

Once Bitten, Twice Shy? The Lasting Impact of IRS Audits on Individual Tax Reporting*

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Abstract

This paper studies the impact of tax enforcement activity on subsequent individual taxpaying behavior. We exploit four waves of randomized Internal Revenue Service (IRS) audits of individual income tax filers during the 2006-2009 period to study both the short and long run effects of audits on taxpaying behavior. Rich and confidential IRS data allow us to show the differential impact of audits across sources of income and deductions. The results highlight how the effects of audits on subsequent compliance behavior are impacted by other aspects of tax policy. The results also show how the lasting impact of audits results in a long-run revenue gain that is about two times as large as the static gain in revenue from an audit.

Keywords: individual income tax, tax audit, tax evasion, tax avoidance

JEL Classifications: H24, H26

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1. Introduction

According to the Internal Revenue Service, the tax gap (the difference between taxes paid and what taxpayers should be paying under law) was approximately \$385 billion in 2006 (IRS 2012). The majority of the tax gap came from the individual income tax. To increase tax compliance, the IRS audits about 1% of individual filers each year (TRAC Reports, Inc. (2014)). Audits of individuals have at least two types of effects. The direct effect is the changes in taxes paid that result from the IRS auditing a filer and uncovering reporting inconsistencies that lowered the filers tax liability. In addition, there are indirect effects of audits. For example, audits influence the behavior of the non-audited through deterrent effects (i.e., individuals reporting correctly in order to avoid the costs associated with audit and/or being in violation). Another potential indirect effect is that upon the audited themselves; do these individuals change their future tax paying behavior as a result of audit? Little is known about these indirect effects and we seek to address the latter- how do audits impact subsequent tax paying behavior among individuals?

Our focus is thus on the tax reporting behavior of individuals following audit. Kleven et al. (2011) use audits in Denmark to understand the determinants of tax non-compliance. They also consider the effects of deterrence (via threat of audit letters) on compliance. We extend their analysis in several ways. First, we focus on the response to audit over the short and long run (by observing tax reporting behavior for up to six years following audit). Second we decompose the effects by income source and type of deduction and thus are able to identify those income sources that have a more persistent response to audit and those whose response is more fleeting. Finally, using detailed data on the audits themselves, we are able to consider the importance of audit stringency on subsequent tax reporting behavior.

The modern economic study of law enforcement emerged with Gary Becker's (1968) work on the economics of crime¹ and was applied to tax evasion in a well-known paper by Allingham and Sandmo (1972). Their key argument is that illicit tax behavior is shaped by audit probability and penalty. Since then, the Allingham-Sandmo model has been extended and tested in many ways.²

Yet, this literature has not satisfactorily addressed the post-audit behavior of taxpayers, and two opposing expectations about the after-effects of tax audits have emerged. The first and perhaps more intuitive expectation is that experiencing an audit leads taxpayers to revise their perceived audit probability up and therefore reduce their subsequent noncompliance. Afterwards, for each year they do not experience another audit, taxpayers revise down their perceived audit probability and thus increase noncompliance. Therefore the post-audit tax payment trend would consist of an immediate rise followed by a decrease. Intriguingly, the second expectation is completely opposite. Taxpayers may, correctly or incorrectly, perceive that auditors rarely come back immediately after an audit, and that it is safest to evade taxes right after an audit. As years pass, the risk that auditors come back increases and thus it is best to reduce noncompliance. In this case, the post-audit tax payment trend would be an immediate fall followed by an increase.

Some interesting laboratory experiments lend some support to the second possibility. Guala and Mittone (2005) and Mittone (2006) find that lab subjects increase tax evasion immediately following an audit. Maciejovsky et al. (2007) also find their lab subjects to increase tax evasion following an audit, but to decrease it gradually over time to the pre-audit level. Kastlunger et al. (2009) show that this behavior is caused mostly by misperception of audit probability.

¹ Earlier treatments include Montesquieu (1748), Beccaria (1764), and Bentham (1789).

² For a review of tax evasion literature see Slemrod (2007), and for a critique of this literature see Alm (2010).

The negative relationship between income tax reporting and audits also has support from the field. DeBacker et al. (Forthcoming) consider the response of corporations to IRS audits. They find that corporations show an increase in aggressive tax reporting (measured through changes in effective tax rates) following audit. The trend in effective tax rates continues for several years after audit before returning to its pre-audit level.

Related empirical studies of individual tax compliance include that of Kleven et al. (2011) who use Danish tax data to study who evades tax and what types of income they misreport. The authors look at income before and after audit to find the elasticities of evasion and avoidance. They also conduct a field experiment, sending threat of audit letters. They find that threat of audit and having a past audit both positively affect reported income. In contrast, Gemmell and Ratto (2012) use UK data and find a mixed effect of audits on subsequent tax paying behavior. They find that following an audit, those who were compliant increase their non-compliance, while those who were non-compliant increase their compliance.

Several studies consider the impact of audit rates on individual tax payer compliance. These include Tauchen, Witte, Beron (1989), Dubin, Graetz, and Wilde (1990), and Witte and Woodbury (1985), all of whom find that increases in audit rates increase compliance. Marginal tax rates also impact evasion since they affect the value of misreported income. Evidence of this has been provided by Clotfelter (1983) and Feinstein (1991). In addition, Feldman and Slemrod (2007) find that documented income is much less likely to be evaded, which has been corroborated in other studies such as Kleven et al (2011).

Additional related studies are those that show evidence of the indirect effects of audits that we are interested in. These include Alm and Yunus (2009), who find a role for norms

and learning in tax evasion in the US, and Dubin (2007), who calculate the deterrent effect of audits.

To understand the impact of audits, we use data from the Internal Revenue Service's (IRS) National Research Program, which began conducting random audits of individual tax filers starting in tax year 2001. To these data, we merge returns from the universe of filers from 2000 to 2012, allowing us to examine the impact of audits³ on individual taxpaying behavior for a period of up to six years after an audit. These data are useful for addressing the impact of legal enforcement on subsequent behavior for several reasons. First, the IRS conducts intermittent audits and keeps systematic records of them. Second, the IRS also provides accurate data on subsequent tax payments every year, even when there is no audit. Third, these data comprise a panel of the entire population of individual taxpayers over time, allowing for rigorous empirical analysis. Furthermore, studying patterns of tax noncompliance is important in itself because of the importance of both taxation as a source of government revenue and the large (and growing) "tax gap".

Our empirical strategy is relatively straightforward since the treatment (i.e., audits) are randomized by the IRS. Using the sampling weights that IRS used to select individuals to audit, we construct a nationally representative sample of audited individuals. We pair this with a random sample of individuals drawn from the same sampling pool. Then, we compare the tax filings of these two groups before and after the audit year.

Our results indicate that auditing has a long-term effect on tax reporting. An audit increases reported taxable income by \$1,109 per year, or equivalent to 2.7% of the average taxable income. To put this in perspective, the average adjustment to taxable income

³ The IRS defines an audit as "a review/examination of an organization's or individual's accounts and financial information to ensure information is being reported correctly, according to the tax laws, to verify the amount of tax reported is correct." (Internal Revenue Service (2014)).

following an audit is \$4,056. When we consider the impact of audit over the five subsequent years, we find that audits raise adjusted gross income by an average of \$7,111 (or \$6,171 in present value terms).⁴ Thus the static revenue gain from the audit understates the true revenue gain by more than half when considering the five-year window after an audit. The effect of audit is 0.45% for wage income but is 7.51% for Schedule-C income. This indicates that it is easier to underreport self-employment income than wages, which can be crosschecked with employers and often subject to withholding. However, we find that the impact of auditing on reported wage lasts over time while it is fleeting on Schedule C income.

The effect of auditing appears to be weaker in certain audit waves. However, when we include stringency measures in the analysis, this difference goes away, indicating the importance of audit stringency.

The paper is organized into eight sections. Following this introduction, Section 2 describes the data and Section 3 presents information on tax compliance in our data. Section 4 presents our main empirical results, and Section 5 reports results for particular income and deduction items and subsample. We then turn to an analysis of the results by filer type in Section 6. In Section 7, we offer evidence that the response to audit is affected to a great extent by the filers tax literacy. Section 8 concludes.

2. Data

Our data come from three sources. We discuss each data source in turn and then the process by which we merge the data and create our final sample.

⁴ We assume a 4% annual interest rate for these net present value calculations.

First, we use data on audits from the IRS's National Research Program (NRP). Specifically, we use the taxpayer information generated by the audits conducted as part of the NRP's 2006 through 2009 waves.⁵ Taxpayer information includes tax payer identifiers (the social security number (SSN) of the primary filer), year of the audited return, and the resulting adjustment to the tax return by line on the Form 1040. The NRP conducts audits on a stratified, random sample of the filing population and includes in their data weights to allow researchers to create population-representative statistics. Each of the 2006-2009 waves have approximately 15,000 observations.

Second, we use the IRS's Compliance Data Warehouse (CDW), which includes the universe of tax returns. The CDW data include many items from the filer's Form 1040 and the associated forms and schedules, including all items on the front page of Form 1040 and the main line items from most associated schedules. We use CDW data from the years 2000 to 2012.

Finally, we use data from the IRS's Audit Information Management System (AIMS). The AIMS data contain detailed information on all IRS audits (including NRP and non-NRP audits) from 1996 to present. We use these data to augment the audit data from the NRP. In particular, the AIMS data allow us to observe variables such as the date the audit began and ended, the hours of examiner time put towards the audit, and examiner characteristics.

Our sample is constructed in the following way. We create a control group by randomly selecting a 0.1% sample of filers by choosing a different set of 10 four-digit SSN endings for each year from 2006 to 2009.⁶ For each of these four years, we then select all primary filers who had one of these 10 four-digit endings from the universe of returns filed

⁵ Note we exclude the first NRP wave from 2001. Documentation suggests that the sampling frame and intent of this wave is sufficiently different from later waves, and so we exclude it.

⁶ The sample size is dictated by computational constraints.

that year. Finally, for each individual we have selected for each of these four years, we include all returns they filed from 2000 through 2012. We create our treatment group by finding the SSN of all primary filers in all NRP waves 2006-2009. We then pull returns from the CDW for the years 2000-2012 for returns where the primary filer's SSN is in this set. Our final panel is thus comprised of a control group of randomly selected filers from the years of the NRP waves (followed over time) and a treatment group of randomly audited filers from the NRP waves (who are also followed over time). Creating our control group in this way (by ensuring that those in the control group filed a return in the year the treatment group was audited) allows us to match the attrition rates across treatment and control groups.

Note that constructing the control group for the 2007 NRP wave is slightly complicated by the stimulus rebate checks sent out in 2008. To be eligible for a stimulus check, one must have filed a year 2007 tax return. Thus, the population of filers for tax year 2007 (who filed taxes in early 2008) was much different than in other years and is not the sample which the NRP weighting reflects. In particular, there was an increase in the number of people who typically did not file a tax return. We address this by using the methodology of Ramnath and Tong (2014) to identify those who filed to claim the stimulus check, but who would not have otherwise filed. We then drop these filers from our control group for the 2007 wave.

Using the SSN of the primary filer, we are able to link returns across the three data sources, the CDW, NRP, and AIMS. Thus in our final panel, we have detailed information on each tax return filed from 2000-2012. For the treatment group, we also have detailed information on the characteristics of the audit and the adjustments to tax returns following audit, though we lack information on audits that are not closed by the time we pull data

from the AIMS database. As such, information from audits not closed by October 2014 is missing in our sample. However, given that our last NRP wave is from 2009 and that well over 95% of audits are closed within two years, almost all audits have been closed. Table 1 summarizes our sample, noting weighted observations in the base year (i.e., NRP wave year) and across all years 2000-2012.⁷

[Table 1 about here]

While we do observe the date an audit was opened and closed, we do not know when the filer was notified of the audit or the results of the audit. Thus we use as our timing convention the number of years since the audited return was filed. For example, for the 2006 NRP wave, their tax year 2006 return was audited. Thus we consider their tax year 2007 return as being one year since the audited return was filed. We use this convention throughout the paper. As a result, one would not expect a sharp increases in reported income for all filers in a given NRP wave in a specific year since audit, since the duration of audits and the time when filers were notified varies. However, since the vast majority of audits are closed within two years, we do expect the effects of audits to fully materialize two to three years after the audited tax year.

Throughout, all monetary variables are deflated to 2005\$ and 99% Winsorized. Winsorization of the data is necessary for dealing with outliers. The IRS does not edit the CDW data we use in any way, and thus data entry and calculation errors by the filers or the IRS agent entering the data are not uncommon. Winsorizing data inevitably removes some genuine variation from the sample, however, we think that Winsorization is acceptable to

⁷ We use weights for both our randomly sampled control group and the treatment group. We weight the control group by giving each filer equal weight to sum to the total population of filers in the base year. We weight the treatment groups using the NRP sampling weights. This gives us a number of weighted observations approximately equal to the population of filer in the base year for the NRP sample. We then apply these weights to the filing units for each year they are in the panel.

ensure that our results are not influenced by extreme outliers that result from coding errors. Further, the results reported in this paper are robust to different levels of Winsorization.⁸

3. Tax Compliance in the U.S.

The IRS's tax gap measure summarizes aggregate compliance with the U.S. income tax.⁹ In 2006, the last year for which the IRS reports the tax gap, the net gap was \$385 billion (Internal Revenue Service (2012)). This represents a compliance rate of 85.5%. Non-compliance with the individual income tax code represents the largest source of noncompliance, accounting for \$235 billion of the \$385 billion gap.

Within the individual income tax, Internal Revenue Service (2012) shows that the lowest compliance rates come from income with less documentation. For example, the underreporting of business income, and in particular income from sole proprietors (as reported on Schedule C of Form 1040), accounts for about half of the individual income tax gap (\$122 of \$235 billion). Looking across income and deduction items, one can see the pattern that compliance rates fall as withholding and third party verification decline. Such a pattern is also documented in Danish data by Kleven et al. (2011).

Our NRP data allow us to delve more deeply into the data than the tax gap statistics provided by IRS. Table 2 documents the measures of compliance found in our NRP data. Column 1 reports means by income and deduction sources and the fractions with those sources of income. Columns 2-4 report audit adjustments. Column 2 shows the average audit adjustment by income/deduction item and the fraction of those who report non-zero values of that item for which there is a non-zero adjustment. Column 3 and 4 decompose the adjustments in Column 2 into underreporting of income (which results in upward

⁸ Results with different levels of Winsorization are available from the authors by request.

⁹ Note that the NRP data we use plays a large role in the IRS's estimation of the individual income tax gap.

adjustments in income/downward adjustments in deductions) and over reporting of income (which results in downward adjustments of income/upward adjustment of deductions).¹⁰

[Table 2 about here]

Consistent with the compliance results seen the aggregate IRS tax gap reports, looking across sources, the pattern that emerges is that those sources with the most documentation show the lowest compliance rates. We find that non-compliance rates (measured by the fraction of filers with adjustments) are largest for Schedule C income, which has no withholding and little third-party verification, which is adjusted for about 73% of those filers who are audited. The rate is lowest for wage and salary income, which is adjusted for about 6.5% of audited filers. Underreported income is more frequent than over reporting of income for all sources and is highest for Schedule C income. The average amount of underreported Schedule C income is \$7,235. This compares to a mean of \$8,458 for reported Schedule C income. Wage income is underreported by \$940 compared to an average of \$42,634. For example, compliance rates are highest for wage income, which has a high withholding rate. Compliance rates are also high for capital income (both capital gains reported on Schedule E and capital income reported elsewhere), which has third party reporting on most items, but not withholding.

4. Effects of audit on reported income

With an understanding of our data and tax compliance in the U.S., we now turn to our research question. The objective of the paper is to understand changes in individual tax paying behavior in response to audit. We answer this question in two ways. First, in this

¹⁰ Note that Column 2 is the sum Columns 3 and 4.

section, we address how the reporting of income changes after an audit using simple, non-parametric estimators. In the next section, we examine whether these results persist when a more rigorous identification strategy is used.

4.1 Difference-in-differences estimates of the effects

The randomized controlled trial nature of the NRP allows us to consider the effects of audit on tax paying behavior using simple, non-parametric estimators. Here we employ a difference-in-differences estimator to understand how audits affect taxpaying behavior. In particular, we look at the reporting of taxable income, wage income, and Schedule C income. These three measures provide a nice contrast in terms of the amount of information the IRS has in each income source (e.g., most wages are subject to withholding, Schedule C income has very little documentation, and taxable income is the most broad measure, composed of income with different reporting requirements and determined after deductions are reported.) Our difference-in-differences estimator of the effect of audit is thus:

$$\text{Effect of audit} = (\bar{Y}_{B,2} - \bar{Y}_{B,1}) - (\bar{Y}_{A,2} - \bar{Y}_{A,1}) \quad (1)$$

where B denotes the treatment group (i.e., the NRP sample) and A the control group. The subscripts 1 and 2 denote the pre-audit and post-audit periods respectively. For each, we consider the mean over a span of 3 years. Thus the $\bar{Y}_{B,2}$ is calculated as the mean of the income source of interest for the NRP sample over the three years after audit and $\bar{Y}_{B,1}$ is calculated as the mean of the income source of interest for the NRP sample over the three years prior to audit. The variables for the control group follow an analogous method.

[Table 3 about here]

Table 3 reports these difference-in-differences results. We present the results in percentage terms because the income sources have very different mean amounts. Note that the sample here includes all filers in all years. That is, the sample means by income source here will differ from those in Table 2 because these means include those who have zero income for a given income source, whereas the means in Table 2 exclude these zeros in their calculation.

The top panel of the table shows that (reported) taxable income of the audited group increases by 2.9% when comparing the post-audit period to the pre-audit period, while that of the control group increases only 0.2%. These figures imply that audits increase taxable income by 2.7% on average (\$928 per year). In the second panel of Table 3, however, the effect of audits on reported wage income is only 0.4% on average (\$170 per year). This effect is consistent with the idea that it is more difficult to misreport income that is also subject to withholding and third party verification (Kleven et al. (2011)). The largest effect of audits, in percentage terms, is on Schedule C income. The third panel in Table 3 shows this effect to be 7.5% (\$107 per year). This large effect supports the view that it's relatively easier to manipulate Schedule C income than wage income.

Since it is difficult for filers to underreport wage income and easier to do so with Schedule C income, we can use wage income change to do a 'rough' triple-difference estimation of the effect of audits on Schedule C income. The last row of Table 3 shows this estimate. This indicates that after an audit, filers increase reported Schedule C income by 7.1%.

Given these results, a question of further interest is how individuals change tax reporting *over time* after audit: do they increase reported income permanently, or does the initial effect decline as time passes? Figure 1 plots the differences between the mean

reported incomes of the audited and control group. Panel A shows that reported taxable income increases in the first and second years and after an audit and remains elevated even after six years. Panel B of Figure 1 shows that adjusted gross income (AGI) follows a similar pattern as taxable income. In Panel C, we see the effect of audits on wage income, which rises persistently after audit for three of the four NRP waves we consider. Thus the effect over three years as reported in the difference-in-differences results in Table 3 understates the longer-term impact of audits on reported wage income. Note that Panels A, B and C of Figure 1 show that the 2007 NRP wave follows a substantially different pattern in the post-audit period than do other waves. We will discuss this pattern further in the next section.

The effect of audits on Schedule C income is strong in the first couple of years after audit, as Panel D of Figure 1 shows. Following the initial upswing in reported Schedule C income, it then turns downward toward the pre-audit level. This result is interesting and in contrast to the trends in AGI and wage income. We thus delve into the responses of Schedule C filers to audit further in Section 5.

In each of the four panels, it is clear that the pre-audit trends are similar across the NRP and non-NRP samples. Thus the common trends assumption needed for identification is satisfied. The level differences between the treatment and control groups appear persistent, even in the pre-audit years. Although the differences in levels of income are not generally statistically significant, one might worry about the similarity between the treatment and control groups. Thus, we next consider models with individual fixed effects, which will control for differences in levels of income between the treatment and control groups.

[Figure 1 about here]

4.2 Within-filer estimates of the effects

Because we have a panel of tax returns, we can examine changes in individuals' behavior after an audit while controlling for time-invariant unobserved individual characteristics. We first estimate an equation of the form

$$Income_{it} = \beta PostAudit_{it} + \gamma_i + \eta_t + \varepsilon_{it}, \quad (2)$$

where $Income_{it}$ denotes a measure of income for individual (taxpayer) i in year t ; and $PostAudit_{it}$ denotes that the individual was audited during our sample period prior to year t , γ_i denotes an individual (taxpayer) fixed effect, and η_t denotes a year fixed effect. In this specification, identification of the effects of audit come from within filer changes in reported income between the pre and post audit periods, net of trends in income common across the treatment and control groups (with are picked up by the year fixed effects).

[Table 4 about here]

Table 4 reports the results from regressions that estimate the effect of audits on taxable income. The effects of the 2006, 2007, 2008 and 2009 audit waves are reported separately in columns 1-4, while the final column shows the pooled effect of all the waves.¹¹ Column 5 shows that audits increase reported taxable income by \$1,110, which is statistically significant at the 1% level. The effects of the individual waves are all positive, but vary significantly in magnitude, with the effects of 2006 and 2008 the largest and strongly significant, while the effect of 2007 and 2009 are smaller and those from the 2007 wave not statistically significant.

The difference in responses across waves is interesting and not immediately obvious. As noted in Section 2, we took steps to control for the stimulus filers from tax year 2007,

¹¹ Because the simple difference-in-differences estimates appeared to be substantially different for the 2007 waves than for the other waves, in the pooled regressions presented here and below, we omit the 2007 treatment and control observations.

which would have otherwise tainted our control group. In addition, we estimated the models separately for high-income individuals (who are likely to file in other years and not likely to have a strong filing response as a result of the stimulus checks) and find similar results to those for the full sample. It is possible that the stringency of audits varies across waves due to available IRS resources or other reasons. In Table 5, we include nine measures of audit stringency in the regression model. It should be noted that some measures of stringency are not perfectly orthogonal with filers' behavior so we need to treat the results as suggestive (and thus these measures are not control variables in our other regression models). However, when the measures of audit stringency are controlled for, the estimated effects of audits in different waves become positive, strongly significant and very similar to each other. This indicates that the weaker effects of certain waves are likely to be due to difference in stringency across audit waves.

Taken together, these results imply that, consistent with the simple difference-in-differences tabulations above, individuals tend to report more income after audit.

Table 6 examines whether, in our estimation framework, the effects of audit differ with the number of years since the audited tax year by estimating equations of the form:

$$Income_{it} = \sum_{k=1}^K \beta_k (PostAudit_{it}) * (k \text{ Years Since Audit}) + \gamma_i + \eta_t + \varepsilon_{it} \quad (3)$$

In this specification, the key explanatory variables are a series of dummies that show the difference between the audited and control group from Year 1 through (at most) Year 6 after the audited tax year. We also include coefficients on each of the two years prior to audit to test for any pre-trends in the analysis. Columns 1-4 again show the separate effect of each individual audit wave, while Column 5 pools all the 2006, 2008, and 2009 waves together. This final column shows that reported taxable income increases quickly during the first two years after the audit, reaching around a \$1,200 increase, and stays at this level until at least

Year 6, with all of the effects being statistically significant. Looking at the effect of each wave, we can see that the effect of audit for the 2006 and 2008 waves is strongly positive while that of 2007 and 2009 is less significant, with the reasons for these differences similar to those we discuss above (and likely related to differences in audit stringency across years). The pre-audit coefficients are insignificant for all samples. These results are summarized in Figure 2.

[Figure 2 about here]

We do observe the adjustment to each filers return. One might suppose that those filers for whom there is a positive adjustment to tax liability, the response to audit is stronger than those for whom there was not adjustment. That is indeed that case. We provide evidence for this in Figure 3, where we estimate Equation 3 on taxable income separately for each of three groups: those with a positive adjustment to tax liability following the audit, those with no adjustment, and those with a negative adjustment. We see the strongest and most statistically significant response from the group with positive adjustments. Almost all the coefficients for the other two groups are statistically insignificant and have much lower point estimates than for the positive adjustment group.

[Figure 3 about here]

5. Differential impacts by income/deduction source

We now use our regression models to examine whether the effects of an audit differ by the source of income or the type of deduction that is being claimed. These decompositions are important, since Table 3 highlights how income sources that are less subject to third party reporting may be more responsive to audit. Using the fixed effects regression models, we extend that analysis to several income and deduction sources.

5.1 *By Income Source*

In Table 7 (and Figure 4), we present estimates versions of Equation 3 on our pooled sample, but the dependent variable is now income of a particular type. Note that Figure 3 presents the coefficients for the post-audit year indicator variables in percentage terms to make the responses more comparable across income sources with very different mean values. We also restrict our sample to those who have non-zero amounts of income of that particular type in the year of the audit, so these can be considered intensive-margin results. Note that due to the very different post-audit behavior of the 2007 NRP wave (when not conditioning on measures of audit stringency), our pooled sample excludes this wave.

[Table 7 about here]

[Figure 4 about here]

In Column 1, we repeat the results from Table 6, in which the dependent variable is taxable income. Column 2 presents results for total income.¹² The results in this column are slightly smaller than, though similar to, those for taxable income. This is not surprising due to the fact that taxable income also incorporates the filer's choice of deductions and so provides for more opportunity to manipulate taxes through reporting.

In Column 3, the dependent variable is wages and salaries. Similar to the results found above in the simple tabulations, this specification finds a small positive effect of an

¹² Total income is from Form 1040, Line 22. It is AGI with the above the line deductions added back in.

audit on reported wages, with an increase of \$330-630 in the first three years after audits that dies out thereafter.

Column 4 presents results when the dependent variable is Schedule C sole proprietorship income. As noted above, this source of income is not subject to third party reporting, and so may be easier for taxpayers to manipulate. Consistent with this, the estimation results suggest that Schedule C income increases substantially after audit, by over \$1,000 in the first two years. Interestingly, that effect diminishes 3 years after the audit, and is insignificant after four years. Further, in years 5 and 6, the estimated impact is actually negative. These results suggest that taxpayers with sole proprietorship income may be more careful in reporting income right after an audit, but may become more aggressive than they were in the years prior to the audit over time.

In Column 5, which presents results for Schedule D income (capital gains and losses), no significant effects of audits are found in any year. However, the results in Column 6 for Schedule E income, which includes partnership, S corporation, and rental income, mirror that for Schedule C income. A significant positive impact of audits is found in the first two years, with the effect diminishing in the third year, and no longer significant in the fourth year. In years 5 and 6, the estimates turn negative, but (unlike for Schedule C income) are not statistically significant in those years. Schedule E income, like Schedule C income, is largely self-reported. These results are consistent with those of Kleven et al. (2011) who point out that taxpayers compliance is strongly related to the ability to cheat. This ability is greatest with self-reports income such as that on Schedules C and E.

5.2 By Deduction Item

We next estimate variants of Equation 3 in which the dependent variables denote the amounts of particular types of deductions that filers claim. Column 1 presents the results for above the line deductions (i.e., deductions that figure into AGI) and Column 2 the results for total itemized deductions. Columns 3-5 present results for individual types of itemized deductions (charitable contributions, state and local income taxes, and mortgage interest). We also summarize the results in Figure 5, which plots the percentage changes in the deduction items following audit. Columns 1 and 2 show that both types of deductions decrease after an audit (which implies higher taxable income), with a larger decline for itemized deductions. For both types of deductions, the effects continue at a high level for up to six years after the audited return was filed. As with the income source results, the results for deductions are consistent with the story that taxpayers manipulate their tax reporting where they are able to do so. Thus we see larger effects of audit on the more malleable, and less documented, itemized deductions category. Charitable contributions are estimated to fall by around \$300-400 after an audit, with the size of the impact being consistent across years. Interestingly, although they are both subject to third party reporting, state and local taxes and mortgage interest are also estimated to fall after an audit, with the effect increasing over time.

[Table 8 about here]

[Figure 5 about here]

6. The differential impact of audit by filer type

To examine whether different types of taxpayers respond differently to audits, we split the sample according to filer type, and estimate a version of Equation 3 where the dependent variable is taxable income. We define filer type by schedule filed and whether the filer claims the Earned Income Tax Credit (EITC). We consider both intensive margin responses by looking at changes in taxable income after audit, and extensive margin responses, by estimating changes in the likelihood the filer continues to file the schedule or claim the EITC after audit. We begin with changes on the intensive margin.

6.1 Intensive margin effects

The estimates of Equation 3 separately by filer type are reported in Figure 5, Panels A-C. Each panel reports results for a different bifurcation of the sample and plots the change in reported taxable income in the years after audit.

6.1.1 Schedule C and E Filers

Figure 6, Panel A splits the sample according to whether the taxpayer reported any Schedule C income in the year of the audit.¹³ These two lines show that Schedule C filers appear to be much more responsive than taxpayers who do not file Schedule C, with estimated increases in income that are generally three times as large as those who did not report Schedule C income. From these results, we cannot decompose the effect of audit into that driven by the ability to manipulate Schedule C income and that due to differences in the disposition towards tax compliance between Schedule C filers and those that do not file a

¹³ For observations in the control group, we split based on whether they reported Schedule C income in the tax year for which they were drawn as a control observation.

Schedule C. However, our previous results support both of these effects. That is, when we use a differences-in-differences or fixed effect regression to look at the effect of audit on Schedule C income, we find a strong responsiveness in Schedule C income for those who are audited as compared to the control group who was not audited, but did report Schedule C income. However, the size of the change in Schedule C income alone (as Table 7 reports) is much smaller than the change in taxable income we find for Schedule C filers here. There is also a difference in post-audit patterns for Schedule C income and taxable income for filers reporting Schedule C income in the year of the audit. Taken together, these results show that Schedule C filers are also changing other income sources in response to audit and not just Schedule C income.

[Figure 6 about here]

The results for Schedule E filers are in Figure 6, Panel B. Like the Schedule C results, these show that the response of Schedule E filers to audit is large in terms of changes in reported taxable income. In the case of Schedule E filers, however, the transitory nature of the audit on Schedule E income (Table 7) carries through to taxable income as well. After two years following audit, changes in taxable income for Schedule E filers decline steeply. Five and six years after audit, the effect of the audit is to reduce taxable income.

6.1.2 Responses by EITC Recipients

Compliance problems with the EITC have been well documented (see, e.g., Blumenthal, Erard, and Ho (2005)). Thus, we consider the differential responses to audit between filers who claim the EITC in the year of audit and those who do not. These

responses are documented in Panel C of Figure 6. Following an audit, EITC recipients show much larger increases in AGI than their non-EITC counterparts. Since EITC claimants have lower income than non-claimants on average (AGI of \$19,000 compared to AGI \$59,000), the percentage changes are even larger. Also, note that these results are not an artifact of mean reversion in income. The post-audit trends already net out trends in taxable income between EITC claimants who were audited and those who weren't via the year fixed effects in the regression models (and similarly for non-claimants). The post-audit effects thus show the trend in reported taxable income following an audit, net of the trend in taxable income for EITC claimants and non-claimants. The incentives of income misreporting for EITC claimants (and other low income filers) are such that one might expect strong responses to audit. For example, if incomes are rising each year and if low-income filers' incentives are to report a steady income every year (for example, to stay below a program's cutoff at near its maximum benefit level), then we would expect a strong divergence between reported income between the treatment and control groups following audit. This is consistent with the pattern observed.

However, these results do warrant more discussion. First, for filers reporting very low AGI, there is less room to under-report and still have non-zero income. If filers still retain some non-compliance behavior after audit, this would tend to make the changes in reported income following audit move more in the upward direction than for those with more income in the year of audit. Second, while income over-reporting is not very large or frequent (see Table 2), it is more likely that those with higher reported income in the year of audit make an error and over-report income than those who report less income in the year of audit. If audits help filers to correct this over-reporting, that would tend to push up the effects of audit on the low-income group relative to the high-income group.

6.3 Extensive margin effects

To understand the extensive margin effects of audit, we estimate linear probability models of the form:

$$I(Y \neq 0)_{it} = \sum_{k=1}^K \beta_k (PostAudit_{it}) * (k \text{ Years Since Audit}) + \gamma_i + \eta_t + \varepsilon_{it}, \quad (4)$$

where $I(Y \neq 0)_{it}$ is an indicator function equal to one if Y is not zero. Y represents either income from Schedule C, E, or an EITC credit. The estimates of Equation 4 are reported in Figure 6, Panels A-C. Each panel reports results for three groups, those who filed the schedule or claimed the EITC in the audit year, those who did not, and the full sample. The graphs then plot the change in the likelihood of filing the given form or claiming the EITC by year since the audited return was filed.

The extensive margin results for Schedule C and E filers are reported in Figure 7, Panels A and B. These two graphs show sharp declines in the likelihood that a filer continues to file the relevant schedule after audit. Thus, the increases in taxable income following audit is only one effect of the audits on those with business income. The other effect is to make them less likely to claim business income. There are at least three possible reasons for this decline, though our data do not allow us to identify them. First, audits may result in increases in reported income and thus taxes. This pushes down the after-tax return on the business endeavors and may cause the filers to forgo them. Second, the Schedule C or E may have been filed for an activity that generated losses. An audit may have found such a losses to be illegitimate and thus the filer discontinued their use of those losses and the filing of the associated schedule. Finally, and this is particularly relevant for Schedule C income, an audit may have found that the filer should not have been filing as an independent

contractor, but instead should have been classified as an employee. The increase in compliance after an audit in this case would result in fewer Schedule Cs being filed.

[Figure 7 about here]

Figure 7, Panel C plots the effect of audit on the likelihood the filer claims the EITC. Here we see evidence that the audit decreases the likelihood of the filer claiming the EITC. This is consistent with the story about the filer becoming unanchored from the benefits schedule of the program after audit since they are less likely to be claiming the credit following audit.

6.4 The importance of income volatility on the lasting impact of audit

The result that those income sources such as Schedule C and Schedule E income have the largest responses to audit is not surprising given the limited amount of third party reporting on these income sources. However, the transitory nature of the impact of audit on these income sources and on the taxable income of those deriving income from these sources is not as intuitive.

Aside from being less subject to third party reporting, business income as reported on Schedules C and E differs from labor income (which makes up the majority of total income) by its volatility. DeBacker, Panousi, and Ramnath (2014) document that business income displays both a higher variance and more volatility than labor. We posit that the difference in income processes interacts with audits in an interesting way. In particular, we posit that higher income volatility allows taxpayers to change reported income from year to year more easily. The result is that the effects of audit are not as persistent for business income as for labor income. For example, consider an audit in year zero on a filer with only

wage income. Since wage income is less volatile, that filer may believe that the IRS can infer that wage income in year k is in some range with a fair degree of accuracy. Thus the effect of audit on wage income is persistent. However, for the more volatile Schedule C income, the filer may believe that k years from the audit, the IRS has very little ability to predict what the range of true Schedule C income is. Therefore the effect of audit on Schedule C income is more transitory.

To test this hypothesis we include a measure of volatility into our models and interact volatility with the audit indicator variable. We measure volatility by considering the variance in each filer's taxable income over time. We then group filers by filing status, number of dependents, and schedules filed. Finally, we take averages over these groups and use that as the measure of volatility for each individual in that group.

Table 9 presents the results of this model, separately for all filers and for those with Schedule C income. In all cases, the interaction terms are negative, indicating that volatility reduces the effect of audits. This is consistent with our hypothesis. Furthermore, the interaction terms show that the effect of volatility becomes more negative over time, which mean the audit effect is more short-lived for people with more volatile income.

[Table 9 about here]

7. Understanding the implications of an NRP audit and tax literacy

An NRP audit is random, and the letters NRP subjects receive explicitly mention that they were selected for a random audit used for IRS research purposes. Thus, if audit subjects are rational, the audit should not impact subsequent tax reporting since it does not

impact the subsequent probability of audit.¹⁴ Despite this, we find significant impacts of audit on filers. One reason for this may be that filers misunderstand the nature of the NRP audit. To test this, we look at the responses to audit by several subsamples. Each of these subsamples is created based on characteristics that may be correlated with tax literacy or understanding of tax enforcement. These include income, age, the use of a paid tax preparer, the use of e-filing of the tax return, and the type of NRP audit the filer was involved with.

7.1 Responses by Filer Age

Figure 8 splits the sample according to the age of the primary filer in the year of the audit.¹⁵ Here, the three oldest age groups (35-44, 45-54, and 55-64) appear to be the most responsive after an audit, with estimated effects two years after audit in excess of \$1,700, while the impact for the youngest group two to four years after audit is around \$1,000. These results are in contrast to Kleven, et al. (2011) who find that the propensity to underreport income falls with age.

[Figure 8 about here]

Considering the long-term patterns, we see that the youngest age group (25-34) responds significantly differently than the older age groups to audit. In particular, this age group does not show a return to the pre-audit trend in income reporting. Following an audit, those aged 25-34 report higher income and this effect persists over the next six years with increases over the entire window. In contrast, the older age groups show an increase in reported taxable income in years two and three after the audit, but a decline after that. Thus

¹⁴ We have confirmed this using the AIMS data on non-random audits.

¹⁵ For observations in the control group, we split based on age in the tax year for which they were drawn as a control observation.

we find evidence that audits have stronger deterrent effects on those who are relatively new tax filers.

7.2 Responses by Filer Income

Next, we show how the responses to audit differ across income groups. These results are shown in Figure 9. Income quintiles 1-4 show similar responses to audit, with persistent increases in reported taxable income following audit. Amongst these, the lowest income group has the strongest response to audit measured in the difference in dollars of taxable income reported after audit. Note that this is true despite this group having the lowest taxable income at the time of audit. The top income quintile shows the opposite trend, with a persistent decline in reported income after the initial increase in income in the year after the audited return was filed. Note also that many of the caveats to the results in 5.2.2 apply to these results as well. In particular, individuals reporting particularly low incomes are unlikely to have true incomes much below what they report, and vice-versa for individuals with particularly high incomes.

[Figure 9 about here]

7.3 Responses by Filing Method

We now condition samples on filing method and compare the responses to audit. By filing method, we mean the use of a paid preparer to file the tax return and the use of e-filing of a tax return. E-filing is highly correlated with the use of tax filing software. Our assumption is that those using a paid preparer or e-filing tend to be more sophisticated in

their understanding of the tax code than those without, at least conditional on the personal or software assistance they receive in filing.

Figure 10, Panel A displays the results comparing those who used paid-preparers in the year the audited return was filed to those who did not. In the first three years after audit, these two groups have very similar responses, increasing reported taxable income by over \$1,000 more than the comparable group who was not audited. However, after year three the post-audit trends diverge. In these years, the trend for those using a paid preparer moves taxable income towards its pre-audit level. While for those who did not use a paid preparer, the increase in reported taxable income is persistent.

[Figure 10 about here]

In Figure 10, Panel B, we see that a similar comparison can be made between those who used e-filing in the year the audited return was filed and those who did not. In particular, the changes in taxable income following audit are greater and more persistent for those who did not e-file.

A word of caution about these results is in order. Over our sample period, there was a sharp increase in the number of e-filed returns. Thus, those who e-file in 2006 (from whom the effect 6 years from audit is identified) may be a very different group of filers than those who e-file later in the sample period. Fixed effects do control for level differences in income between these groups, but the composition of the groups may also differ on unobservables that lead to heterogeneous audit treatment effects that skew the estimated effects of time since audit.

7.4 Responses by Audit Experience

An NRP audit may result in one of three interactions between the IRS and the tax filer. First, a return selected for audit may be accepted as filed, with no follow-up contact between the IRS and the tax filer. Second, a return may be selected and subject to a correspondence audit, where the IRS and the tax filer communicate impersonally. Third, a return may be selected and subject to an in-person interview as part of the audit. Each of these reveals a different amount of information to the filer, with all filers receiving the same initial mailing stating that they have been selected for an NRP audit.

Figure 11 presents the results from estimating Equation 3 on taxable income separately by audit experience: accepted as filed, correspondence, and in-person audit. Of these three audit experience, those who received a correspondence audit show the largest increases in taxable income following audit. For this group, taxable income increases by about \$5,000 three years after the audited return was filed. What is surprising is that the in-person audit group have the smallest response of the three, despite having much more contact with the IRS than those for whom the tax return was accepted as filed.

A possible explanation for the results is the following. Those whose return is accepted as filed are still influenced by the letter stating they were selected for audit. This group perhaps ignores the exact content of the letter that states they audit was entirely random. Such a story is consistent with the findings of Manoli and Turner (2014). Those with the correspondence audit responds more strongly since they get follow up contact and may have adjustments made to their reported income, causing them to further adjust their perceptions of the IRS after audit. However, those receiving correspondence audits may still largely ignore the content of the contact not immediately relevant to the settlement of the audit. In contrast, the small responses from those receiving in-person audits may result from their receiving the message about the random audit more directly and thoroughly as they talk

with the examiner. Thus, it may be this group that best understands the randomness of the NRP audit and so displays the smallest response to audit. We do, however, note that selection into each of these groups is not random and thus the results should be taken with caution.

7.4 Summary of findings related to tax literacy

Although there exists no direct measure of tax literacy for the filers in our sample, in each case above, the results are consistent with smaller, and more transitory, responses from those with a better understanding of the audit process they are involved in: the young and inexperience respond more strongly and persistently than the old, those with low income respond to a much greater extent than those with high income, those using paid-preparers have more fleeting responses than those who don't, those who e-file have less of the long-run response than those who do not, and those with more information from the IRS about the nature of the audit respond to a smaller degree than those with less information. While the proxies for tax literacy are imperfect, the robustness of these results should suggest that there is a relationship between tax literacy and the responses to audits.

8. Conclusion

Tax evasion is estimated to be around 18% of the global tax collections and it costs public funding nearly three trillions dollars around the world (Murphy 2011). Among all countries, the U.S. suffers the largest loss in absolute terms because of the sheer size of the economy. One way to deal with this problem is through audits of tax returns. Auditing affects tax compliance through deterrence effect, which impact all filers. Auditing also have

more direct effects on the audited. First, there is a static revenue gain when the auditors discover noncompliance. Second, those audited tend to report higher taxable income in subsequent years, resulting in further revenue gains. This study provides a rigorous evaluation of the effectiveness of tax audits in reducing tax evasion, in the short and long term.

We examine the impact of audits on subsequent individual taxpaying behavior using data from the Internal Revenue Service (IRS) National Research Program on random audits on tax returns from 2006-2009 matched to returns from the universe of filers from 2000 to 2012. It is worth noting that the effects we measure of the effects of a random audit. Filers may respond differently to non-random audit since in those cases they can make some inferences about the auditing process from the fact that they were selected. However, because of this selection, the effects of non-random audits are more difficult to measure. One argument that suggests the effects of non-random and random audits may not be far apart is made by Manoli and Turner (2014). They provided evidence from a randomized field experiment showing that the content of contact between the IRS and tax filers is much less important than the existence of this contact.

The results from a simple difference-in-differences specification indicate that an audit increases reported taxable income by over \$1,000 per year, or equivalent to 2.7% of the average income. This effect is only 0.4% for wage income but is 7.5% for Schedule C income. Further, we find that the impact of auditing on reported wage lasts over time while it is fleeting for Schedule C income.

Similar results are found when controlling for individual fixed effects. These results suggest that Adjusted Gross Income increases for at least 6 years after an audit. Contributing to this increase, Schedule C and Schedule E income (which are not subject to

third-party reporting or withholding) tends to sharply increase after an audit, but this increase diminishes (and turns negative) 5 or more years after audit, while the increase in wage and salary (which is subject to third-party reporting and withholding) is considerably smaller. In addition, above the line and itemized deductions both decrease significantly after audit, and the decrease in deductions is apparent even among deductions (like state and local taxes and mortgage interest) that are subject to third-party reporting.

We believe this paper to have several clear implications. First, an audit of a randomly-selected individual tax filer increases reported taxable income by an average of about \$1,000, and this effect appears to persist for at least six years. Second, audits produce longer-lasting effects on wage income than on other sources of income. Third, audit stringency has a noticeable effect on the lasting effects of the audit. Fourth, different demographic groups respond differently to audits. All of these results refer solely to the direct effects of the audit, and not to deterrence effects that may impact non-audited individuals. We believe that extending this research to encompass both the direct and indirect effects of audit is an important topic for future work.

References:

- Allingham, Michael G and Agnar Sandmo. 1972. "Income Tax Evasion: A Theoretical Analysis." *Journal of Public Economics*, 1(3), 323-38.
- Alm, James. 2010. "Testing Behavioral Public Economics Theories in the Laboratory." *National Tax Journal*, 63(4), 635-58.
- Alm, James and Mohammad Yunus. 2009. "Spatiality and Persistence in Us Individual Income Tax Compliance." *National Tax Journal*, 101-24.
- Beccaria, Cesare. 2009. *On Crimes and Punishments and Other Writings*. University of Toronto Press.
- Becker, Gary S. 1974. "Crime and Punishment: An Economic Approach," *Essays in the Economics of Crime and Punishment*. UMI, 1-54.
- Bentham, Jeremy. 1879. *An Introduction to the Principles of Morals and Legislation*. Clarendon Press.
- Blumenthal, Marsha; Brian Erard and Chih-Chin Ho. 2005. "Participation and Compliance with the Earned Income Tax Credit." *National Tax Journal*, 189-213.
- Clotfelter, Charles T. 1983. "Tax Evasion and Tax Rates: An Analysis of Individual Returns." *The review of economics and statistics*, 363-73.
- DeBacker, Jason Matthew; Bradley T Heim; Anh Tran and Alex Yuskavage. 2013. "Legal Enforcement and Corporate Behavior: An Analysis of Tax Aggressiveness after an Audit." *Available at SSRN 2262586*.
- DeBacker, Jason Matthew; Vasia Panousi, and Shanthi Ramnath, 2014. "A Risky Venture: Income Dynamics within the Non-Corporate Private Business Sector", mimeo.
- Dubin, Jeffrey A. 2007. "Criminal Investigation Enforcement Activities and Taxpayer Noncompliance." *Public Finance Review*, 35(4), 500-29.
- Dubin, Jeffrey A; Michael J Graetz and Louis L Wilde. 1990. "The Effect of Audit Rates on the Federal Individual Income Tax, 1977-1986." *National Tax Journal*, 395-409.
- Feinstein, Jonathan S. 1991. "An Econometric Analysis of Income Tax Evasion and Its Detection." *The RAND Journal of Economics*, 14-35.
- Feldman, Naomi E and Joel Slemrod. 2007. "Estimating Tax Noncompliance with Evidence from Unaudited Tax Returns." *The Economic Journal*, 117(518), 327-52.

- Gemmell, Norman and Marisa Ratto. 2012. "Behavioral Responses to Taxpayer Audits: Evidence from Random Taxpayer Inquiries." *National Tax Journal*, 65(1), 33-58.
- Guala, Francesco and Luigi Mittone. 2005. "Experiments in Economics: External Validity and the Robustness of Phenomena." *Journal of Economic Methodology*, 12(4), 495-515.
- Internal Revenue Service. 2012. "IRS Releases New Tax Gap Estimates."
- Internal Revenue Service. 2014. "IRS Audits."
- Kastlunger, Barbara; Erich Kirchler; Luigi Mittone and Julia Pitters. 2009. "Sequences of Audits, Tax Compliance, and Taxpaying Strategies." *Journal of Economic Psychology*, 30(3), 405-18.
- Kleven, Henrik Jacobsen; Martin B Knudsen; Claus Thustrup Kreiner; Søren Pedersen and Emmanuel Saez. 2011. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark." *Econometrica*, 79(3), 651-92.
- Maciejovsky, Boris; Erich Kirchler and Herbert Schwarzenberger. 2007. "Misperception of Chance and Loss Repair: On the Dynamics of Tax Compliance." *Journal of Economic Psychology*, 28(6), 678-91.
- Manoli, Dayanand S. and Nicholas Turner, 2014. "Nudges and Learning: Evidence From Informational Interventions for Low-income Taxpayers." National Bureau of Economic Research, NBER Working Paper 20718.
- Mittone, Luigi. 2006. "Dynamic Behaviour in Tax Evasion: An Experimental Approach." *The Journal of Socio-Economics*, 35(5), 813-35.
- Tauchen, Helen V; Ann Dryden Witte and Kurt J Beron. 1993. "Tax Compliance: An Investigation Using Individual Taxpayer Compliance Measurement Program (Tcmp) Data." *Journal of quantitative criminology*, 9(2), 177-202.
- TRAC Reports, Inc. 2014. "Graphical Highlights of the Internal Revenue Service."
- Witte, Ann D and Diane F Woodbury. 1985. "The Effect of Tax Laws and Tax Administration on Tax Compliance: The Case of the Us Individual Income Tax." *National Tax Journal*, 1-13.

Table 1. Number of observations

	Total observations
NRP Sample	
All Years	5,833,670,339
Base Year	540,275,442
Postive Adj to Tax Liability	220,656,532
Negative Adj to Tax Liability	40,310,633
Random Sample	
All Years	5,814,143,000
Base Year	544,498,000

Note: Observations are weighted

Table 2. Summary of adjustments

	Pre-audit Income	Audit Adjustment	Underreported Income	Overreported Income
Taxable Income	\$41,110	\$4,056	\$5,209	-\$1,471
Fraction Non-zero	0.769	0.596	0.827	0.173
Adjusted Gross Income	\$48,913	\$4,514	\$5,890	-\$1,563
Fraction Non-zero	0.998	0.435	0.815	0.185
Deductions	\$2,418	\$65	\$728	-\$947
Fraction Non-zero	0.254	0.470	0.604	0.396
Wages and Salaries	\$42,634	\$940	\$1,233	-\$116
Fraction Non-zero	0.845	0.065	0.782	0.218
Sch C Income	\$8,458	\$7,235	\$8,624	-\$1,368
Fraction Non-zero	0.156	0.733	0.861	0.139
Sch D Income	\$4,076	\$1,762	\$3,164	-\$945
Fraction Non-zero	0.176	0.170	0.659	0.341
Sch E Income	\$11,227	\$4,572	\$6,693	-\$2,210
Fraction Non-zero	0.117	0.482	0.762	0.238

Note: NRP Audits, 2006-2009 Waves

Table 3. Double and triple difference with percentage changes

Column1	NRP Sample	Non-NRP, Random Sample	% Difference
Taxable Income			
Pre-audit	34,522.24	34,379.88	0.004
Post-audit	35,522.13	34,452.26	0.031
% Diff	0.029	0.002	0.027
Wage Income			
Pre-audit	39,207.37	38,895.10	0.008
Post-audit	38,985.24	38,502.45	0.013
% Diff	-0.006	-0.010	0.004
Sch C Income			
Pre-audit	1,439.92	1,427.60	0.009
Post-audit	1,492.94	1,372.62	0.088
% Diff	0.037	-0.039	0.075
Sch C - Wage			
% Diff	0.042	-0.028	0.071

Note: Pool all waves 2006-2009. Calculate means over three years before and three years after audit (to define pre and post-audit period)

Table 4: Effect of audit on reported taxable income

	2006 Wave	2007 Wave	2008 Wave	2009 Wave	Pooled*
Post-Audit	1203.397*** (349.766)	469.034 (349.983)	1494.705*** (356.496)	608.917* (340.782)	1109.729*** (184.343)
Individual FE	yes	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes
R-squared	0.005	0.004	0.005	0.005	0.005
N	1,589,675	1,632,271	1,618,809	1,561,799	4,770,283

Notes: "Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Table 5. Effect of audit stringency on subsequent taxable income

	2006 Wave	2007 Wave	2008 Wave	2009 Wave	Pooled*
Post-Audit	2217.121*** (454.663)	1884.685*** (437.097)	2478.222*** (456.616)	1141.392*** (425.524)	1989.524*** (210.922)
Time spend on Audit	-74.265*** (21.922)	-109.261*** (20.154)	-93.921*** (20.323)	-75.730*** (23.507)	-89.119*** (10.631)
Positive Wage Adjustment	1.371** (0.560)	0.962 (1.203)	2.434** (0.950)	0.101 (0.913)	1.500*** (0.494)
Negative Wage Adjustment	-0.285 (22.631)	-4369.224** (2045.994)	1.381 (12.745)	-27.326 (34.729)	-4.091 (10.768)
Positive Sch C Adjustment	0.104 (0.083)	0.157 (0.148)	-0.063 (0.098)	0.027 (0.091)	0.071 (0.056)
negative Sch C Adjustment	-0.312 (1.578)	0.633 (1.920)	1.058 (1.511)	-0.512 (1.294)	0.170 (0.874)
Positive AGI Adjustment	-0.161*** (0.055)	-0.207* (0.107)	-0.161* (0.083)	-0.303*** (0.076)	-0.198*** (0.041)
Negative AGI Adjustment	-0.095 (0.556)	1.102** (0.487)	-1.070* (0.626)	1.459*** (0.559)	0.294 (0.289)
Positive Tax Adjustment	0.784*** (0.284)	1.384*** (0.372)	1.335*** (0.330)	2.234*** (0.312)	1.320*** (0.170)
Negative Tax Adjustment	6.807** (2.766)	4.215 (2.565)	3.798 (3.444)	-6.682** (2.667)	3.453** (1.455)
Indiviudal FE	yes	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes
R-squared	0.006	0.006	0.006	0.006	0.006
N	1,589,675	1,632,271	1,618,809	1,561,799	6,402,554

Notes:"Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Table 6: Effect of audit on reported taxable income

	2006 Wave	2007 Wave	2008 Wave	2009 Wave	Pooled*
1 Since Audit	851.172** (353.556)	792.524** (373.197)	1004.740*** (346.982)	135.601 (343.347)	687.479*** (186.071)
2 Since Audit	1406.821*** (364.955)	483.078 (370.144)	1499.831*** (374.391)	621.914 (388.503)	1203.476*** (201.130)
3 Since Audit	1518.053*** (453.476)	325.123 (425.294)	1724.814*** (454.052)	1113.162*** (431.712)	1425.065*** (246.540)
4 Since Audit	1015.506** (436.367)	385.319 (473.994)	1804.713*** (503.866)		1480.768*** (328.271)
5 Since Audit	1129.007** (466.423)	312.516 (505.025)			1123.536*** (434.238)
6 Since Audit	1339.585** (526.638)				1190.705** (515.719)
Indiviudal FE	yes	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes
R-squared	0.005	0.004	0.005	0.005	0.005
N	1,589,675	1,632,271	1,618,809	1,561,799	4,770,283

Notes: Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Table 7: Effect of auditing on different sources of income, for the pooled sample

	Taxable Income	Total Income	Wage Income	Schedule C	Schedule D	Schedule E
1 Since Audit	687.479*** (186.071)	607.500*** (202.385)	332.112* (181.728)	1172.651*** (129.585)	-232.016 (146.617)	1011.074*** (277.332)
2 Since Audit	1203.476*** (201.130)	1036.840*** (222.500)	453.119** (220.232)	1035.852*** (146.681)	-86.188 (118.592)	1498.121*** (305.325)
3 Since Audit	1425.065*** (246.540)	1281.666*** (277.165)	522.746** (262.230)	477.533*** (154.870)	135.238 (131.841)	845.860*** (313.129)
4 Since Audit	1480.768*** (328.271)	1363.560*** (367.720)	104.390 (355.881)	4.264 (196.377)	284.624 (178.553)	356.726 (417.331)
5 Since Audit	1123.536*** (434.238)	940.884* (500.424)	-41.244 (505.161)	-723.753*** (261.949)	145.406 (212.225)	-404.683 (518.878)
6 Since Audit	1190.705** (515.719)	1156.579* (591.495)	4.772 (588.443)	-745.602*** (284.962)	133.686 (249.455)	-288.232 (584.562)
Indiviudal FE	yes	yes	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes	yes
R-squared	0.005	0.008	0.009	0.008	0.040	0.006
N	4,770,283	4,762,015	3,995,981	849,544	955,930	695,098

Notes: Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Table 8: Effect of auditing on different deduction items, for the pooled sample

	Above the Line Deductions	Itemized Deductions	Charitable Contributions	State & Local Tax	Mortgage Interest
1 Since Audit	12.344 (26.787)	-562.862*** (119.833)	-267.338*** (26.917)	-39.371 (28.099)	82.527 (70.717)
2 Since Audit	-75.112** (30.062)	-1406.816*** (128.418)	-358.466*** (29.490)	-91.179*** (32.041)	-415.863*** (76.330)
3 Since Audit	-132.365*** (31.950)	-1690.393*** (139.138)	-361.663*** (31.396)	-118.972*** (37.641)	-636.402*** (78.950)
4 Since Audit	-169.023*** (42.230)	-1845.696*** (172.259)	-356.896*** (40.351)	-119.208** (52.517)	-785.238*** (95.296)
5 Since Audit	-261.039*** (57.611)	-2507.945*** (234.794)	-463.813*** (55.964)	-337.782*** (67.111)	-1069.190*** (127.861)
6 Since Audit	-290.212*** (58.739)	-2012.491*** (255.434)	-436.067*** (60.480)	-252.973*** (78.816)	-920.886*** (132.120)
Indiviudal FE	yes	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes	yes
Constant	yes	yes	yes	yes	yes
R-squared	0.031	0.064	0.012	0.021	0.076
N	1,323,767	1,931,640	1,607,475	1,859,376	1,551,224

Notes: Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Table 9. Effect of audit and income volatility on subsequent taxable income

	All Filers	All Filers, Volatility Controls	Sch C Filers	Sch C Filers, Volatility Controls
1 Since Audit	687.479*** (186.071)	1947.612*** (267.387)	1221.978*** (418.961)	3492.685*** (572.641)
2 Since Audit	1203.476*** (201.130)	2877.531*** (289.554)	2861.039*** (468.652)	5782.568*** (630.981)
3 Since Audit	1425.065*** (246.540)	3889.109*** (344.964)	2639.577*** (526.073)	7303.842*** (708.251)
4 Since Audit	1480.768*** (328.271)	2753.112*** (427.062)	3117.348*** (715.668)	6559.093*** (894.531)
5 Since Audit	1123.536*** (434.238)	3686.791*** (555.105)	2614.872*** (993.278)	8843.038*** (1374.977)
6 Since Audit	1190.705** (515.719)	2454.001*** (646.240)	2120.437** (1052.639)	6669.599*** (1355.575)
1 Since Audit*Volatility		-443.468*** (94.432)		-524.046*** (163.809)
2 Since Audit*Volatility		-584.206*** (100.075)		-667.521*** (173.951)
3 Since Audit*Volatility		-860.694*** (106.468)		-1063.922*** (184.137)
4 Since Audit*Volatility		-429.097*** (136.846)		-764.952*** (230.803)
5 Since Audit*Volatility		-870.330*** (179.005)		-1395.998*** (324.008)
6 Since Audit*Volatility		-419.777** (197.771)		-1004.097*** (321.623)
Individual FE	yes	yes	yes	yes
Year of Tax Return	yes	yes	yes	yes
Constant	yes	yes	yes	yes
R-squared	0.005	0.004	0.003	0.006
N	4,770,283	4,770,283	849,544	849,544

Notes: "Pooled excludes 2007 Wave. * p<0.10, ** p<0.05, *** p<0.01,

Figure 1: Difference-in-Differences Estimates of Effects of Audit on Reported Income

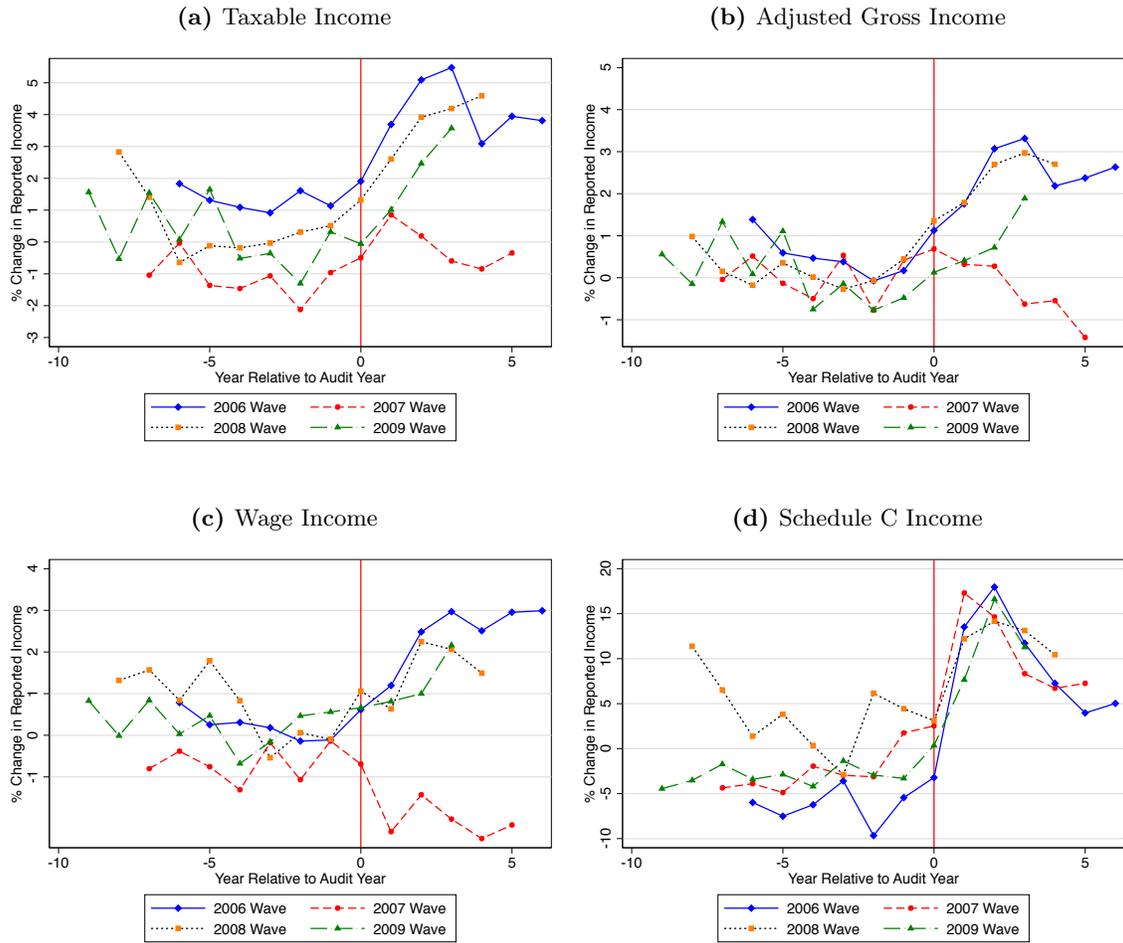


Figure 2: Effects of Audit on Reported Taxable Income by NRP Wave

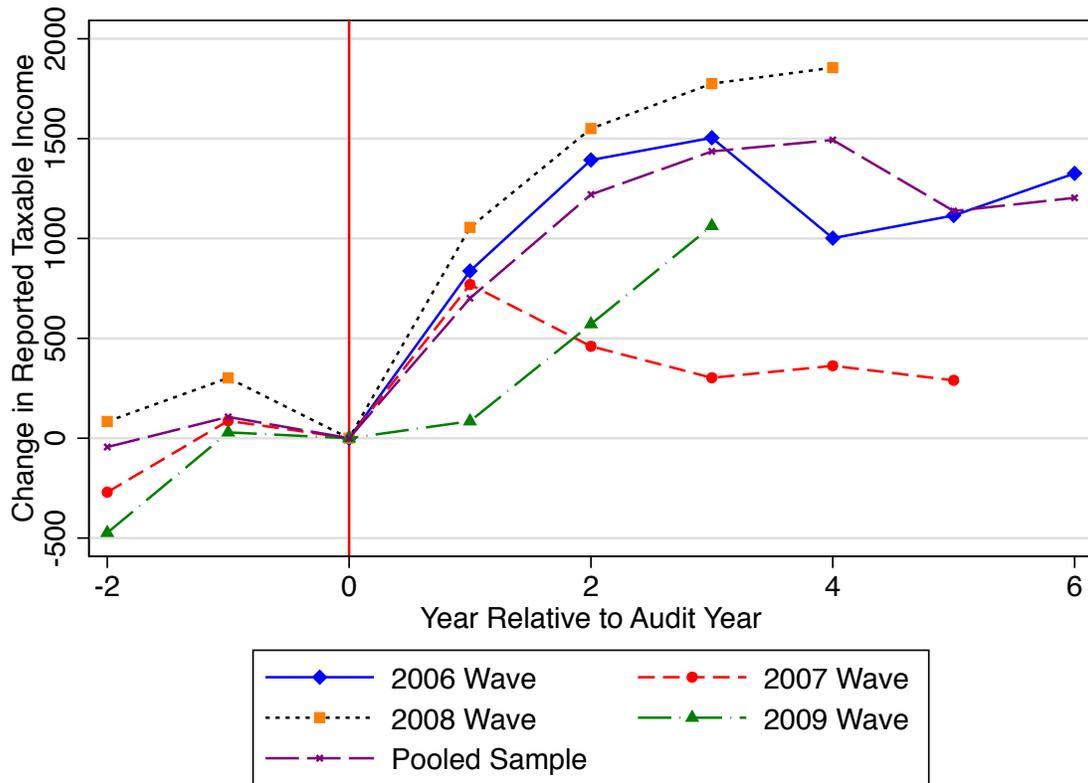


Figure 3: Effects of Audit on Reported Taxable Income by Audit Experience

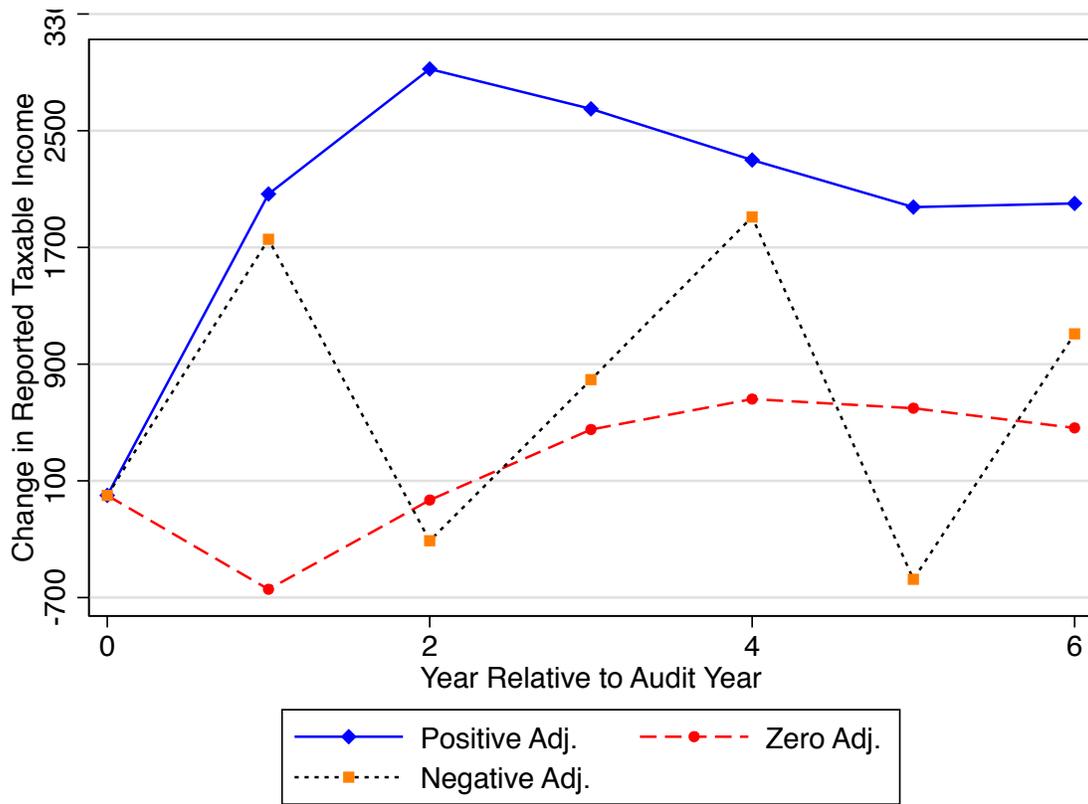


Figure 4: Effects of Audit on Reported Income by Income Source

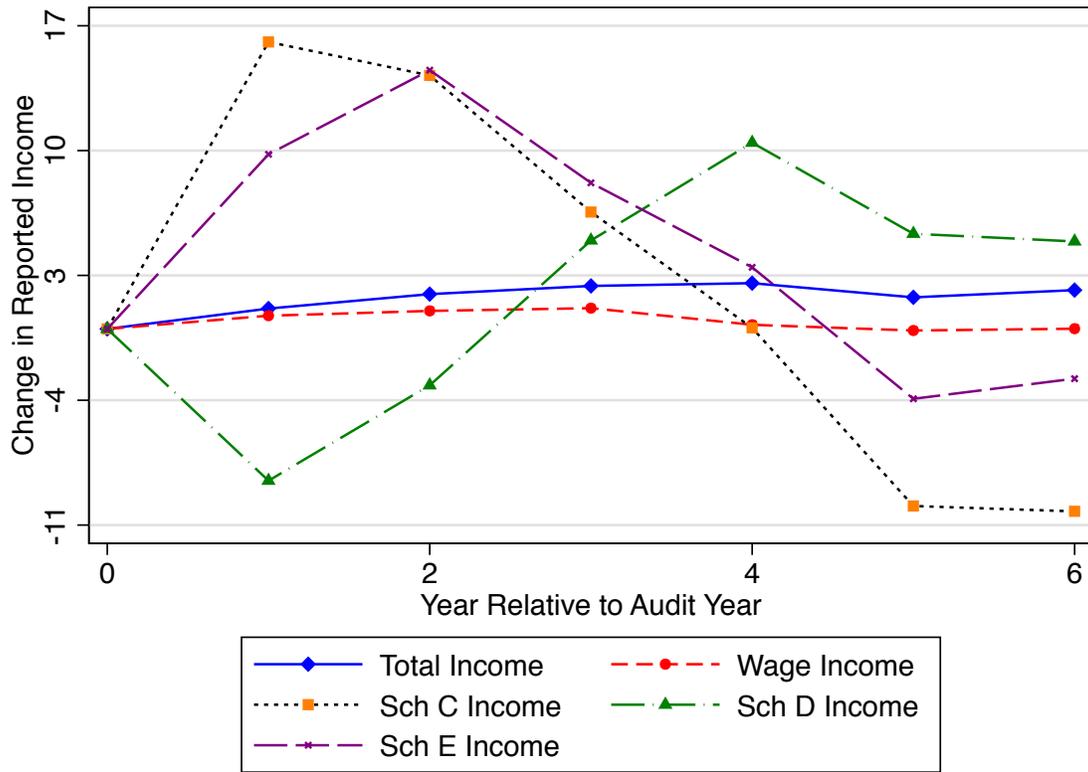


Figure 5: Effects of Audit on Reported Deductions by Deduction Type

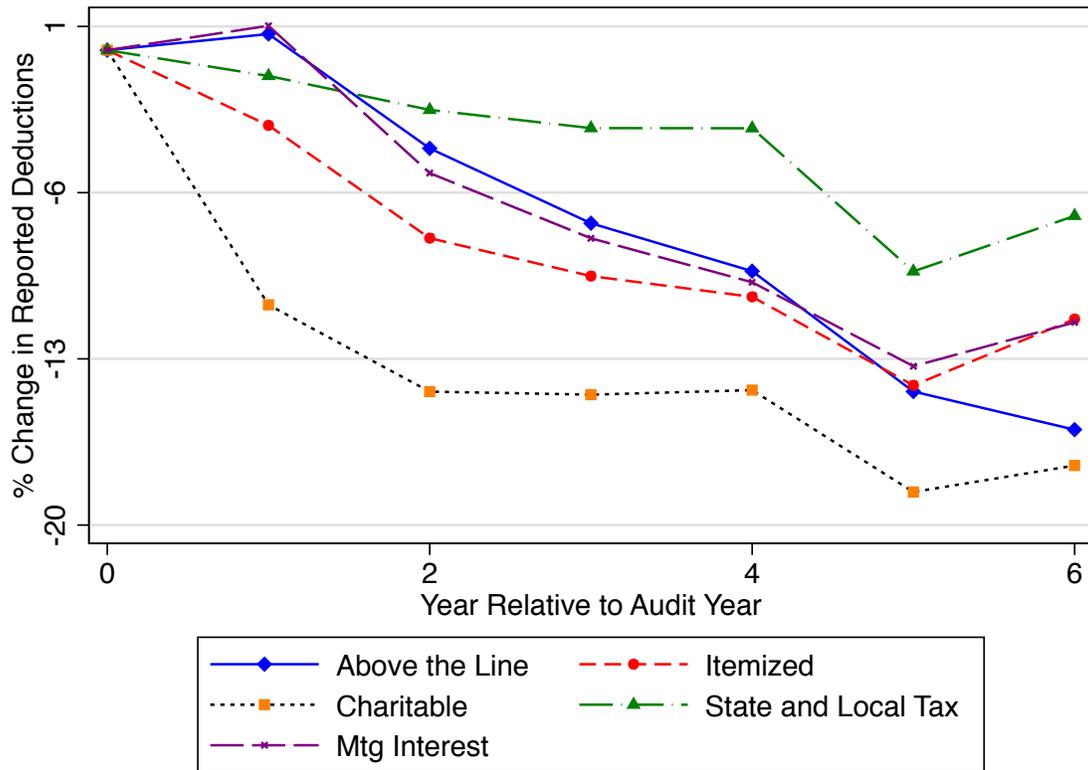


Figure 6: Effects of Audit on Reported Taxable Income by Filer Type

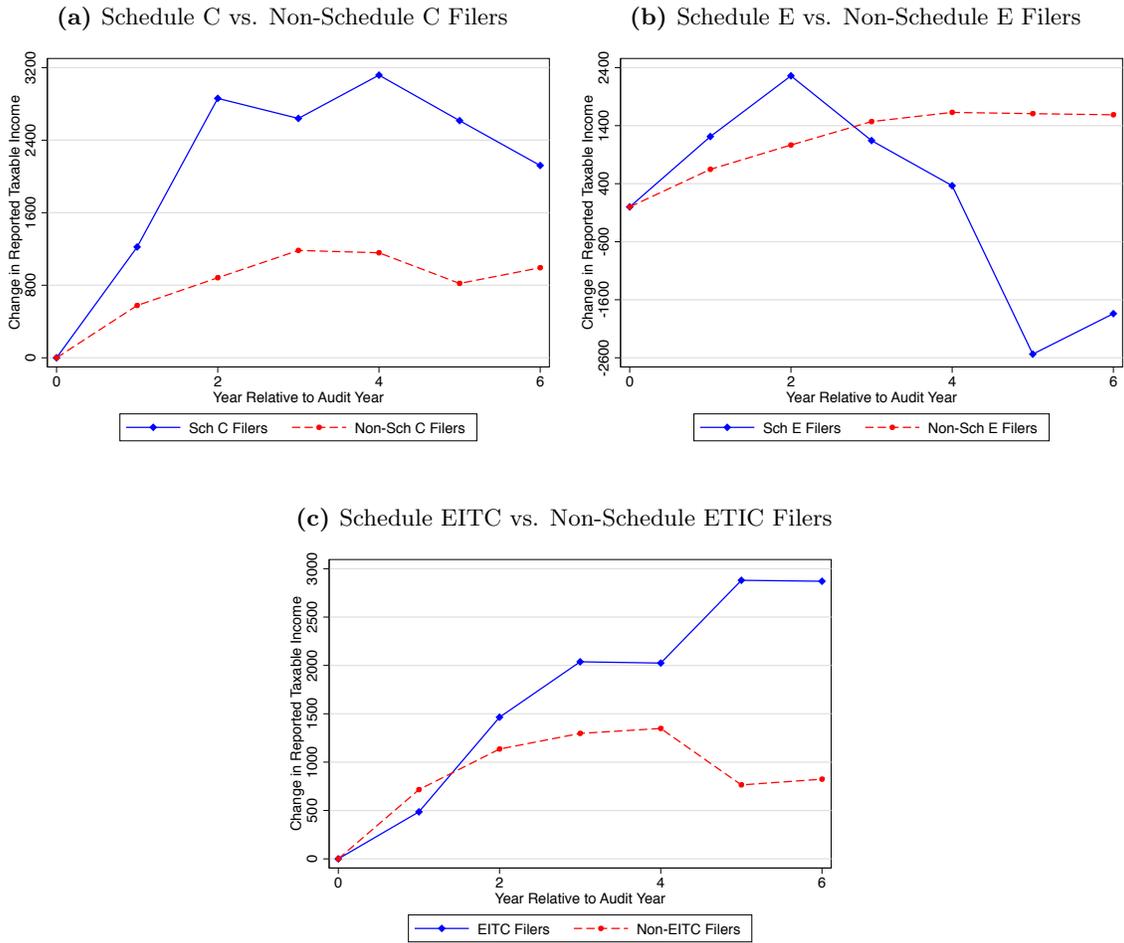


Figure 7: Effects of Audit by Filer Type, Extensive Margin

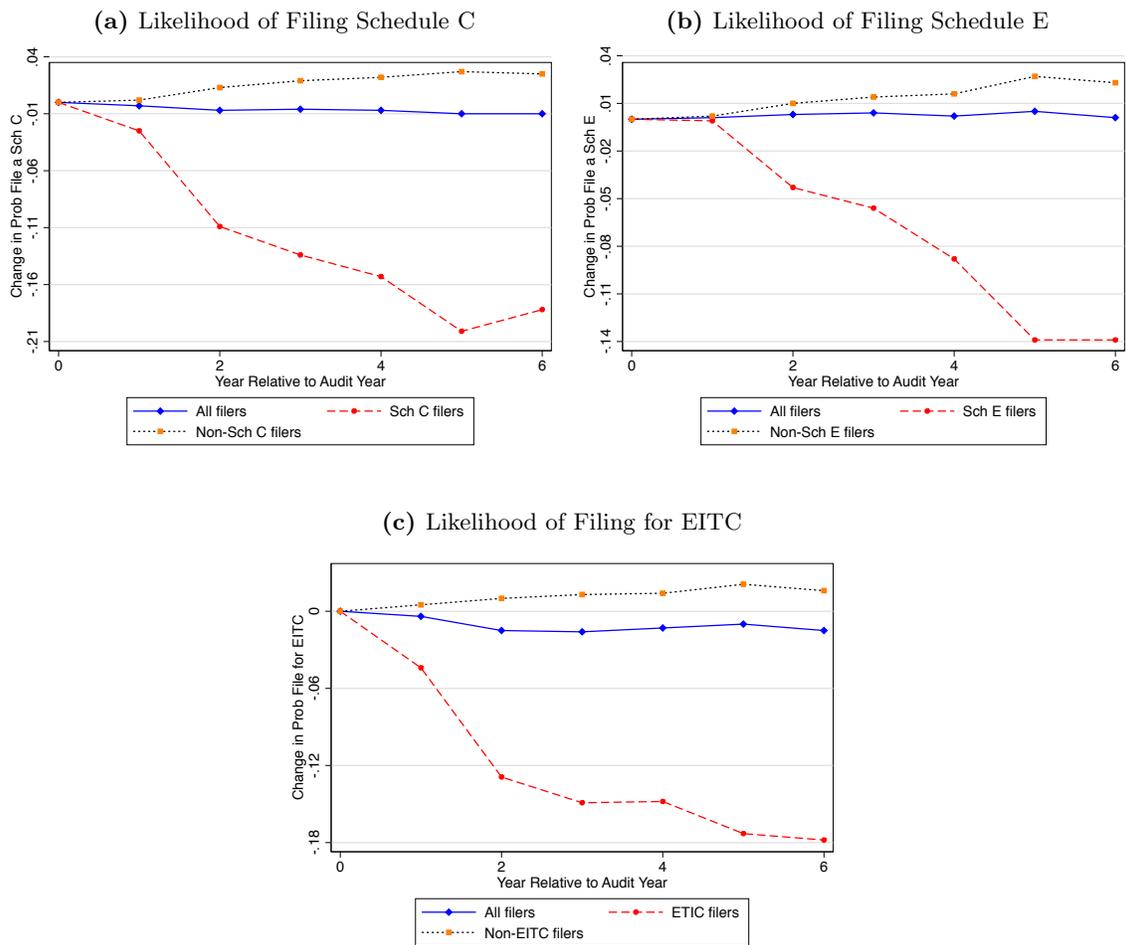


Figure 8: Effects of Audit on Reported Taxable Income by Filer Age

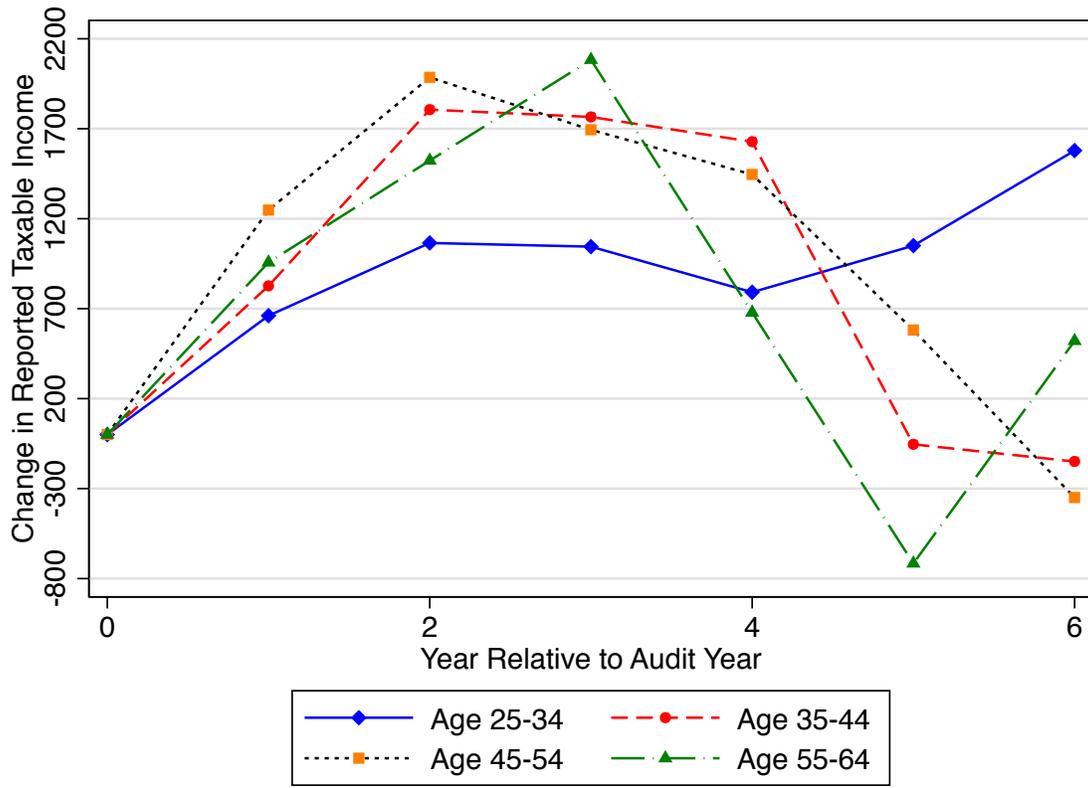


Figure 9: Effects of Audit on Reported Taxable Income by Filer Income

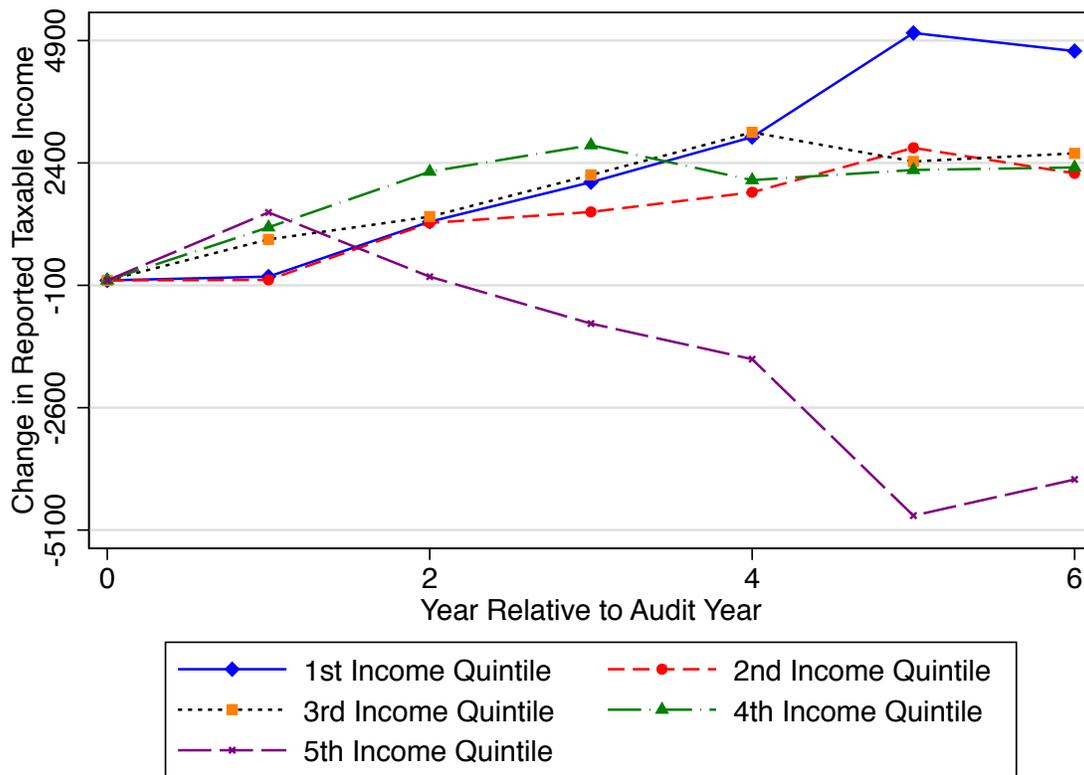
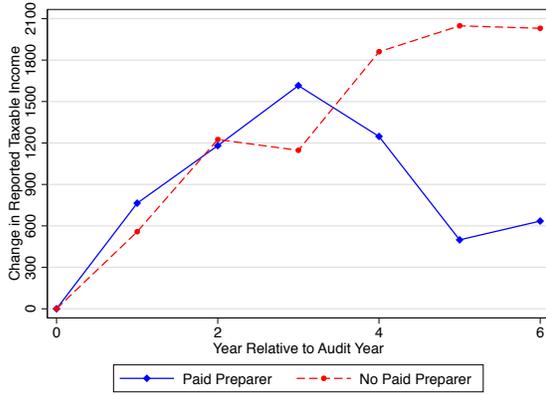


Figure 10: Effects of Audit on Reported Taxable Income by Filing Method

(a) Filers Who Used Paid Preparers vs. Others



(b) E-filers vs. Non-E-filers

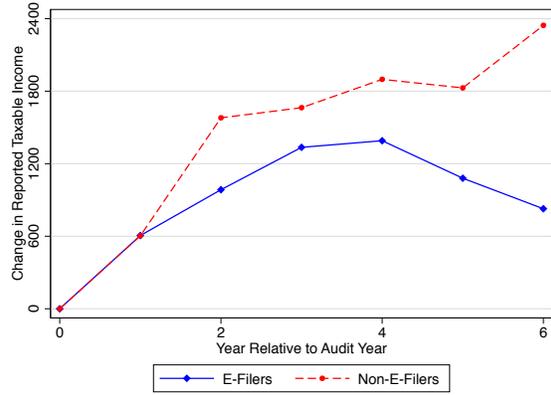


Figure 11: Effects of Audit on Reported Taxable Income by Audit Experience

