the nudge effect from the notices.

Using the estimated regression coefficients, we calculate “persuasion rates” following DellaVigna and Gentzkow (2010). Persuasion rates rescale the estimated regression coefficients by baseline take-up rates and treatment intensity, and hence allow us to characterize the effect of the notice *among those whose behavior could have been influenced*. (We discuss the calculation of these rates further in the Appendix.) Applying the persuasion rate formula to the regression estimates suggests that the notices nudge a meaningful fraction of taxpayers. As shown in Table 4, we estimate persuasion rates of 77% of returns without kids and 46% of returns with kids in 2005. For taxpayers with kids, the standard errors for the persuasion rates after 2005 are very large and we cannot draw any meaningful conclusions. For taxpayers without kids, the persuasion rate in 2006 measured with respect to tax return claiming in that year is just over 22%, and about 18% when measured based on claiming EITC benefits on tax returns or through notices. The point estimates for the persuasion rates after 2005 suggest some persistent learning effects, but the standard errors are relatively large so that we cannot rule out that the hypothesis that there are no meaningful learning effects after 2005.

## B. Effects of Different Notices

### 1. Identification Strategy & Regression Specification

To further investigate the causal effects of IRS notices on taxpayer behavior, we consider the effects of being sent simpler notices with more salient benefit information versus more complicated and less salient notices. (See Bhargava and Manoli (2015) for a more detailed discussion of this experiment.) If the causal effects of notices are concentrated only in the nudge effect, then one would expect that the differences between groups sent simpler and more salient notices versus more complicated notices are also concentrated in the notice year. To test this hypothesis, we exploit the randomized variation in notice messaging from the 2009 CA experiment. The identification strategy compares outcomes for taxpayers who were randomly

assigned to different treatment groups with simpler and more salient notices or more complicated notices as described in Bhargava and Manoli (2015). Compared to the 2005 glitch analysis, there are two key differences in this experiment. First, the sample includes individuals who did not respond to an initial notice in a given year rather than individuals receiving a notice for the first time in a given year. Second, the results identify the effect of more versus less complicated and salient notices, rather than the effect of being sent a notice versus not being sent a notice.

To test the effects of the different treatments, we estimate the following regression specification

$$y_{it} = \beta_0 + \sum_k \beta_{1k} 1(Treat_i = k) + \sum_{s=2008}^{2011} \beta_{2s} [1(Year_t = s)] \\ + \sum_k \sum_{s=2008}^{2011} \beta_{3k,s} [1(Year_t = s) * 1(Treat_i = k)] + \varepsilon_{it}$$

where  $Treat_i$  captures the taxpayer's 2009 treatment group  $k =$  simple, benefit, social, or time. The variable  $y_{it}$  denotes outcome  $y$  for taxpayer  $i$  in tax year  $t$ , including take-up of EITC benefits as well as EITC amounts claimed. The key coefficients of interest are the coefficients on the interactions between the year dummies and the treatment group dummies,  $\beta_{3k,s}$ . These coefficients capture the differences between the treatment groups across the different tax years. As with the 2005 glitch regression specification, we include in the pre-period only one-year prior to the experiment (the experiment was in 2009).

Similar to the 2005 glitch analysis, we estimate the above regression for the 2009 California Experiment using only the sample of observations that are EITC eligible in each year. Similar to Figure 2 for the glitch analysis, Figures 4A-D plot the time series of EITC eligibility and the probability of being sent a notice for the 2009 experiment sample. By construction, all individuals in the sample were eligible and received a notice in 2009. Consistent with the random assignment in the experiment, Figures 4A and B demonstrate that the different treatment groups all have essentially identical EITC eligibility histories and notice-receipt histories prior to 2009. Furthermore, after 2009, the plots indicate nearly identical trends for the different treatment groups, suggesting that the different notice treatments in 2009 did not differentially impact EITC eligibility and notice receipt subsequently.

## 2. California Experiment Estimation Results

The sample means suggest that the benefit notice had a relatively larger nudge effect, relative to other notice messages. Figures 4E and F illustrate the main results for the 2009 California Experiment analysis. The plots illustrate take-up rates based on claiming EITC benefits on tax returns or through a notice in 2009 in each year for the different treatment groups. (Appendix Figures 8 A & B illustrate the same plots based on claiming EITC benefits on tax returns or through a notice in any year.) The plots show noticeable nudge effects in the notice year, but after the notice year, the series all converge. This convergence suggests minimal differential long-term learning effects from the different notices. Similar to the 2005 glitch analysis on the effect of being sent a notice in a given year, the results for the 2009 California experiment suggest that a simpler or more salient notice can have a more meaningful nudge effect than a more complicated notice, but these effects appear to decline relatively quickly.

Table 5 shows the regression results for the California experiment, where the effects are relative to being sent the standard (complex) notice a second time. While Table 5 focuses on EITC take-up outcomes, Appendix Table 8 presents results using EITC amounts claimed as the dependent variable. The results for both outcomes show similar patterns that confirm the graphical evidence in Figures 5 E and F. The regression results for both returns without and with kids show that the benefit salience treatment had the largest nudge effects, but the differential impacts of all of the treatments in subsequent years are all statistically insignificant. Thus, the different notices appear to have different nudge effects, but there are no differences in long-term learning effects.<sup>22</sup>

## IV. Conclusion

Incomplete take up of benefit programs among eligible individuals has meaningful welfare effects in a variety of contexts, ranging from health insurance (Aizer 2007) to college financial aid (Manoli and Turner 2014). In the case of the largest anti-poverty program in the U.S., the Earned Income Tax Credit, we exploit a national level natural experiment and find evidence that IRS notices informing taxpayers about their eligibility for the EITC have substantive effects on take-up in the short-term. The empirical results suggest that IRS notices persuade as much as 80

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<sup>22</sup> Appendix Table 9 presents the persuasion rates for the CA experiment. We do not focus on these results since the post-2009 regression coefficients are not statistically different from zero, and hence the persuasion rates are also not statistically different from zero.

percent of taxpayers who would not have otherwise claimed the credit to claim the credit in that year. These effects attenuate rapidly and are meaningfully smaller and potentially economically insignificant in the longer-term. The longer-term effects also suggest that repeated notices may be more effective at increasing take-up each year, as opposed to one-time notices. We also find evidence that clear messaging in the IRS notices can amplify the short-term nudge effects even among a relatively more inert population using data from a randomized experiment in California. Longer-term outcomes in this setting suggest relatively small and insignificant longer-term effects, consistent with the national experiment.

While our findings suggest that relatively low-cost interventions can have meaningful welfare effects, the relatively smaller longer-term learning effects also suggests that teaching individuals about potential benefits is difficult. The interpretation that individuals do not have a full understanding of the tax system, including potential benefits from refundable tax credits like the EITC, is consistent with prior work (Chetty and Saez 2013; Chetty Looney and Kroft 2009; Feldman, Katuscak and Kawano 2014). Determining how individuals learn about benefit programs and the federal income tax code and designing experiments and interventions to test these ideas remain important areas for future research.

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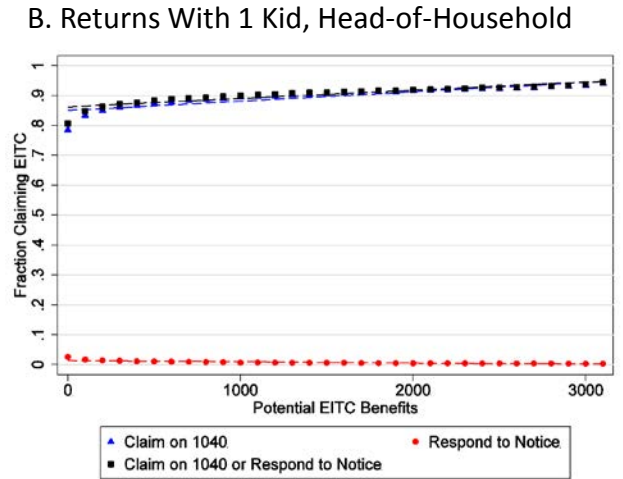
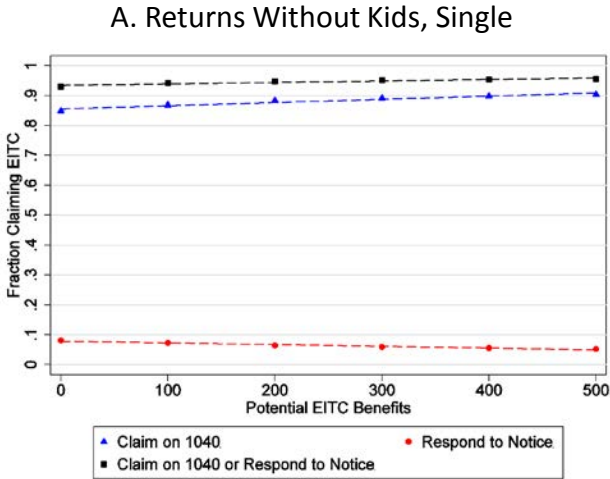
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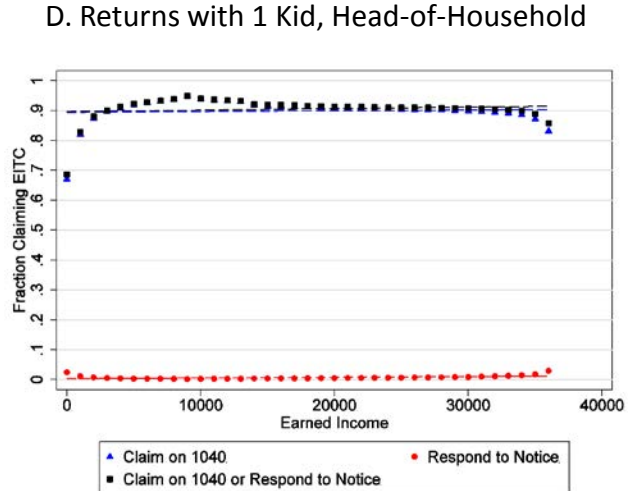
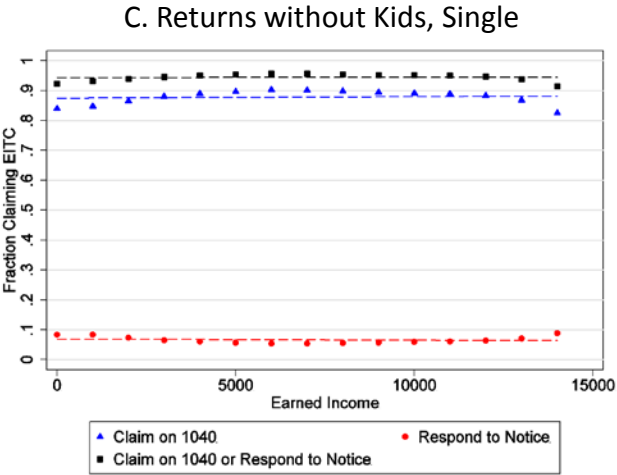


United States Treasury, “General Explanations of the Administration’s Fiscal Year 2016 Revenue Proposals.” Downloaded 6/17/2015: <http://www.treasury.gov/resource-center/tax-policy/Documents/General-Explanations-FY2016.pdf>

Figure 1. EITC Take-Up Rates Among Tax Filers  
 Take-Up Rates by Potential Benefits



Take-Up Rates by Earned Income

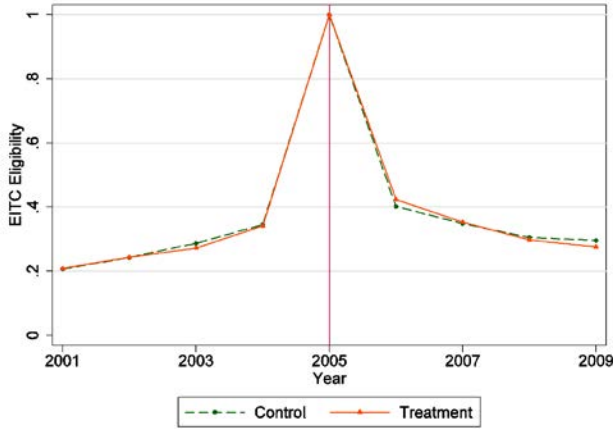


Notes: This figure plots EITC take-up rates among taxpayers across potential benefit amounts (Panels A & B) and earned income (Panels C & D). In all panels, the sample includes taxpayers who are eligible for the EITC. Panels A and C include taxpayers without kids, and Panels B and D include taxpayers with one kid. The sample of EITC eligible taxpayers include both taxpayers filing a tax return and claiming the EITC and taxpayers who were sent a notice after failing to claim the EITC on their tax returns. The blue triangles depict claiming EITC benefits on the 1040, the red circles depict claiming EITC in response to a reminder notice, and purple squares depict claiming EITC on either 1040 or in response to the reminder notice. In all panels data are from 2003, 2004, 2006 and 2007.

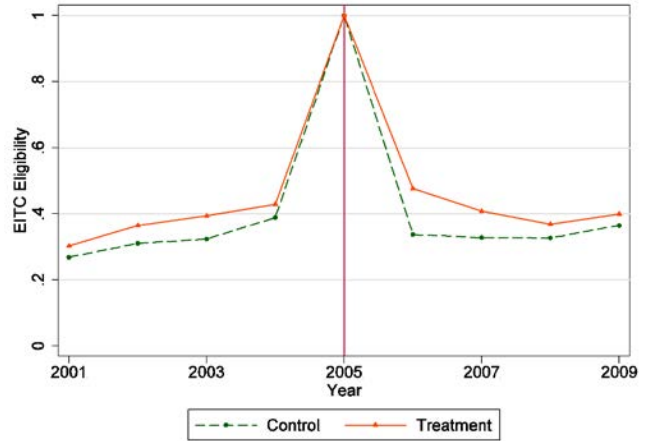
Figure 2: EITC Eligibility and IRS Notices

### EITC Eligibility

A. Sample Without Kids in 2005

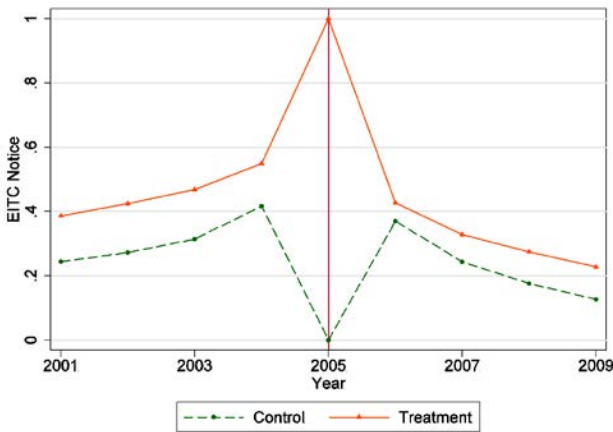


B. Sample With Kids in 2005

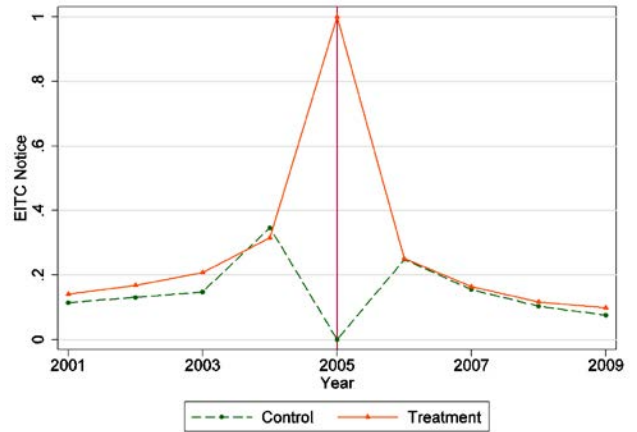


### Probability of Being Sent a Notice, Conditional on Eligibility

C. Sample Without Kids in 2005



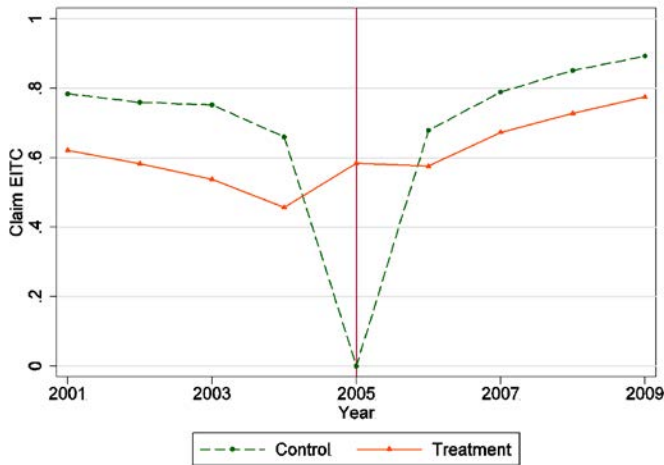
D. Sample With Kids in 2005



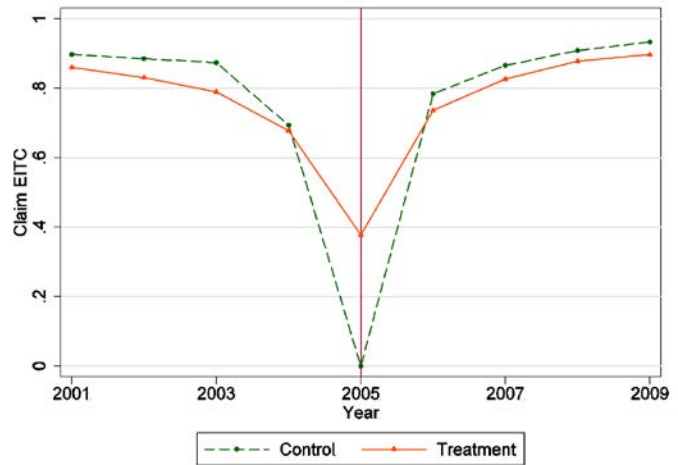
Notes: This figure plots the trends in the fraction of taxpayers eligible for EITC (Panels A and B), and who were sent EITC notices (Panels C and D) for the 2005 Glitch Analysis Sample. Panels A and C include observations without kids, and Panels B and D include observations with kids. The treatment group includes taxpayers who were sent notices and the control group includes computer-paper taxpayers who were not sent notices but who would have absent the glitch.

**Figure 3: EITC Take-Up, Conditional on Eligibility**  
**Claiming EITC on Form 1040 or a Notice in 2005**

**A. Returns without Kids**

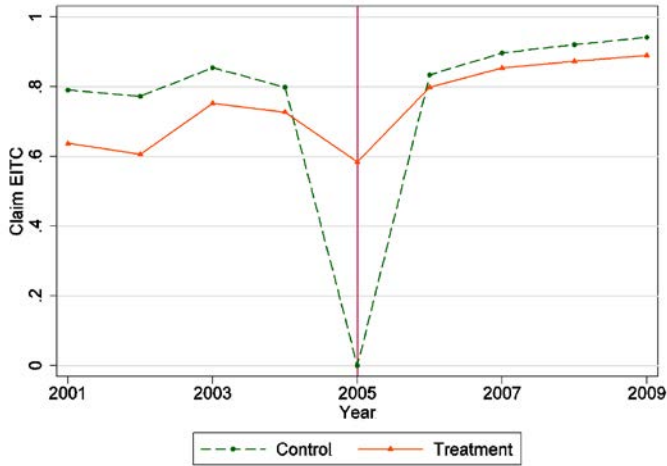


**B. Returns with Kids**

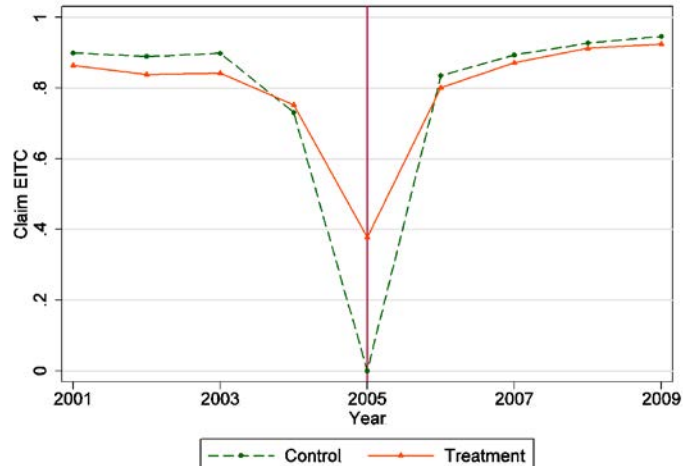


**Claiming EITC on Form 1040 or a Notice**

**C. Returns without Kids**



**D. Returns with Kids**

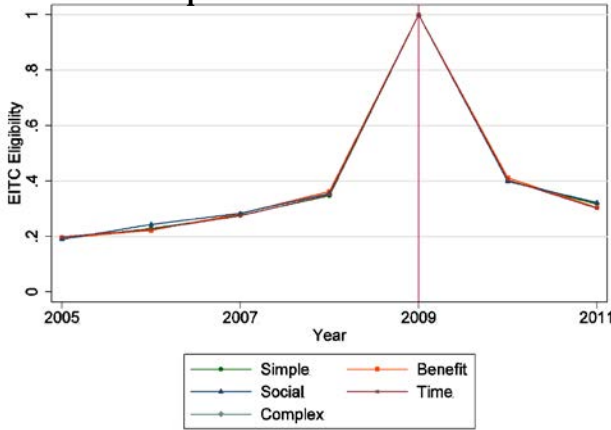


Notes: This figure plots the trends of re-weighted take-up rates conditional on EITC eligibility for the treatment and control groups. Panels A and B plot the take-up rates for taxpayers without and with kids respectively who claim the credit on their tax return in 2001-04 and 2006-09 and for responding to the notice in 2005. Panels C and D plot the total take-up rates, which includes both notice responses and tax return claiming, in all years. The treatment group includes taxpayers who were sent notices and the control group includes computer-paper taxpayers who were not sent notices but who would have absent the glitch. In all cases, the control group has a zero response in 2005 by construction since individuals in the control group were not sent notices.

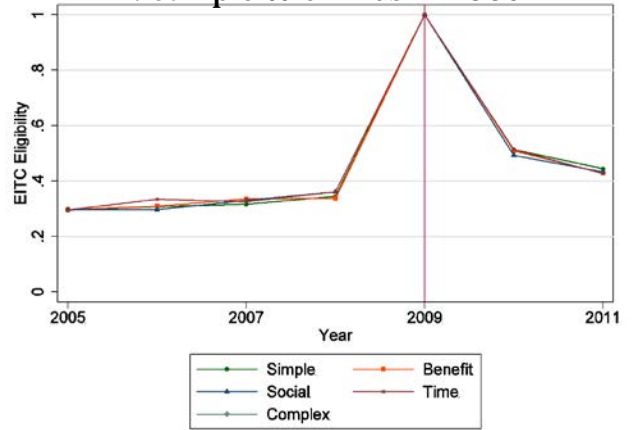
Figure 4: CA Experiment Results

### EITC Eligibility

A. Sample Without Kids in 2009

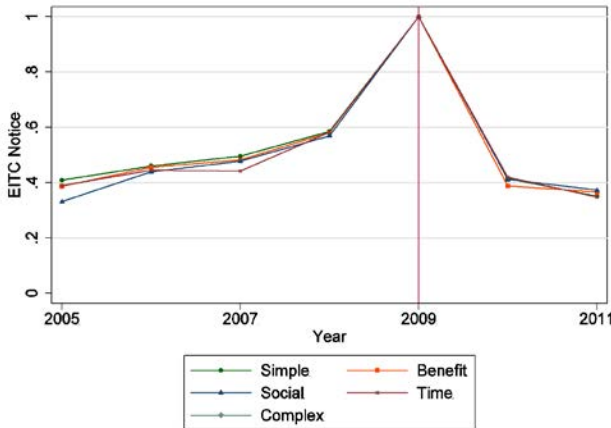


B. Sample With Kids in 2009

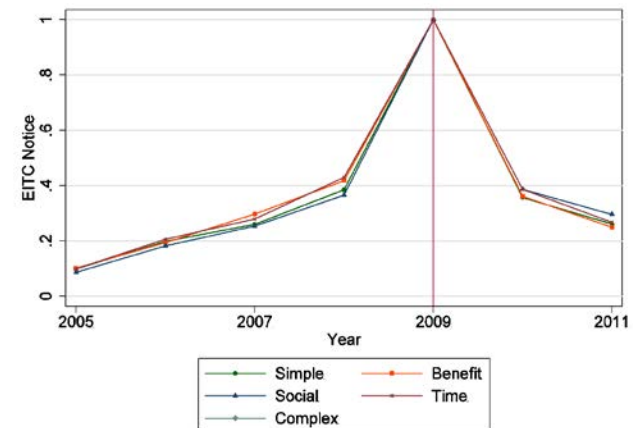


### Probability of Receiving Notice, Conditional on Eligibility

C. Sample Without Kids in 2009

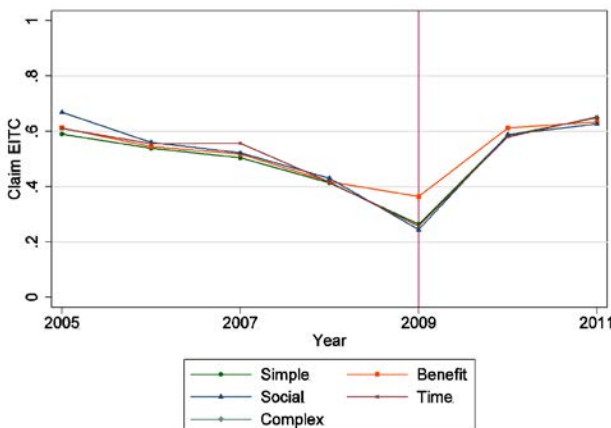


D. Sample With Kids in 2009

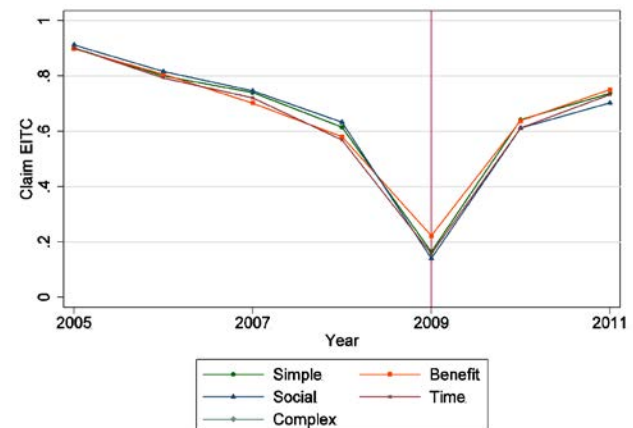


### EITC Take-Up, Conditional on Eligibility Claiming EITC on Form 1040 or a Notice in 2009

E. Sample Without Kids in 2009



F. Sample With Kids in 2009



Notes: This figure plots the trends in the EITC eligibility (Panels A and B), probability of being sent a notice, conditional on eligibility (Panels C and D), and EITC take-up, conditional on eligibility (Panels E and F) in 2009. Panels A, C and E include observations without kids, and Panels B, D and F include observations with kids. Each plot includes different trend lines for each kind of treatment – simple, social, benefit, time and complex.

**Table 1: Sample Means**

	2005 Glitch Analysis				2009 Experiment Analysis			
	Returns without Kids		Returns with Kids		Returns without Kids		Returns with Kids	
	Analysis Sample (1)	EITC Sample (2)	Analysis Sample (3)	EITC Sample (4)	CA Experimental Sample (5)	Notice Sample (6)	CA Experimental Sample (7)	Notice Sample (8)
Wage Income	6386 [4983]	6897 [6512]	26181 [13679]	18238 [11729]	6062 [5499]	6032 [5796]	29521 [15520]	31089 [17152]
Has positive wages	0.87 [0.33]	0.81 [0.39]	0.93 [0.26]	0.92 [0.28]	0.81 [0.39]	0.80 [0.40]	0.92 [0.26]	0.92 [0.27]
Schedule C Income	794 [2908]	1160 [4077]	1932 [7067]	1802 [8059]	871 [4736]	1023 [5790]	1730 [9737]	2225 [17787]
Has Schedule C Income	0.18 [0.38]	0.27 [0.45]	0.21 [0.41]	0.19 [0.39]	0.24 [0.43]	0.23 [0.42]	0.19 [0.40]	0.21 [0.41]
Adjusted Gross Income	7300 [4842]	6616 [67448]	28501 [11464]	20281 [38502]	5657 [31320]	4653 [57677]	28803 [56107]	29746 [92403]
Joint Tax Filer	0.09 [0.29]	0.13 [0.33]	0.49 [0.50]	0.26 [0.44]	0.13 [0.34]	0.15 [0.36]	0.56 [0.50]	0.51 [0.50]
Paid Tax Preparer	0.13 [0.33]	0.62 [0.49]	0.41 [0.49]	0.76 [0.43]	0.22 [0.41]	0.22 [0.41]	0.69 [0.46]	0.68 [0.47]
Computer-paper	0.14 [0.35]	0.27 [0.44]	0.34 [0.47]	0.12 [0.32]	0.16 [0.36]	0.16 [0.37]	0.23 [0.42]	0.22 [0.42]
Observations	561,261	4,583,456	135,971	18,022,195	23,553	55,127	11,496	21,377

Notes: This table shows mean values with standard deviations in brackets. The 2005 Glitch Analysis Sample (Columns 1 & 3) includes taxpayers sent notices in 2005 and those that should have been sent notices. The EITC Sample (Columns 2 & 4) includes all taxpayers who claimed the EITC on their tax 2005 returns. The 2009 CA Experiment Analysis Sample (Columns 5 & 7) includes taxpayers who were sent a first notice, did not respond to it, and then were sent a randomly assigned second notice. The 2009 CA Notice Sample (Columns 6 & 8) includes taxpayers who were sent a first notice in 2009 and responded to the first notice.

**Table 2: Sample Means, 2005 Analysis Sample**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>Returns without Kids</b>				<b>Returns with Kids</b>			
	<b>Unweighted</b>		<b>Weighted</b>		<b>Unweighted</b>		<b>Weighted</b>	
	Not Sent Notices	Sent Notices	Not Sent Notices	Sent Notices	Not Sent Notices	Sent Notices	Not Sent Notices	Sent Notices
Wage Income	5036 [5598]	6604 [4841]	6438 [10265]	6387 [5464]	23233 [13627]	27700 [13455]	26454 [25724]	26257 [13252]
Has positive wages	0.69 [0.46]	0.90 [0.30]	0.87 [1.04]	0.87 [0.35]	0.88 [0.32]	0.95 [0.22]	0.93 [0.62]	0.93 [0.33]
Schedule C Income	1951 [4297]	607 [2556]	788 [2321]	795 [4009]	3182 [8524]	1288 [6084]	1923 [5830]	1954 [9463]
Has Schedule C Income	0.41 [0.49]	0.14 [0.35]	0.19 [0.31]	0.18 [0.52]	0.27 [0.44]	0.19 [0.39]	0.21 [0.42]	0.22 [0.49]
Adjusted Gross Income	6510 [4944]	7428 [4814]	7339 [11787]	7291 [5243]	26342 [11744]	29613 [11155]	28829 [27066]	28552 [12266]
Joint Tax Filer	0.14 [0.35]	0.08 [0.28]	0.10 [0.41]	0.09 [0.35]	0.48 [0.50]	0.50 [0.50]	0.48 [0.65]	0.49 [0.53]
Paid Tax Preparer	0.52 [0.50]	0.06 [0.25]	0.13 [0.13]	0.13 [0.52]	0.61 [0.49]	0.31 [0.46]	0.41 [0.34]	0.41 [0.64]
Observations	78,210	483,051	78,210	483,049	46,239	89,732	46,239	89,732

Notes: This table shows mean values with standard deviations in brackets. Columns 1-4 report summary statistics for the treatment and control groups among returns without kids and Columns 5-8 report these statistics for returns with kids.

**Table 3: Diff-in-Diffs Estimates, 2005 Analysis Sample**

	Returns without Kids			Returns with Kids		
	Claim EITC on Tax Return, or Respond to 2005 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice	Claim EITC on Tax Return, or Respond to 2005 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice
Treatment*2005	0.788 [0.0366]	0.797 [0.0280]	0.656 [0.0474]	0.394 [0.0683]	0.984 [0.0445]	0.356 [0.0715]
Treatment*2006	0.0995 [0.0513]	-0.0995 [0.0339]	0.0361 [0.0675]	-0.0320 [0.0864]	0.0320 [0.0407]	-0.0556 [0.0920]
Treatment*2007	0.0875 [0.0560]	-0.0875 [0.0293]	0.0285 [0.0691]	-0.0233 [0.0880]	0.0233 [0.0384]	-0.0425 [0.0921]
Treatment*2008	0.0793 [0.0587]	-0.0793 [0.0279]	0.0239 [0.0694]	-0.0141 [0.0881]	0.0141 [0.0370]	-0.0362 [0.0922]
Treatment*2009	0.0851 [0.0609]	-0.0851 [0.0275]	0.0198 [0.0705]	-0.0206 [0.0911]	0.0206 [0.0367]	-0.0423 [0.0947]
2005	-0.660 [0.0356]	-0.340 [0.0236]	-0.799 [0.0463]	-0.694 [0.0655]	-0.306 [0.0216]	-0.731 [0.0683]
2006	0.0191 [0.0506]	-0.0191 [0.0311]	0.0354 [0.0666]	0.0908 [0.0842]	-0.0908 [0.0265]	0.104 [0.0887]
2007	0.129 [0.0553]	-0.129 [0.0264]	0.0985 [0.0681]	0.172 [0.0859]	-0.172 [0.0241]	0.162 [0.0891]
2008	0.191 [0.0580]	-0.191 [0.0249]	0.122 [0.0684]	0.215 [0.0859]	-0.215 [0.0228]	0.196 [0.0893]
2009	0.233 [0.0602]	-0.233 [0.0246]	0.143 [0.0694]	0.240 [0.0888]	-0.240 [0.0222]	0.215 [0.0916]
Treatment	-0.203 [0.0364]	0.203 [0.0254]	-0.0717 [0.0473]	-0.0161 [0.0665]	0.0161 [0.0351]	0.0210 [0.0698]
Constant	0.660 [0.0356]	0.340 [0.0236]	0.799 [0.0463]	0.694 [0.0655]	0.306 [0.0216]	0.731 [0.0683]
Observations	1511157	1511157	1511157	403225	403225	403225

Notes: This table shows the regression estimates for claiming EITC on tax return or responding to the 2005 notice, being sent an IRS notice, and claiming EITC on a tax return or in response to an IRS notice in any year. The first three columns present the results for the full sample of taxpayers without kids and the last three columns present the results for the sample of taxpayers with kids. Standard errors are clustered based on treatment status, 2005 AGI deciles, and year and reported in brackets.



**Table 4: Persuasion Rates, 2005 Glitch Analysis**

Persuasion Rates Based on Claiming EITC on Form 1040				
	Returns without Kids		Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2005	77.012	(1.284)	45.571	(5.046)
2006	22.349	(9.345)	-16.279	(49.817)
2007	24.874	(12.562)	-18.226	(79.295)
2008	26.549	(15.238)	-15.506	(108.941)
2009	32.273	(16.806)	-29.431	(161.650)

Persuasion Rates Based on Claiming EITC on Form 1040 or a Notice				
	Returns without Kids		Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2005	72.028	(2.056)	42.838	(5.647)
2006	17.895	(28.384)	-45.541	(103.420)
2007	19.212	(39.061)	-58.666	(188.573)
2008	18.645	(45.650)	-82.833	(354.838)
2009	17.936	(54.273)	-151.206	(759.605)

Notes: The persuasion rates are calculated based on estimated regression coefficients as detailed in the Appendix. Standard errors, shown in parentheses, are computed using the delta method.

**Table 5: Diff-in-Diffs Estimates, 2009 California Sample**

	Returns without Kids			Returns with Kids		
	Claim EITC on Tax Return, or Respond to 2009 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice	Claim EITC on Tax Return, or Respond to 2009 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice
Simple*2009	0.0385 [0.0376]	0.0154 [0.0341]	0.0716 [0.0385]	0.0463 [0.0722]	-0.00258 [0.0696]	0.0398 [0.0665]
Simple*2010	-0.00162 [0.0397]	0.00162 [0.0397]	0.0272 [0.0395]	0.0160 [0.0799]	-0.0160 [0.0799]	0.0122 [0.0735]
Simple*2011	-0.0188 [0.0422]	0.0188 [0.0422]	0.00673 [0.0400]	0.0139 [0.0746]	-0.0139 [0.0746]	0.00615 [0.0680]
Benefit*2009	0.133 [0.0385]	0.0200 [0.0351]	0.172 [0.0396]	0.139 [0.0816]	-0.0367 [0.0791]	0.134 [0.0789]
Benefit*2010	0.0209 [0.0430]	-0.0209 [0.0430]	0.0599 [0.0421]	0.0458 [0.0907]	-0.0458 [0.0907]	0.0575 [0.0862]
Benefit*2011	-0.0373 [0.0416]	0.0373 [0.0416]	0.0119 [0.0438]	0.0602 [0.0852]	-0.0602 [0.0852]	0.0571 [0.0809]
Social*2009	0.00227 [0.0384]	0.0313 [0.0346]	0.0233 [0.0389]	0.00415 [0.0703]	0.0161 [0.0691]	0.0119 [0.0693]
Social*2010	-0.0137 [0.0405]	0.0137 [0.0405]	0.00490 [0.0389]	-0.0326 [0.0875]	0.0326 [0.0875]	-0.0270 [0.0845]
Social*2011	-0.0559 [0.0452]	0.0559 [0.0452]	-0.0487 [0.0409]	-0.0396 [0.0748]	0.0396 [0.0748]	-0.0288 [0.0733]
Time*2009	0.0283 [0.0416]	0.0185 [0.0385]	0.0509 [0.0406]	0.0845 [0.0819]	-0.0479 [0.0797]	0.0763 [0.0790]
Time*2010	-0.00916 [0.0439]	0.00916 [0.0439]	0.00850 [0.0424]	0.0316 [0.0908]	-0.0316 [0.0908]	0.0337 [0.0875]
Time*2011	-0.0185 [0.0470]	0.0185 [0.0470]	0.00123 [0.0419]	0.0540 [0.0902]	-0.0540 [0.0902]	0.0463 [0.0865]
2009	0.0154 [0.0341]	-0.0154 [0.0341]	-0.0177 [0.0350]	-0.00258 [0.0696]	0.00258 [0.0696]	0.00387 [0.0638]
2010	0.0200 [0.0351]	-0.0200 [0.0351]	-0.0185 [0.0364]	-0.0367 [0.0791]	0.0367 [0.0791]	-0.0320 [0.0764]
2011	0.0313 [0.0346]	-0.0313 [0.0346]	0.0102 [0.0351]	0.0161 [0.0691]	-0.0161 [0.0691]	0.00830 [0.0681]
Simple	0.0185 [0.0385]	-0.0185 [0.0385]	-0.00420 [0.0374]	-0.0479 [0.0797]	0.0479 [0.0797]	-0.0397 [0.0767]
Benefit	-0.188 [0.0343]	0.399 [0.0318]	-0.370 [0.0356]	-0.498 [0.0508]	0.618 [0.0497]	-0.526 [0.0467]
Social	0.172 [0.0363]	-0.172 [0.0363]	0.0805 [0.0364]	0.0115 [0.0610]	-0.0115 [0.0610]	0.00715 [0.0568]
Time	0.253 [0.0369]	-0.253 [0.0369]	0.186 [0.0363]	0.109 [0.0531]	-0.109 [0.0531]	0.0989 [0.0478]
Constant	0.399 [0.0318]	0.601 [0.0318]	0.581 [0.0332]	0.618 [0.0497]	0.382 [0.0497]	0.646 [0.0456]
Observations	48688	48688	48688	26419	26419	26419

Notes: This table shows the regression estimates for claiming EITC on tax return or responding to the 2009 notice, being sent an IRS notice, and claiming EITC on a tax return or in response to an IRS notice in any year for the 2009 CA Sample. The first three columns present the results for the full sample of taxpayers without kids and the last three columns present the results for the sample of taxpayers with kids. Standard errors are clustered based on treatment status, 2009 AGI deciles, and year and reported in brackets.

## ONLINE APPENDIX – NOT FOR PUBLICATION

### Appendix A. Weighting Method

Using  $X_i$  to denote a vector of covariates from individual  $i$ 's 2005 tax return, we estimate the probability that individual  $i$  is in the treatment group given observables  $X_i$  using a probit specification,

$$p_i = \text{Prob}(Treat_i = 1) = \Phi(\beta X_i)$$

where  $Treat_i$  is an indicator equal to one if individual  $i$  is in the treatment group and zero otherwise, and  $\Phi(\cdot)$  denotes the Normal cumulative distribution function. We estimate separate regressions for the samples with and without kids, and Appendix Table 2 presents the probit results. We obtain the predicted probabilities  $\hat{p}_i$  for each individual, and then calculate weights

$$w_i = \begin{cases} \frac{1}{1 - \hat{p}_i} & \text{if } Treat_i = 0 \\ \frac{1}{\hat{p}_i} & \text{if } Treat_i = 1. \end{cases}$$

Intuitively, the weights are constructed so that observations in the control group that have observables similar to observations in the treatment group are “up-weighted,” and observations in the treatment group that have observables similar to observations in the control group are “down-weighted.”

## Appendix B: Persuasion Rates

Following DellaVigna and Gentzkow (2010), we calculate persuasion rates, defined as:

$$f_t = 100\% * \left( \frac{y_t^T - y_t^C}{e^T - e^C} \right) * \left( \frac{1}{1 - y_t^0} \right)$$

where  $T$  denotes the treatment group,  $C$  the control group,  $t$  tax years,  $e$  the treatment rate, and  $y$  the response rate where  $y_t^0$  captures the baseline response rate. We define  $e^T - e^C$  as 0.85.

Guyton, Manoli, Schafer and Sebastiani (2015) present an analysis of a field experiment in which the IRS mailed postcards and information flyers to low-income, potentially EITC-eligible nonfilers. They report that 73 percent of intended recipients received their mailings. Because address information for filers may be more accurate than address information for nonfilers, we assume that 85 percent of notices sent to taxpayers would reach the intended recipients. To define the baseline take-up, we define  $y_t^0$  as the sum of the constant and the year effect in the notice year and as the sum of the constant the year effect and the treatment effect in other years. In the notice year the response should not differ by treatment status and the sum of the constant and the year term should be zero. Instead of mechanically setting this difference to zero, we rely on the coefficients from the regression specification in order to keep the approach similar to the approach applied to other years and as a check that these terms sum to zero as expected. In other years, the combination of the constant, the treatment indicator and the year indicator give us an estimate of what take-up would have been in that year for the treatment group, absent the intervention. We define the difference in response  $y_t^T - y_t^C$  using the regression results, using the key differential effect in each year. For the notice year, this effect is relative to EITC claiming in response to the notice, but in other years we include the differential effect of claiming on the tax return. We use this approach so the persuasion rates measure the effectiveness of the notices on teaching taxpayers to claim the EITC on their return in following years.

Using the notation of the regression specification for the glitch analysis given in the main text, the persuasion rates for the glitch analysis are calculated as

$$f_t = 100 * \left( \frac{\beta_{3t}}{0.85} \right) \left( \frac{1}{1 - \beta_0 - \beta_1 - \beta_{2t}} \right)$$

Using the notation of the regression specification for the CA experiment analysis given in the main text, the persuasion rates for the CA experiment analysis are calculated as

$$f_{t,k} = 100 * \left( \frac{\beta_{3t,k}}{0.85} \right) \left( \frac{1}{1 - \beta_0 - \beta_{1,k} - \beta_{2t}} \right)$$

where the subscript k refers to the treatment group (simple, benefit, social or time).

Standard errors for the persuasion rates are computed using the standard errors of the estimated regression coefficients and the delta method.

## Appendix C. Audit Analysis

To examine a potentially more aggressive informational intervention than the notification letters, the empirical analysis below considers individuals who were audited in tax years 2006, 2007, 2008 or 2009.<sup>23</sup> Audit data is available for tax years 2006 through 2009 from the IRS National Research Program (NRP) database.<sup>24</sup> In these data, there are 100 taxpayers who meet our criteria of: filing a tax return in the audit year and not claiming an EITC; ruled eligible for the EITC following the audit; received the EITC as a result of the audit. The IRS selects tax returns for audit review quasi-randomly. It is not possible for us to explain the audit selection criteria; the specific details of the audit selection are not made publicly available by the IRS so that taxpayers cannot figure out how to evade audit selection. Because audit reviews can involve significant time with an IRS auditing agent and tax preparer, as well as significant time spent reviewing financial records and tax rules, the audit may represent a more aggressive informational intervention that teaches taxpayers more about the EITC than notification letters. Summary statistics are below.

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<sup>23</sup> We restrict the sample to audits in these years only since consistent audit data is only available for these years. Data from earlier years is not comparable to data on from these years, and in some cases, not digitized. Audit data is made available internally 4 years after a given tax year. More recent audits may be ongoing.

<sup>24</sup> We are very grateful to Melissa Vigil for help with the audit event study analysis.

### **Audit Sample Summary Statistics**

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Wage Income	6172 [10435]
Has positive wage income	0.48 [0.50]
Schedule C Income	-9 [26809]
Has Schedule C Income	0.61 [0.49]
Adjusted Gross Income	6651 [30744]
Joint Tax Filer	0.12 [0.33]
Has Kids	0.24 [0.43]
Number of Kids	0.49 [1.11]
Paid Tax Preparer	0.57 [0.50]
Fraction Audited in 2006	0.49
Fraction Audited in 2007	0.18
Fraction Audited in 2008	0.18
Fraction Audited in 2009	0.15
<b>Observations</b>	<b>100</b>

---

## Empirical Analysis: Audit Event Study

For taxpayers in our audit sample, we create a panel dataset based on 2001 through 2013. We then implement an event study research design to examine behavior before and after the audit. Specifically, we define event time as year since the audit,  $evtime = year - audit\_year$ , and we estimate the following specification,

$$y_{it} = \sum_{k=2001}^{2013} \beta_k 1(year_t = k) + \sum_{k=-5}^5 \delta_k 1(evtime_t = k) + \varepsilon_{it}$$

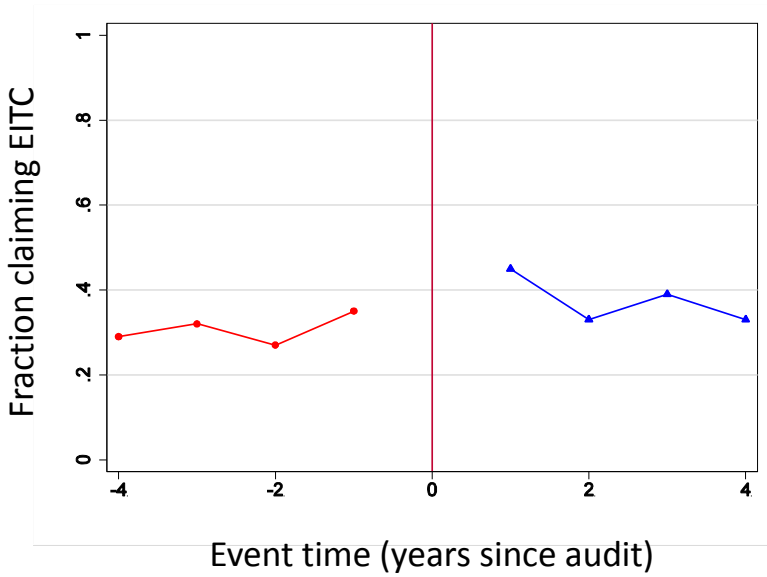
where  $y_{it}$  denotes claiming EITC benefits at time  $t$  for individual  $i$ . We also pool pre- and post-audit years and estimate the following specification,

$$y_{it} = \sum_{k=2001}^{2013} \beta_k 1(year_t = k) + \delta^{pre} 1(evtime_t < 0) + \delta^0 1(evtime_t = 0) \\ + \delta^1 1(evtime_t = 1) + \delta^{post} 1(evtime_t > 1) + \varepsilon_{it}.$$

With this specification, we can test compare  $\delta^1$  and  $\delta^{post}$  to  $\delta^{pre}$  to test if there are short-term and long-term effects following the audit.

The figure below presents the average fraction of individuals in the audit sample who claim EITC benefits by event time. Prior to the audit year, the average fraction of taxpayers claiming EITC benefits is roughly 0.33. In the year of the audit, the fraction of individuals who claim EITC benefits on the initially filed tax returns and the fraction of individuals who ultimately received EITC benefits following the audit are 0 and 1 respectively because of how the sample is defined. Following the audit, the fractions of individuals receiving EITC benefits does not appear to be significantly higher than the pre-audit fractions.





Notes: This figure plots the probability of claiming EITC benefits by years relative to the year of audit. The sample is restricted to individuals who did not claim the EITC in the audit year but were then found to be eligible for EITC benefits after the audit was complete. Thus, pre-audit, the Fraction Claiming EITC is 0, and post-audit, the Fraction Claiming EITC is 1. The sample is taken from audits in Tax Years 2006 to 2009, and data from tax years 2001 through 2013 are pulled for all individuals in the sample.

# Appendix Figure 1: Earned Income Tax Credit Schedules

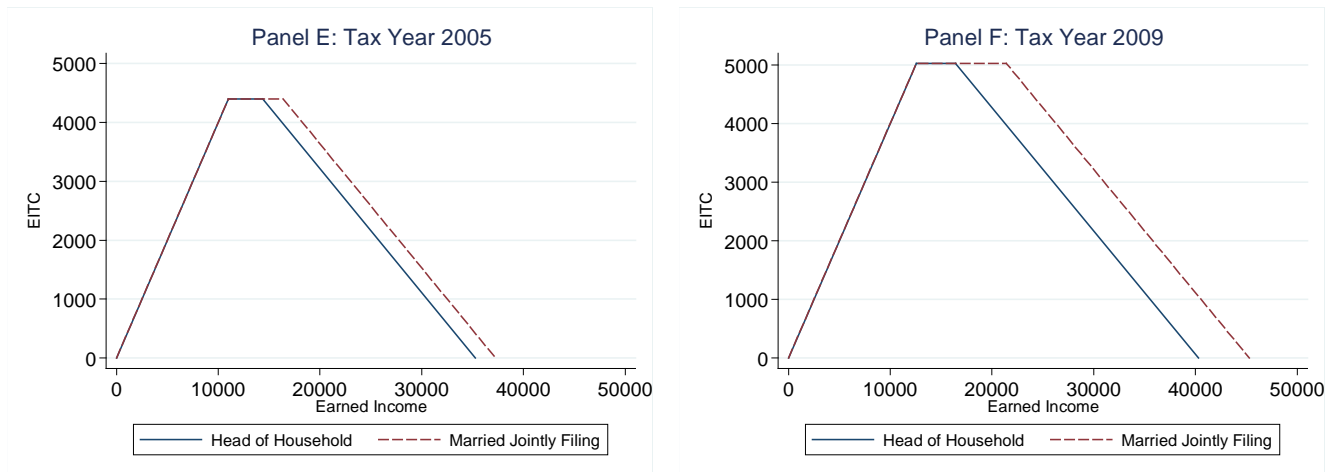
## A. No Qualifying Children



## B. One Qualifying Child



## C. Two Qualifying Children



Notes: This figure shows the EITC schedules for taxpayers with no children, one child and two children for the years 2005 and 2009, by filing status. The solid lines depict single filing status and the dashed lines depict the married filing joint status. For simplicity, these figures show the statutory EITC schedules by earned income. In practice, the EITC is a function of both earnings and adjusted gross income.

# Appendix Figure 2: Example Notice (CP27), Returns without Kids

## Page 1 of 3



Department of Treasury  
Internal Revenue Service

[Redacted]

[Redacted]

Notice	CP27 (joint)
Tax Year	2011
Notice date	July 1, 2012
Social Security number	XXX-XX-9999
To contact us	Phone [Redacted]

Page 1 of 3

Important information about the Earned Income Credit

## You may be eligible for a refund of up to \$464

Our records show that you may be eligible for the Earned Income Credit (EIC), but didn't claim it on your 2011 tax form. Depending on your earnings and eligibility, your benefit can be up to \$464.

Do not discard or overlook this notice because you may be entitled to some additional money.

### Summary

The credit, which can be up to \$464, is for certain people who have worked and earned income. Please complete the worksheet on Page 3 to determine if you're eligible for the credit.

### What you need to do

Complete the Earned Income Credit Worksheet on page 3.

#### If the worksheet confirms that you're eligible for the credit

- Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

#### If the worksheet indicates that you aren't eligible for the credit

- Please do not return the worksheet to us.

### Next steps

If you're eligible for the credit, we'll send you a refund check in 6–8 weeks, as long as you don't owe tax or any other debts we're required to collect.

#### When you file your Form 1040 next year,

- Claim the credit if you are still eligible.
- Write "NO" on the EIC line if you don't want or don't qualify for the credit.
- You can also ask the IRS to figure the EIC credit for you. Write "EIC" on the EIC line, and if you qualify for the credit, the IRS will calculate it for you.

If you're not eligible for the credit, we will notify you by mail.

# Appendix Figure 2: Example Notice (CP27), Returns without Kids

## Page 2 of 3

Notice	CP27 (joint)
Tax Year	2011
Notice date	July 1, 2012
Social Security number	XXX-XX-9999

Page 2 of 3

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### Additional information

- Visit [www.irs.gov/cp27](http://www.irs.gov/cp27). You can also find the following online:
  - Form 1040 or 1040A
  - Earned Income Credit (Publication 596)
- For tax forms, instructions, and publication, visit [www.irs.gov](http://www.irs.gov) or call 1-800-TAX-FORM (1-800-829-3676).

If you need assistance, please don't hesitate to contact us.

# Appendix Figure 2: Example Notice (CP27), Returns without Kids

## Page 3 of 3



Department of Treasury  
Internal Revenue Service

Notice	CP27 (joint)
Tax Year	2011
Notice date	July 1, 2012
Social Security number	XXX-XX-9999

Page 3 of 3

INTERNAL REVENUE SERVICE

Fold here

### Earned Income Credit Worksheet

**Step 1** Read each statement listed below, and place a check mark next to any that describes you or your spouse.

- I lived in the United States for less than 6 months in 2011.
- I can be claimed as a dependent by another person.
- My or my spouse's Social Security card reads "Not Valid for Employment", and was issued so one of us could receive a federally funded benefit, such as Medicaid.
- I am or my spouse is an Earned Income Credit qualifying dependent of another person. Being an EIC qualifying dependent of another person means that you meet all of the following criteria:
  - You are that person's son, daughter, stepchild, grandchild, or foster child. Or, you are that person's brother, sister, half brother, half sister, stepbrother, or stepsister (or the child or grandchild of that person's brother, sister, half brother, half sister, stepbrother, or stepsister).
  - You were under age 19 at the end of the year and younger than that person (or that person's spouse, if the person files jointly). Or, you were under age 24 at the end of the year, a student, and younger than that person (or that person's spouse, if the person files jointly). Or, you were permanently and totally disabled, regardless of age.
  - You lived with that person in the United States for more than half of the year.
  - You are not filing a joint return for the year (or are filing a joint return only as a claim for refund).
- If you **checked any** of the above boxes, **you're not eligible** for the credit. Please do not continue completing this worksheet.
- If you **did not check any** of the above boxes, **you are eligible** for the credit. Please continue to Step 2.

**Step 2** Sign and date the statement if you are eligible for the credit.

Under penalties of perjury, I declare that this information is true and correct to the best of my knowledge.

Your signature _____		Date _____	
Your spouse's signature _____		Date _____	
		<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.
Primary phone _____	Best time to call _____	Secondary phone _____	Best time to call _____

# Appendix Figure 3: Example Notice (CP09), Returns with Kids

## Page 1 of 4



Department of Treasury  
Internal Revenue Service

[Redacted]

[Redacted]

Notice	CP09 (joint)
Tax Year	2011
Notice date	July 1, 2012
Social Security number	XXX-XX-9999
To contact us	Phone [Redacted]

Page 1 of 4

### Important information about the Earned Income Credit

## You may be eligible for a refund of up to \$5,751

Our records show that you may be eligible for the Earned Income Credit (EIC), but didn't claim it on your 2011 tax form. Depending on your earnings and eligibility, your benefit can be up to \$5,751.

Do not discard or overlook this notice because you may be entitled to some additional money.

### Summary

The credit, which can be up to \$5,751, is for certain people who have worked and earned income. Please complete the worksheet on Page 3 to determine if you're eligible for the credit.

### What you need to do

Complete the Earned Income Credit Worksheet on page 3.

#### If the worksheet confirms that you're eligible for the credit

- Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

#### If the worksheet indicates that you're not eligible for the credit

- Please do not return the worksheet to us.

### Next steps

If you're eligible for the credit, we'll send you a refund check in 6–8 weeks, as long as you don't owe tax or any other debts we're required to collect.

#### When you file your Form 1040 next year,

- Claim the credit if you are still eligible.
- Write "NO" on the EIC line if you don't want or don't qualify for the credit.
- You can also ask the IRS to figure the EIC credit for you. Write "EIC" on the EIC line, complete Schedule EIC, and attach it to your return. If you qualify for the credit, the IRS will calculate it for you.

If you're not eligible for the credit, we will notify you by mail.

# Appendix Figure 3: Example Notice (CP09), Returns with Kids

## Page 2 of 4

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**Additional information**

- Visit [www.irs.gov/cp09](http://www.irs.gov/cp09). You can also find the following online:
    - Form 1040 or 1040A
    - Earned Income Credit (Publication 596)
  - For tax forms, instructions, and publication, visit [www.irs.gov](http://www.irs.gov) or call 1-800-TAX-FORM (1-800-829-3676).
- If you need assistance, please don't hesitate to contact us.

# Appendix Figure 3: Example Notice (CP09), Returns with Kids

## Page 3 of 4



Department of Treasury  
Internal Revenue Service

Notice	CP09 (joint)
Tax Year	2011
Notice date	July 1, 2012
Social Security number	XXX-XX-9999

Page 3 of 4

INTERNAL REVENUE SERVICE

Fold here

## Earned Income Credit Worksheet

**Step 1** Read each statement listed below, and place a check mark next to any that describes you or your spouse.

- My or my spouse's Social Security card reads "Not Valid for Employment", and was issued so one of us could receive a federally funded benefit, such as Medicaid.
- I am or my spouse is an Earned Income Credit qualifying dependent of another person. Being an EIC qualifying dependent of another person means that you meet all of the following criteria:
  - You are that person's son, daughter, stepchild, grandchild, or foster child. Or, you are that person's brother, sister, half brother, half sister, stepbrother, or stepsister (or the child or grandchild of that person's brother, sister, half brother, half sister, stepbrother, or stepsister).
  - You were under age 19 at the end of the year and younger than that person (or that person's spouse, if the person files jointly). Or, you were under age 24 at the end of the year, a student, and younger than that person (or that person's spouse, if the person files jointly). Or, you were permanently and totally disabled, regardless of age.
  - You lived with that person in the United States for more than half of the year.
  - You are not filing a joint return for the year (or are filing a joint return only as a claim for refund).
- If you checked any of the above boxes, you're not eligible for the credit. Please do not continue completing this worksheet.
- If you did not check any of the above boxes, you're eligible for the credit. Please continue to Step 2 on the next page.



# Appendix Figure 3: Example Notice (CP09), Returns with Kids

## Page 4 of 4

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**Step 2** Provide the information requested below for no more than three of your dependents who lived with you or your spouse in 2011, and are related to you or your spouse. A dependent is related to you if they are your son, daughter, stepchild, adopted child, brother, sister, stepbrother, stepsister, or any of their descendants, or a foster child.

Do not provide information if:

- The dependent has a Social Security card that reads "Not Valid for Employment" and the Social Security number was issued so the dependent could receive a federally funded benefit, such as Medicaid.
- The dependent filed a joint return for reasons other than claiming a tax refund.

# Appendix Figure 3: Example Notice (CP09), Returns with Kids

## Page 4 of 4 (continued)

**Step 2** Provide the information requested below for no more than three of your dependents who lived with you or your spouse in 2011, and are related to you or your spouse. A dependent is related to you if they are your son, daughter, stepchild, adopted child, brother, sister, stepbrother, stepsister, or any of their descendants, or a foster child.

Do not provide information if:

- The dependent has a Social Security card that reads "Not Valid for Employment" and the Social Security number was issued so the dependent could receive a federally funded benefit, such as Medicaid.
- The dependent filed a joint return for reasons other than claiming a tax refund.

**Dependent #1**

Name \_\_\_\_\_ Social Security number \_\_\_\_\_ or Taxpayer ID number \_\_\_\_\_

Did the dependent live with you or your spouse in the U.S. for more than 6 months in 2011?  Yes  No

Was the dependent any of the following:

- Born after January 1, 1993, or
- Born after January 1, 1988 and a student, or
- Permanently disabled during 2011?  Yes  No

Is the dependent younger than you or your spouse?  Yes  No

**Dependent #2**

Name \_\_\_\_\_ Social Security number \_\_\_\_\_ or Taxpayer ID number \_\_\_\_\_

Did the dependent live with you or your spouse in the U.S. for more than 6 months in 2011?  Yes  No

Was the dependent any of the following:

- Born after January 1, 1993, or
- Born after January 1, 1988 and a student, or
- Permanently disabled during 2011?  Yes  No

Is the dependent younger than you or your spouse?  Yes  No

**Dependent #3**

Name \_\_\_\_\_ Social Security number \_\_\_\_\_ or Taxpayer ID number \_\_\_\_\_

Did the dependent live with you or your spouse in the U.S. for more than 6 months in 2011?  Yes  No

Was the dependent any of the following:

- Born after January 1, 1993, or
- Born after January 1, 1988 and a student, or
- Permanently disabled during 2011?  Yes  No

Is the dependent younger than you or your spouse?  Yes  No

**Step 3** Refer to your answers from Step 2 to determine if your dependents meet the requirements.

- If you answered no to any questions for a dependent, he or she doesn't meet the requirements.
- If you answered yes to all questions for a dependent, he or she meets the requirements.

How many dependents meet the requirements? \_\_\_\_\_

**If at least one dependent meets the requirements**

- If at least one dependent meets the requirements, you are eligible for the credit. Continue to Step 4.

(Keep in mind that a dependent who meets the requirements can only be claimed by one person. If you and someone else claim the same dependent, the IRS will use guidelines found in Publication 596 to determine who is eligible for the credit.)

**If none of your dependents meet the requirements**

- If none of your dependents meet the requirements, you are not eligible for the credit. Please do not continue completing this worksheet.

**Step 4** Sign and date the statement if you are eligible for the credit.

Under penalties of perjury, I declare that this information is true and correct to the best of my knowledge.

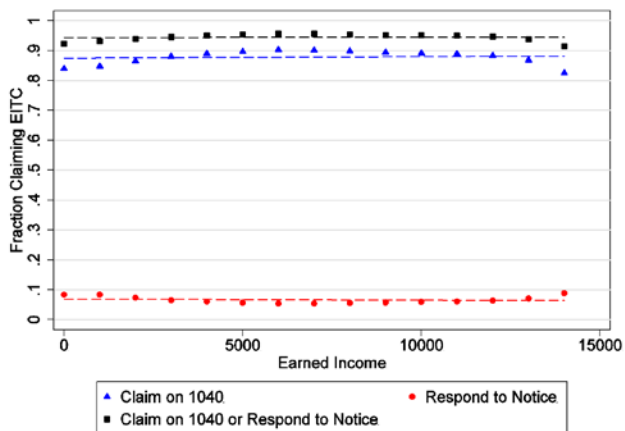
Your signature \_\_\_\_\_ Date \_\_\_\_\_

Your spouse's signature \_\_\_\_\_ Date \_\_\_\_\_

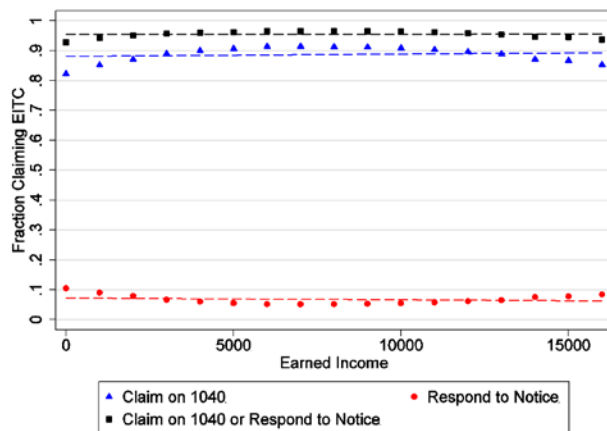
Primary phone \_\_\_\_\_ Best time to call  a.m.  p.m. Secondary phone \_\_\_\_\_ Best time to call  a.m.  p.m.

# Appendix Figure 4. EITC Take-Up Rates by Earned Income

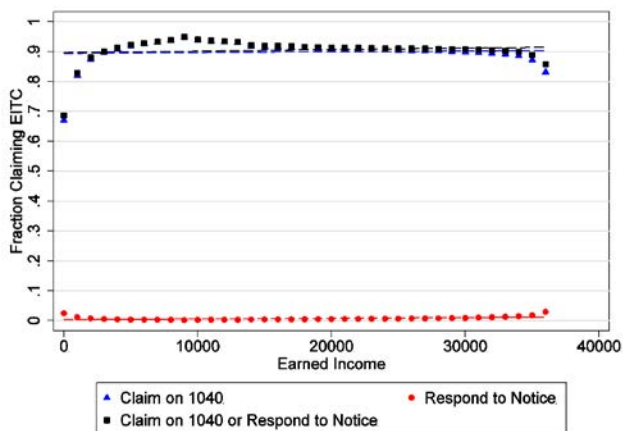
## A. Returns Without Kids, Single



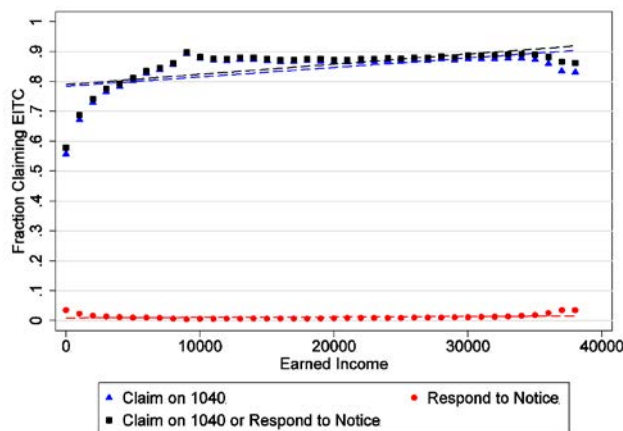
## B. Returns Without Kids, Married



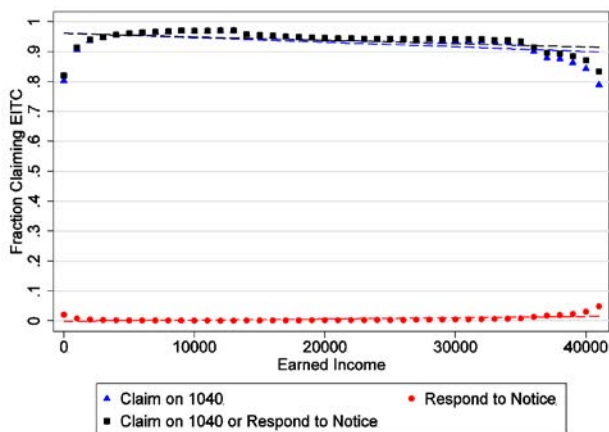
## C. Returns with 1 Child, Head-of-Household



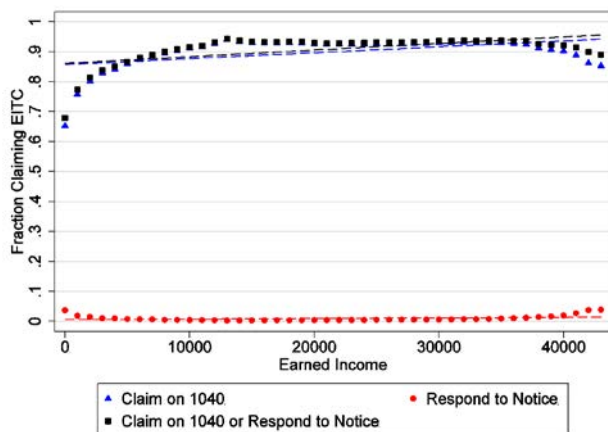
## D. Returns with 1 Child, Married



## E. Returns with 2+ Children, Head-of-Household



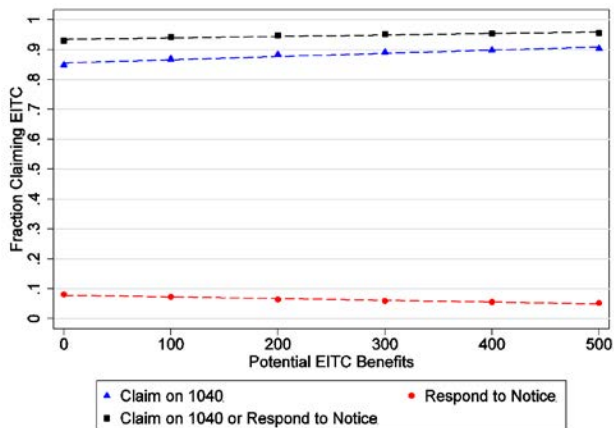
## F. Returns with 2+ Children, Married



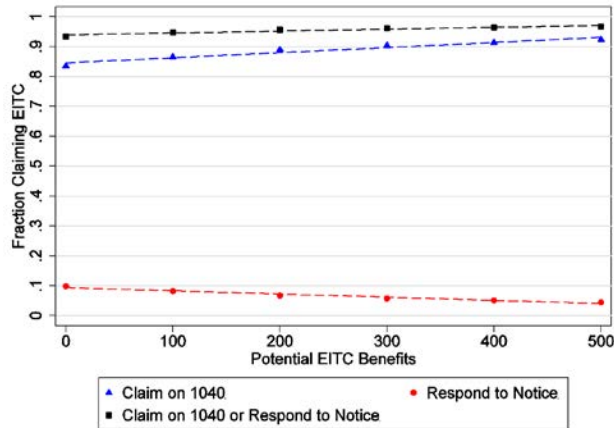
Notes: This figure plots EITC take-up rates against earned income, by number of children and filing status. Panels A and B include taxpayers without kids, Panels C and D include taxpayers with one kid, and Panels E and F include taxpayers with two or more kids. The blue triangles depict claiming EITC benefits on the 1040, the red circles depict claiming EITC in response to a reminder notice, and purple squares depict claiming EITC on either 1040 or in response to the reminder notice.

# Appendix Figure 5. EITC Take-Up Rates by Potential EITC Benefits

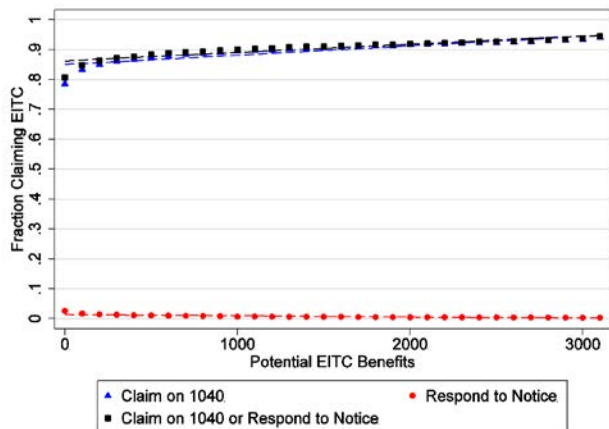
A. Returns Without Kids, Single



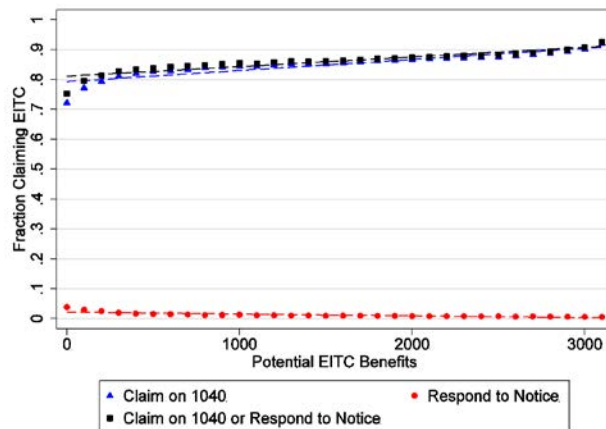
B. Returns Without Kids, Married



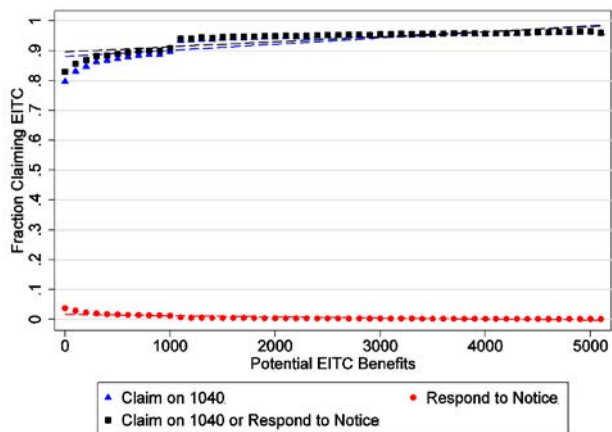
C. Returns with 1 Child, Head-of-Household



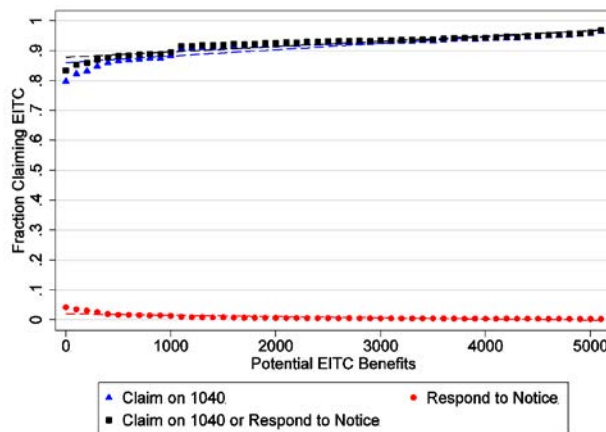
D. Returns with 1 Child, Married



E. Returns with 2+ Children, Head-of-Household



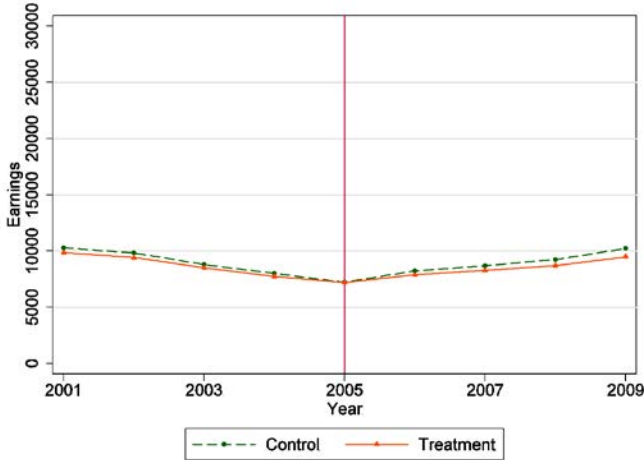
F. Returns with 2+ Children, Married



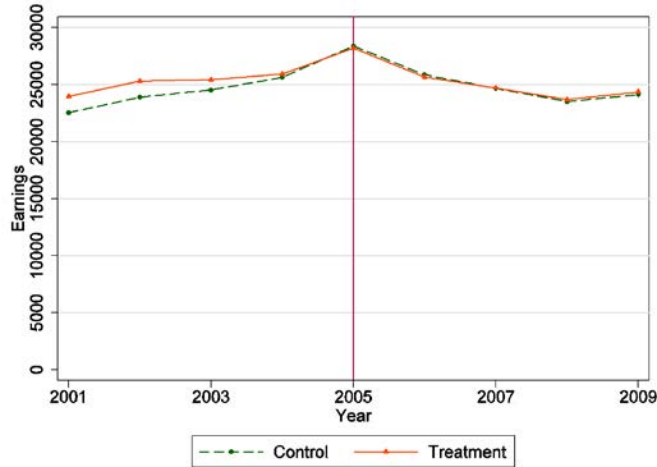
Notes: This figure plots EITC take-up rates against potential EITC benefits, by number of children and filing status. Panels A and B include taxpayers without kids, Panels C and D include taxpayers with one kid, and Panels E and F include taxpayers with two or more kids. The blue triangles depict claiming EITC benefits on the 1040, the red circles depict claiming EITC in response to a reminder notice, and purple squares depict claiming EITC on either 1040 or in response to the reminder notice.

## Appendix Figure 6: Covariates

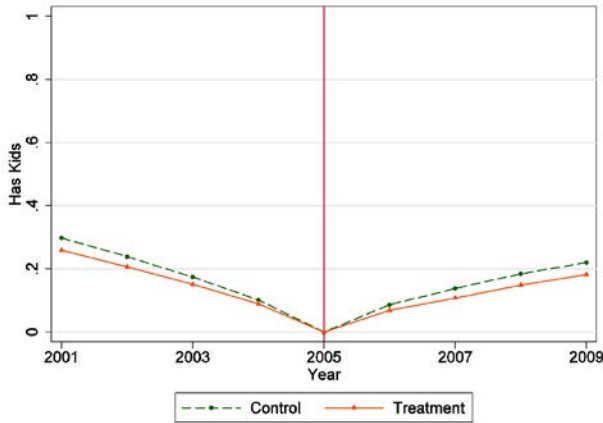
**A. Earnings,  
Returns without Kids in 2005**



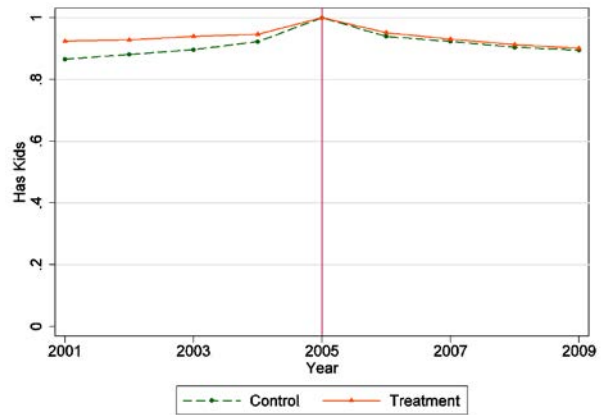
**B. Earnings  
Returns with Kids in 2005**



**C. Has Kids,  
Returns without Kids in 2005**



**D. Has Kids  
Returns with Kids in 2005**

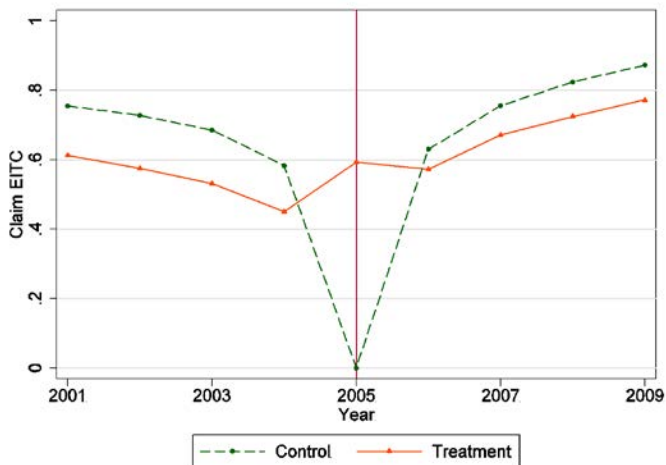


Notes: This figure presents trends in earnings and the likelihood of having kids for the treatment and control groups separately for the 2005 Analysis Sample. The plots are based on the sample of EITC-eligible taxpayers in each year. The treatment group includes taxpayers who were sent notices in 2005 and the control group includes taxpayers who were not sent notices in 2005 but who would have been sent notices absent the glitch. In Panels A and B, earnings refers to the sum of wages reported on Form 1040 and schedule C self-employment income. In Panel C and D, the presence of kids on a tax return is measured based on the claiming of dependent exemptions.

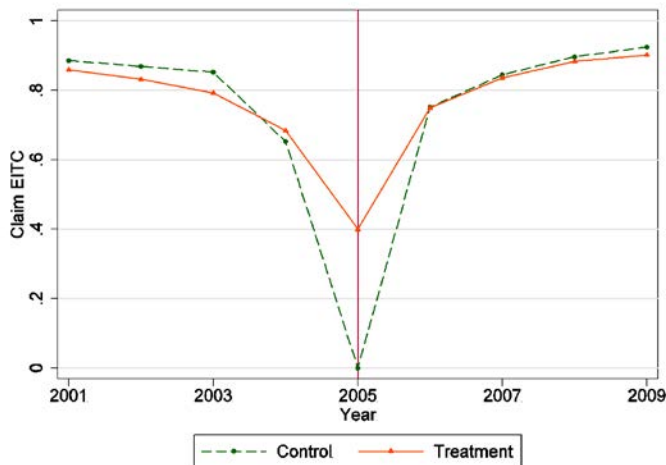
# Appendix Figure 7: EITC Take-Up, Conditional on Eligibility Unweighted

## Claiming EITC on Form 1040 or a Notice in 2005

**A. Returns without Kids**

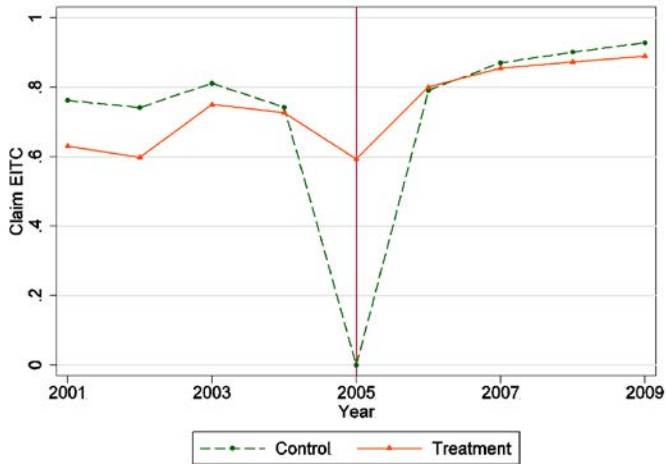


**B. Returns with Kids**

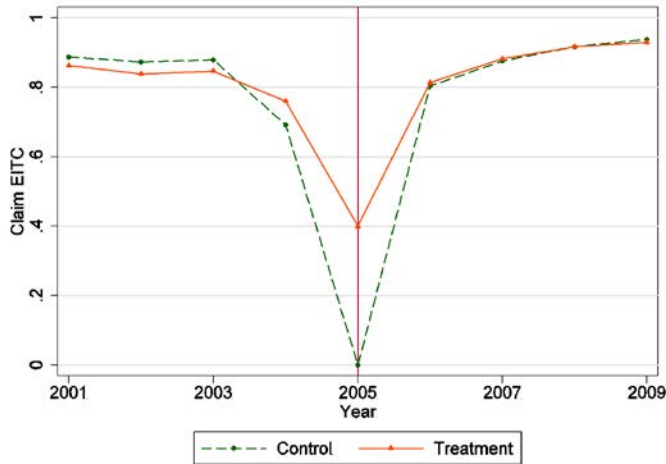


## Claiming EITC on Form 1040 or a Notice

**C. Returns without Kids**



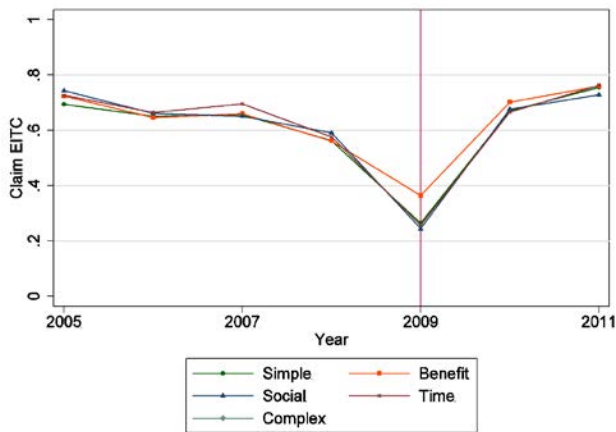
**D. Returns with Kids**



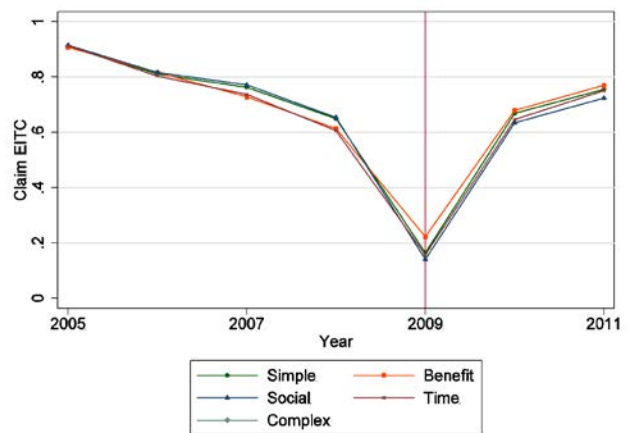
Notes: This figure plots the trends of unweighted take-up rates conditional on EITC eligibility for the treatment and control groups. Panels A and B plot the take-up rates for taxpayers without and with kids respectively who claim the credit on their tax return in 2001-04 and 2006-09 and for responding to the notice in 2005. Panels C and D plot the total take-up rates, which includes both notice responses and tax return claiming, in all years. The treatment group includes taxpayers who were sent notices and the control group includes computer-paper taxpayers who were not sent notices but who would have absent the glitch. In all cases, the control group has a zero response in 2005 by construction since individuals in the control group were not sent notices.

## Appendix Figure 8. EITC Take-Up, Conditional on Eligibility Claiming EITC on Form 1040 or through a Notice

**A. Sample Without Kids in 2009**



**B. Sample With Kids in 2009**



Notes: These figures plot EITC take-up rates based on claiming EITC benefits on tax returns or through a notice in any year for sample without kids, and with kids, respectively. Each plot includes different trend lines for each kind of treatment – simple, social, benefit, time and complex.

### **Appendix Table 1: IRS Notice Filters**

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#### **Control Group Construction**

Retain returns that meet earnings & investment income restriction

Remove married filing separate returns

Retain returns from US states

Age Restrictions Taxpayer: 25-64 for returns with no kids, 18-80 for returns with kids

Age Restrictions Children: no missing dependent ages, no returns with dependents over age 19

Remove dependent returns

Remove returns with foreign income

Remove returns with primary taxpayers that do not have valid SSN

Remove returns that decline EITC

Remove late filed returns

Remove returns that claim EITC

Remove returns with dependent children that do not have valid SSN

Remove returns with prior compliance issues with EITC

Drop returns that file as single with kids

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Source: Plueger (2009).



**Appendix Table 2: Probit Results**

	Dependent Variable = 1(Treat)	
	Returns without Kids	Returns with Kids
1(Male)	0.0238 [0.00503]	-0.222 [0.00928]
1(Paid Tax Preparer)	-1.477 [0.00560]	-0.730 [0.00741]
Age Quintile 2	0.00197 [0.00763]	0.0687 [0.0112]
Age Quintile 3	-0.0540 [0.00754]	0.0310 [0.0116]
Age Quintile 4	-0.167 [0.00764]	0.0161 [0.0113]
Age Quintile 5	-0.245 [0.00767]	0.171 [0.0115]
Joint Return	-0.0907 [0.00824]	0.144 [0.00865]
Wages (in \$10000s)	0.00447 [0.00720]	0.0220 [0.00535]
Schedule C Income (in \$10000s)	-0.0805 [0.0105]	-0.176 [0.00845]
AGI (in \$10000s)	0.132 [0.00736]	0.136 [0.00533]
Has W2 Income	0.111 [0.0107]	-0.137 [0.0191]
Has Schedule C Income	-0.472 [0.00851]	-0.0924 [0.0113]
Constant	1.426 [0.0118]	0.518 [0.0210]
Pseudo-R <sup>2</sup>	0.230	0.094
Observations	561,259	135,971

Notes: This table presents results for estimating a probit specification using the 2005 glitch analysis sample and an indicator for being in the treatment group as the dependent variable. Standard errors are shown in parantheses.

**Appendix Table 3: Diff-in-Diffs Estimates, 2005 Analysis Sample, Unweighted Results**

	Returns without Kids			Returns with Kids		
	Claim EITC on Tax Return, or Respond to 2005 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice	Claim EITC on Tax Return, or Respond to 2005 Notice	Sent IRS Notice	Take EITC on Tax Return or by Responding to Notice
Treatment*2005	0.726 [0.0125]	0.867 [0.0107]	0.609 [0.0105]	0.369 [0.0356]	1.031 [0.0341]	0.331 [0.0336]
Treatment*2006	0.0757 [0.0132]	-0.0757 [0.0132]	0.0254 [0.0105]	-0.0336 [0.0373]	0.0336 [0.0373]	-0.0590 [0.0350]
Treatment*2007	0.0483 [0.0125]	-0.0483 [0.0125]	0.000375 [0.00972]	-0.0399 [0.0362]	0.0399 [0.0362]	-0.0629 [0.0339]
Treatment*2008	0.0337 [0.0128]	-0.0337 [0.0128]	-0.0128 [0.00968]	-0.0446 [0.0351]	0.0446 [0.0351]	-0.0691 [0.0328]
Treatment*2009	0.0320 [0.0123]	-0.0320 [0.0123]	-0.0224 [0.00930]	-0.0539 [0.0349]	0.0539 [0.0349]	-0.0779 [0.0326]
2005	0.0469 [0.0107]	-0.0469 [0.0107]	0.0488 [0.00853]	0.0988 [0.0293]	-0.0988 [0.0293]	0.112 [0.0297]
2006	0.173 [0.00973]	-0.173 [0.00973]	0.128 [0.00756]	0.192 [0.0285]	-0.192 [0.0285]	0.184 [0.0290]
2007	0.241 [0.00997]	-0.241 [0.00997]	0.159 [0.00755]	0.244 [0.0274]	-0.244 [0.0274]	0.225 [0.0278]
2008	0.290 [0.00942]	-0.290 [0.00942]	0.186 [0.00722]	0.272 [0.0271]	-0.272 [0.0271]	0.247 [0.0276]
2009	-0.583 [0.00891]	-0.417 [0.00891]	-0.743 [0.00682]	-0.653 [0.0269]	-0.347 [0.0269]	-0.692 [0.0274]
Treatment	-0.133 [0.0107]	0.133 [0.0107]	-0.0160 [0.00827]	0.0310 [0.0341]	-0.0310 [0.0341]	0.0691 [0.0320]
Constant	0.583 [0.00891]	0.417 [0.00891]	0.743 [0.00682]	0.653 [0.0269]	0.347 [0.0269]	0.692 [0.0274]
Observations	1511157	1511157	1511157	403225	403225	403225

Notes: This table shows the regression estimates for claiming EITC on tax return or responding to the 2005 notice, being sent an IRS notice, and claiming EITC on a tax return or in response to an IRS notice in any year. The first three columns present the results for the full sample of taxpayers without kids and the last three columns present the results for the sample of taxpayers with kids. Standard errors are clustered based on treatment status, 2005 AGI deciles, and year and reported in brackets.

**Appendix Table 4A: Alternative Pre-Treatment Years, 2005 Analysis Sample**

**Dependent Variable = Claiming EITC on Form 1040 or a Notice in 2005**

Pre-Treatment Years Included:	2001-2004		2002-2004		2003-2004		2004 (baseline)	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
<i>Panel A: Returns without Kids</i>								
Treatment*2005	0.738	0.777	0.739	0.784	0.737	0.794	0.726	0.788
	[0.0176]	[0.0249]	[0.0179]	[0.0273]	[0.0180]	[0.0317]	[0.0125]	[0.0366]
Treatment*2006	0.0874	0.0887	0.0884	0.0961	0.0864	0.106	0.0757	0.0995
	[0.0181]	[0.0437]	[0.0184]	[0.0451]	[0.0185]	[0.0479]	[0.0132]	[0.0513]
Treatment*2007	0.0599	0.0766	0.0609	0.0840	0.0590	0.0936	0.0483	0.0875
	[0.0176]	[0.0491]	[0.0179]	[0.0503]	[0.0180]	[0.0528]	[0.0125]	[0.0560]
Treatment*2008	0.0454	0.0684	0.0464	0.0759	0.0444	0.0854	0.0337	0.0793
	[0.0178]	[0.0521]	[0.0181]	[0.0533]	[0.0182]	[0.0557]	[0.0128]	[0.0587]
Treatment*2009	0.0437	0.0742	0.0447	0.0816	0.0427	0.0912	0.0320	0.0851
	[0.0175]	[0.0546]	[0.0178]	[0.0557]	[0.0179]	[0.0580]	[0.0123]	[0.0609]
2005	-0.0457	-0.0516	-0.0268	-0.0389	0.000386	-0.0229	0.0469	0.0191
	[0.0136]	[0.0420]	[0.0142]	[0.0436]	[0.0147]	[0.0465]	[0.0107]	[0.0506]
2006	0.0804	0.0585	0.0993	0.0711	0.126	0.0871	0.173	0.129
	[0.0129]	[0.0476]	[0.0135]	[0.0489]	[0.0140]	[0.0516]	[0.00973]	[0.0553]
2007	0.148	0.121	0.167	0.134	0.194	0.150	0.241	0.191
	[0.0131]	[0.0507]	[0.0137]	[0.0520]	[0.0142]	[0.0545]	[0.00997]	[0.0580]
2008	0.197	0.162	0.216	0.175	0.243	0.191	0.290	0.233
	[0.0127]	[0.0532]	[0.0133]	[0.0544]	[0.0138]	[0.0568]	[0.00942]	[0.0602]
2009	-0.676	-0.731	-0.657	-0.718	-0.630	-0.702	-0.583	-0.660
	[0.0123]	[0.0219]	[0.0129]	[0.0246]	[0.0134]	[0.0295]	[0.00891]	[0.0356]
Treatment	-0.144	-0.192	-0.145	-0.200	-0.143	-0.209	-0.133	-0.203
	[0.0164]	[0.0246]	[0.0167]	[0.0270]	[0.0168]	[0.0314]	[0.0107]	[0.0364]
Constant	0.676	0.731	0.657	0.718	0.630	0.702	0.583	0.660
	[0.0123]	[0.0219]	[0.0129]	[0.0246]	[0.0134]	[0.0295]	[0.00891]	[0.0356]
Observations	1918847	1918847	1801984	1801984	1665240	1665240	1511157	1511157
<i>Panel B: Returns with Kids</i>								
Treatment*2005	0.419	0.423	0.416	0.425	0.408	0.422	0.369	0.394
	[0.0268]	[0.0424]	[0.0304]	[0.0477]	[0.0359]	[0.0561]	[0.0356]	[0.0683]
Treatment*2006	0.0166	-0.00254	0.0139	-0.000990	0.00537	-0.00366	-0.0336	-0.0320
	[0.0290]	[0.0678]	[0.0323]	[0.0712]	[0.0375]	[0.0771]	[0.0373]	[0.0864]
Treatment*2007	0.0103	0.00619	0.00768	0.00775	-0.000888	0.00508	-0.0399	-0.0233
	[0.0277]	[0.0698]	[0.0311]	[0.0732]	[0.0365]	[0.0789]	[0.0362]	[0.0880]
Treatment*2008	0.00568	0.0153	0.00302	0.0169	-0.00555	0.0142	-0.0446	-0.0141
	[0.0262]	[0.0700]	[0.0298]	[0.0733]	[0.0354]	[0.0790]	[0.0351]	[0.0881]
Treatment*2009	-0.00361	0.00886	-0.00628	0.0104	-0.0148	0.00774	-0.0539	-0.0206
	[0.0260]	[0.0736]	[0.0296]	[0.0768]	[0.0352]	[0.0823]	[0.0349]	[0.0911]
2005	-0.0517	-0.0427	-0.0300	-0.0244	0.00810	0.00902	0.0988	0.0908
	[0.0230]	[0.0647]	[0.0259]	[0.0682]	[0.0307]	[0.0741]	[0.0293]	[0.0842]
2006	0.0416	0.0384	0.0633	0.0567	0.101	0.0901	0.192	0.172
	[0.0221]	[0.0669]	[0.0251]	[0.0703]	[0.0300]	[0.0760]	[0.0285]	[0.0859]
2007	0.0933	0.0813	0.115	0.0996	0.153	0.133	0.244	0.215
	[0.0206]	[0.0670]	[0.0238]	[0.0703]	[0.0289]	[0.0761]	[0.0274]	[0.0859]
2008	0.121	0.106	0.143	0.125	0.181	0.158	0.272	0.240
	[0.0202]	[0.0706]	[0.0235]	[0.0738]	[0.0286]	[0.0793]	[0.0271]	[0.0888]
2009	-0.803	-0.828	-0.782	-0.809	-0.744	-0.776	-0.653	-0.694
	[0.0199]	[0.0374]	[0.0232]	[0.0431]	[0.0284]	[0.0519]	[0.0269]	[0.0655]
Treatment	-0.0192	-0.0456	-0.0166	-0.0471	-0.00798	-0.0445	0.0310	-0.0161
	[0.0248]	[0.0395]	[0.0286]	[0.0452]	[0.0344]	[0.0539]	[0.0341]	[0.0665]
Constant	0.803	0.828	0.782	0.809	0.744	0.776	0.653	0.694
	[0.0199]	[0.0374]	[0.0232]	[0.0431]	[0.0284]	[0.0519]	[0.0269]	[0.0655]
Observations	540104	540104	500563	500563	453475	453475	403225	403225

Notes: The dependent variable for all results is EITC claiming on the F1040 or by responding to IRS notices in 2005. This table presents results based on using different sets of pre-2005 years as alternative baselines. Standard errors are clustered at the treatment status, 2005 AGI decile and year level and reported in brackets.

**Appendix Table 4B: Alternative Pre-Treatment Years, 2005 Analysis Sample**

**Dependent Variable = Claiming EITC on Form 1040 or a Notice**

Pre-Treatment Years Included:	2001-2004		2002-2004		2003-2004		2004 (baseline)	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
<i>Panel A: Returns without Kids</i>								
Treatment*2005	0.673 [0.0136]	0.702 [0.0259]	0.661 [0.0150]	0.693 [0.0300]	0.630 [0.0122]	0.670 [0.0352]	0.609 [0.0105]	0.656 [0.0474]
Treatment*2006	0.0895 [0.0136]	0.0822 [0.0545]	0.0768 [0.0150]	0.0735 [0.0566]	0.0464 [0.0122]	0.0501 [0.0595]	0.0254 [0.0105]	0.0361 [0.0675]
Treatment*2007	0.0644 [0.0130]	0.0746 [0.0565]	0.0518 [0.0145]	0.0658 [0.0585]	0.0213 [0.0115]	0.0425 [0.0613]	0.000375 [0.00972]	0.0285 [0.0691]
Treatment*2008	0.0512 [0.0129]	0.0700 [0.0569]	0.0386 [0.0144]	0.0613 [0.0589]	0.00814 [0.0114]	0.0379 [0.0617]	-0.0128 [0.00968]	0.0239 [0.0694]
Treatment*2009	0.0416 [0.0127]	0.0659 [0.0582]	0.0289 [0.0142]	0.0571 [0.0601]	-0.00147 [0.0111]	0.0338 [0.0629]	-0.0224 [0.00930]	0.0198 [0.0705]
2005	-0.765 [0.00614]	-0.806 [0.0233]	-0.765 [0.00740]	-0.810 [0.0272]	-0.774 [0.00938]	-0.824 [0.0341]	-0.743 [0.00682]	-0.799 [0.0463]
2006	0.0268 [0.00799]	0.0281 [0.0532]	0.0262 [0.00899]	0.0244 [0.0550]	0.0173 [0.0107]	0.0101 [0.0588]	0.0488 [0.00853]	0.0354 [0.0666]
2007	0.106 [0.00695]	0.0911 [0.0551]	0.106 [0.00808]	0.0875 [0.0568]	0.0966 [0.00993]	0.0731 [0.0605]	0.128 [0.00756]	0.0985 [0.0681]
2008	0.137 [0.00693]	0.115 [0.0555]	0.137 [0.00807]	0.111 [0.0572]	0.128 [0.00992]	0.0967 [0.0609]	0.159 [0.00755]	0.122 [0.0684]
2009	0.164 [0.00657]	0.136 [0.0567]	0.163 [0.00776]	0.132 [0.0584]	0.154 [0.00967]	0.118 [0.0619]	0.186 [0.00722]	0.143 [0.0694]
Treatment	-0.0801 [0.0119]	-0.118 [0.0257]	-0.0674 [0.0135]	-0.109 [0.0298]	-0.0370 [0.0103]	-0.0857 [0.0350]	-0.0160 [0.00827]	-0.0717 [0.0473]
Constant	0.765 [0.00614]	0.806 [0.0233]	0.765 [0.00740]	0.810 [0.0272]	0.774 [0.00938]	0.824 [0.0341]	0.743 [0.00682]	0.799 [0.0463]
Observations	1918847	1918847	1801984	1801984	1665240	1665240	1511157	1511157
<i>Panel B: Returns with Kids</i>								
Treatment*2005	0.400 [0.0234]	0.404 [0.0415]	0.393 [0.0268]	0.401 [0.0471]	0.375 [0.0330]	0.389 [0.0568]	0.331 [0.0336]	0.356 [0.0715]
Treatment*2006	0.00984 [0.0253]	-0.00813 [0.0712]	0.00280 [0.0284]	-0.0109 [0.0746]	-0.0151 [0.0344]	-0.0227 [0.0811]	-0.0590 [0.0350]	-0.0556 [0.0920]
Treatment*2007	0.00604 [0.0237]	0.00497 [0.0714]	-0.00100 [0.0271]	0.00219 [0.0748]	-0.0189 [0.0333]	-0.00957 [0.0813]	-0.0629 [0.0339]	-0.0425 [0.0921]
Treatment*2008	-0.000219 [0.0221]	0.0112 [0.0714]	-0.00726 [0.0257]	0.00844 [0.0749]	-0.0251 [0.0322]	-0.00332 [0.0813]	-0.0691 [0.0328]	-0.0362 [0.0922]
Treatment*2009	-0.00897 [0.0218]	0.00511 [0.0746]	-0.0160 [0.0254]	0.00233 [0.0779]	-0.0339 [0.0320]	-0.00943 [0.0841]	-0.0779 [0.0326]	-0.0423 [0.0947]
2005	-0.0191 [0.0214]	-0.0108 [0.0677]	-0.00205 [0.0244]	0.00318 [0.0711]	0.0272 [0.0298]	0.0283 [0.0774]	0.112 [0.0297]	0.104 [0.0887]
2006	0.0528 [0.0204]	0.0476 [0.0682]	0.0698 [0.0235]	0.0616 [0.0716]	0.0991 [0.0290]	0.0866 [0.0778]	0.184 [0.0290]	0.162 [0.0891]
2007	0.0940 [0.0187]	0.0813 [0.0684]	0.111 [0.0220]	0.0953 [0.0718]	0.140 [0.0279]	0.120 [0.0780]	0.225 [0.0278]	0.196 [0.0893]
2008	0.115 [0.0184]	0.0998 [0.0714]	0.132 [0.0218]	0.114 [0.0746]	0.161 [0.0277]	0.139 [0.0806]	0.247 [0.0276]	0.215 [0.0916]
2009	-0.823 [0.0181]	-0.846 [0.0373]	-0.806 [0.0215]	-0.832 [0.0431]	-0.777 [0.0275]	-0.807 [0.0528]	-0.692 [0.0274]	-0.731 [0.0683]
Treatment	0.000166 [0.0210]	-0.0264 [0.0385]	0.00721 [0.0247]	-0.0236 [0.0445]	0.0251 [0.0314]	-0.0119 [0.0547]	0.0691 [0.0320]	0.0210 [0.0698]
Constant	0.823 [0.0181]	0.846 [0.0373]	0.806 [0.0215]	0.832 [0.0431]	0.777 [0.0275]	0.807 [0.0528]	0.692 [0.0274]	0.731 [0.0683]
Observations	540104	540104	500563	500563	453475	453475	403225	403225

Notes: The dependent variable for all results is any EITC claiming, including both claiming on the F1040 or by responding to IRS notices in any year. This table presents results based on using different sets of pre-2005 years as alternative baselines. Standard errors are clustered at the treatment status, 2005 AGI decile and year level and reported in brackets.

**Appendix Table 5: Alternative Pre-Treatment Years, EITC Amounts, 2005 Analysis Sample**

Pre-Treatment Years Included:	2001-2004		2002-2004		2003-2004		2004 (baseline)	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
<i>Panel A: Returns without Kids</i>								
Treatment*2005	193.7	243.0	186.8	236.0	168.2	217.7	158.1	198.0
	[43.44]	[49.33]	[41.14]	[48.80]	[37.54]	[47.64]	[27.64]	[42.81]
Treatment*2006	28.35	50.16	21.44	43.18	2.915	24.86	-7.220	5.162
	[40.22]	[55.03]	[37.71]	[54.55]	[33.75]	[53.52]	[22.21]	[49.28]
Treatment*2007	-5.199	12.16	-12.10	5.188	-30.63	-13.14	-40.77	-32.83
	[39.98]	[59.93]	[37.46]	[59.50]	[33.47]	[58.57]	[21.79]	[54.72]
Treatment*2008	-37.58	-9.136	-44.49	-16.11	-63.01	-34.43	-73.15	-54.13
	[41.91]	[65.27]	[39.52]	[64.88]	[35.75]	[64.02]	[25.16]	[60.53]
Treatment*2009	-84.67	-41.40	-91.58	-48.37	-110.1	-66.69	-120.2	-86.39
	[41.83]	[70.57]	[39.43]	[70.21]	[35.66]	[69.42]	[25.03]	[66.22]
2005	-623.9	-686.6	-568.9	-632.4	-499.8	-563.6	-418.6	-473.3
	[29.28]	[38.31]	[27.58]	[38.84]	[23.17]	[38.18]	[13.20]	[36.15]
2006	-212.4	-238.7	-157.4	-184.5	-88.32	-115.7	-7.151	-25.36
	[31.67]	[49.63]	[30.11]	[50.05]	[26.13]	[49.56]	[17.89]	[48.02]
2007	-65.93	-86.23	-10.94	-32.11	58.19	36.72	139.4	127.1
	[31.40]	[55.02]	[29.82]	[55.40]	[25.79]	[54.96]	[17.41]	[53.59]
2008	65.30	36.13	120.3	90.25	189.4	159.1	270.6	249.4
	[33.20]	[60.49]	[31.71]	[60.84]	[27.96]	[60.45]	[20.48]	[59.20]
2009	225.9	182.5	280.8	236.6	350.0	305.4	431.1	395.8
	[32.90]	[65.87]	[31.41]	[66.20]	[27.61]	[65.84]	[20.00]	[64.71]
Treatment	-47.30	-98.54	-40.39	-91.56	-21.86	-73.24	-11.73	-53.54
	[37.39]	[44.55]	[34.67]	[43.96]	[30.31]	[42.66]	[16.52]	[37.18]
Constant	623.9	686.6	568.9	632.4	499.8	563.6	418.6	473.3
	[29.28]	[38.31]	[27.58]	[38.84]	[23.17]	[38.18]	[13.20]	[36.15]
Observations	1918847	1918847	1801984	1801984	1665240	1665240	1511157	1511157
<i>Panel B: Returns with Kids</i>								
Treatment*2005	558.7	514.7	555.3	510.2	528.0	487.2	451.7	432.0
	[131.7]	[146.1]	[136.9]	[152.1]	[145.8]	[162.3]	[152.3]	[177.6]
Treatment*2006	35.54	28.46	32.17	23.93	4.842	0.971	-71.43	-54.27
	[165.1]	[174.2]	[169.3]	[179.2]	[176.6]	[187.9]	[182.1]	[201.3]
Treatment*2007	-11.45	-10.37	-14.81	-14.91	-42.14	-37.86	-118.4	-93.10
	[142.6]	[165.5]	[147.4]	[170.8]	[155.8]	[179.9]	[161.9]	[193.8]
Treatment*2008	-36.97	-16.88	-40.34	-21.41	-67.67	-44.37	-143.9	-99.61
	[121.6]	[152.0]	[127.2]	[157.8]	[136.8]	[167.6]	[143.7]	[182.5]
Treatment*2009	-54.54	-54.41	-57.91	-58.94	-85.24	-81.90	-161.5	-137.1
	[99.35]	[159.1]	[106.2]	[164.6]	[117.4]	[174.0]	[125.4]	[188.4]
2005	-121.2	-137.6	-71.75	-86.72	25.75	8.447	229.5	193.5
	[106.6]	[65.59]	[110.5]	[70.28]	[116.1]	[75.00]	[112.2]	[68.75]
2006	157.3	136.5	206.7	187.4	304.2	282.5	507.9	467.6
	[90.92]	[67.39]	[95.46]	[71.96]	[101.9]	[76.57]	[97.36]	[70.47]
2007	315.8	279.1	365.3	330.0	462.8	425.2	666.5	610.2
	[81.19]	[74.53]	[86.23]	[78.69]	[93.25]	[82.94]	[88.31]	[77.35]
2008	551.9	531.2	601.4	582.1	698.9	677.3	902.6	862.3
	[68.44]	[105.4]	[74.35]	[108.4]	[82.38]	[111.6]	[76.72]	[107.5]
2009	-1506.0	-1501.9	-1456.6	-1451.0	-1359.1	-1355.8	-1155.4	-1170.8
	[47.81]	[53.49]	[55.92]	[59.14]	[66.21]	[64.66]	[59.00]	[57.29]
Treatment	-44.41	-3.965	-41.05	0.568	-13.72	23.52	62.56	78.76
	[64.22]	[80.54]	[74.31]	[90.84]	[89.61]	[106.9]	[99.78]	[128.9]
Constant	1506.0	1501.9	1456.6	1451.0	1359.1	1355.8	1155.4	1170.8
	[47.81]	[53.49]	[55.92]	[59.14]	[66.21]	[64.66]	[59.00]	[57.29]
Observations	540104	540104	500563	500563	453475	453475	403225	403225

Notes: The dependent variable for all results is EITC amount claimed on Form 1040 or through a notice. This table presents results based on using different sets of pre-2005 years as alternative baselines. Standard errors are clustered at the treatment status, 2005 AGI decile and year level and reported in brackets.

**Appendix Table 6: Parallel Trends Tests, 2005 Analysis Sample**

	Returns without Kids				Returns with Kids			
	Eligibility		Sent Notice, conditional on eligibility		Eligibility		Sent Notice, conditional on eligibility	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Treatment	0.00412 [0.0103]	0.00384 [0.0168]	0.155 [0.0156]	0.153 [0.0261]	0.0407 [0.0187]	0.0432 [0.0386]	0.0675 [0.0323]	0.0617 [0.0329]
Time	0.0460 [0.00254]	0.0400 [0.00538]	0.0585 [0.00453]	0.0404 [0.00923]	0.0372 [0.00400]	0.0382 [0.0133]	0.0765 [0.0118]	0.0668 [0.00964]
Treatment*Time	-0.00330 [0.00435]	0.00346 [0.00714]	-0.00387 [0.00574]	0.0148 [0.0104]	0.00354 [0.00647]	0.00339 [0.0148]	-0.0181 [0.0146]	-0.00592 [0.0145]
Constant	0.156 [0.00579]	0.160 [0.0123]	0.166 [0.0118]	0.160 [0.0227]	0.230 [0.0113]	0.235 [0.0354]	-0.00557 [0.0242]	-0.00405 [0.0201]
N	2245036	2245036	599500	599500	543884	543884	193304	193304

Notes: The dependent variable for Columns 1, 2, 5 and 6 is the EITC eligibility, and for columns 3, 4, 7 and 8 is probability of being sent a notice, conditional on eligibility. This table presents results for years prior to 2005 years. Standard errors are clustered at the treatment status, 2005 AGI decile and year level and reported in brackets.

**Appendix Table 7: Treatment Impacts on Eligibility & Notice Receipt, 2005 Analysis Sample**

	Eligibility				Notice Receipt, conditional on eligibility			
	Returns without Kids		Returns with Kids		Returns without Kids		Returns with Kids	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Treatment*2005	0.00433 [0.0109]	-0.0228 [0.0641]	-0.0403 [0.0127]	-0.0445 [0.0802]	0.867 [0.0107]	0.797 [0.0280]	1.031 [0.0341]	0.984 [0.0445]
Treatment*2006	0.0265 [0.0159]	0.0178 [0.0298]	0.0986 [0.0269]	0.0920 [0.0538]	-0.0757 [0.0132]	-0.0995 [0.0339]	0.0336 [0.0373]	0.0320 [0.0407]
Treatment*2007	0.00898 [0.0136]	-0.00239 [0.0274]	0.0401 [0.0249]	0.0385 [0.0496]	-0.0483 [0.0125]	-0.0875 [0.0293]	0.0399 [0.0362]	0.0233 [0.0384]
Treatment*2008	-0.00369 [0.0120]	-0.0145 [0.0257]	0.00150 [0.0216]	0.000738 [0.0467]	-0.0337 [0.0128]	-0.0793 [0.0279]	0.0446 [0.0351]	0.0141 [0.0370]
Treatment*2009	-0.0156 [0.0115]	-0.0214 [0.0258]	-0.00626 [0.0159]	-0.0117 [0.0476]	-0.0320 [0.0123]	-0.0851 [0.0275]	0.0539 [0.0349]	0.0206 [0.0367]
2005	0.655 [0.00660]	0.675 [0.0619]	0.612 [0.00739]	0.604 [0.0731]	-0.417 [0.00891]	-0.340 [0.0236]	-0.347 [0.0269]	-0.306 [0.0216]
2006	0.0564 [0.0105]	0.0621 [0.0254]	-0.0515 [0.0100]	-0.0507 [0.0382]	-0.0469 [0.0107]	-0.0191 [0.0311]	-0.0988 [0.0293]	-0.0908 [0.0265]
2007	0.00326 [0.00870]	0.0112 [0.0234]	-0.0609 [0.00956]	-0.0640 [0.0350]	-0.173 [0.00973]	-0.129 [0.0264]	-0.192 [0.0285]	-0.172 [0.0241]
2008	-0.0403 [0.00763]	-0.0323 [0.0223]	-0.0620 [0.00935]	-0.0670 [0.0347]	-0.241 [0.00997]	-0.191 [0.0249]	-0.244 [0.0274]	-0.215 [0.0228]
2009	-0.0496 [0.00729]	-0.0462 [0.0228]	-0.0234 [0.00832]	-0.0256 [0.0400]	-0.290 [0.00942]	-0.233 [0.0246]	-0.272 [0.0271]	-0.240 [0.0222]
Treatment	-0.00433 [0.0109]	0.0228 [0.0193]	0.0403 [0.0127]	0.0445 [0.0360]	0.133 [0.0107]	0.203 [0.0254]	-0.0310 [0.0341]	0.0161 [0.0351]
Constant	0.345 [0.00660]	0.325 [0.0152]	0.388 [0.00739]	0.396 [0.0310]	0.417 [0.00891]	0.340 [0.0236]	0.347 [0.0269]	0.306 [0.0216]
Observations	3367554	3367554	815826	815826	1511157	1511157	403225	403225

Notes: This table shows the regression estimates for EITC eligibility (Columns 1-4) and the likelihood of being sent a notice conditional on being eligible (Column 5-8). Standard errors are clustered based on treatment status, 2005 AGI deciles, and year and reported in brackets.

**Appendix Table 8: Diff-in-Diffs Estimates, EITC Amounts, 2009 California Sample**

	Returns without Kids	Returns with Kids
Simple*2009	31.15 [47.27]	64.26 [165.6]
Simple*2010	31.33 [52.32]	82.53 [202.6]
Simple*2011	63.66 [53.82]	-71.64 [197.5]
Benefit*2009	61.59 [48.16]	161.8 [195.4]
Benefit*2010	42.52 [53.15]	53.39 [183.8]
Benefit*2011	58.42 [53.45]	-33.50 [179.3]
Social*2009	4.914 [47.78]	-37.47 [134.2]
Social*2010	19.63 [60.23]	-89.07 [163.2]
Social*2011	50.17 [57.41]	-184.9 [162.1]
Time*2009	10.91 [55.38]	123.3 [158.1]
Time*2010	0.737 [58.86]	53.83 [192.0]
Time*2011	55.67 [67.06]	-37.34 [175.4]
2009	-19.40 [44.25]	10.86 [113.6]
2010	-23.98 [43.48]	13.30 [125.9]
2011	4.438 [45.23]	50.79 [96.08]
Simple	4.717 [52.40]	-69.49 [115.0]
Benefit	-220.2 [42.25]	-739.5 [104.8]
Social	21.19 [47.93]	137.8 [128.5]
Time	101.7 [46.10]	529.6 [115.0]
Constant	277.8 [40.93]	935.2 [78.61]
Observations	48688	26419

Notes: This table shows the regression estimates for EITC amount for the 2009 CA Sample. The first column presents the results for the full sample of taxpayers without kids and the second column presents the results for the sample of taxpayers with kids. Standard errors are clustered based on treatment status, 2009 AGI deciles, and year and reported in brackets.



**Appendix Table 9: Persuasion Rates, 2009 California Experiment**

Persuasion Rates based on Claiming EITC on 1040				
Simple Treatment				
Returns without Kids			Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2009	5.858	(5.451)	6.167	(9.139)
2010	-0.462	(11.324)	5.045	(24.139)
2011	-6.654	(15.641)	5.942	(30.333)

Benefit Treatment				
Returns without Kids			Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2009	20.373	(4.928)	17.792	(8.956)
2010	6.001	(11.833)	13.232	(23.514)
2011	-13.391	(16.479)	22.839	(26.686)

Persuasion Rates based on Claiming EITC on 1040 or a Notice				
Simple Treatment				
Returns without Kids			Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2009	10.431	(5.141)	5.346	(8.552)
2010	8.991	(12.119)	4.176	(24.368)
2011	3.156	(18.313)	2.879	(31.123)

Benefit Treatment				
Returns without Kids			Returns with Kids	
Tax Year	Persuasion Rate	Std. Error	Persuasion Rate	Std. Error
2009	25.017	(4.615)	17.283	(8.758)
2010	19.726	(11.847)	17.856	(22.983)
2011	5.570	(19.670)	23.423	(27.123)

Notes: The persuasion rates are calculated based on estimated regression coefficients, as discussed in the Appendix. Standard errors, shown in parentheses, are computed using the delta method.