Less is More? Limits to Itemized Deductions and Tax Evasion*

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Abstract

Deductions for personal expenses often feature thresholds above which additional documentation is needed. These itemizing thresholds have two well-established roles: adding a non-monetary cost to the extra tax benefit, and transferring the burden of proof of the accuracy of the deduction to the taxpayer. Both roles suggest that the imposition of deduction thresholds should increase reported tax liability. This paper documents for the first time the existence of an additional role for the threshold of itemizing rules: disclosing information about the tax authority's audit procedures. If deduction thresholds change individuals' perceptions about enforcement rules, the effect on reported tax liability is uncertain. I show in a simple conceptual framework how the introduction of an itemizing rule could increase reported deductions, which could lead to a decrease in reported tax liability. To test the hypothesis, I use a natural experiment in Ecuador, where an itemizing rule was implemented retroactively. I observe a substantial increase in the deductions reported under the itemizing threshold, so the overall effect of the reform was a decrease in reported tax liability.

JEL Codes: H24, H26, D83;

Keywords: Income Tax, Deduction, Unintended Consequence, Threshold, Evasion.

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1 Introduction

Deductions for personal expenses are a common feature of the income tax. Some countries have a standard deduction, others allow taxpayers to report the actual amount of the deductions, and others have a combination of both. Usually, for larger deductions there is an itemizing requirement where taxpayers have to provide extra information to the tax authority. Most itemizing requirements have embedded thresholds that feature discontinuities. These itemizing thresholds have two well-established intended roles. First, the filing requirement creates a non-monetary cost for receiving the tax benefit, analogous to an ordeal. Second, itemizing deductions make the taxpayer responsible for proving the legality of the deduction and providing the tax authority with additional information to verify the tax benefit. These roles have been analyzed, and the consensus is that an increase in the information requirements leads to a decrease in the reported deductions (Wenzel and Taylor, 2004; Serocki and Murphy, 2015; Fack and Landais, 2016; Benzarti, 2017; Gillitzer and Skov, 2018; Tazhitdinova, 2018).

In this paper I show a novel unintended role, in which the itemizing threshold conveys information about the tax authority's audit procedure. Taxpayers might change their perception of the enforcement rules because of the introduction of a threshold, and that change in perception could lead to an *increase* in reported deductions. Taxpayers who perceive an increase in the audit threshold believe claiming a larger deduction does not increase their probability of being audited, as long as it is less than the itemizing threshold.

The introduction of an itemizing requirement, for which taxpayers who have made a deduction above a threshold are required to provide extra information, affects taxpayer behavior through two mechanisms. The first is the introduction of a non-monetary hassle cost for deductions above the threshold. The intended roles of the itemizing threshold, adding a non-monetary cost and transferring the burden of proof of the legality of the deduction to the taxpayers, operates through this first mechanism. The hassle cost creates a group of taxpayers that would be better off by taking a lower deduction than by itemizing their deductions and receiving a larger tax benefit; these taxpayers will decrease their deduc-

tion. The second mechanism is to reveal information about the tax authority's monitoring preferences, which can cause some taxpayers to *increase* their deductions. I use a simple conceptual framework to illustrate this point, in which I make the monitoring probability endogenous to the reported deduction. If the taxpayer believes that there is a level of deduction (i.e., an auditing threshold) that will invite attention from the tax authority, the probability of detection has an S-shape around this auditing threshold. The introduction of the itemizing requirement decreases the uncertainty regarding the value that this auditing threshold can take. The information mechanism potentially affects all taxpayers, not only the taxpayers for whom the itemizing rule is binding, because it affects their perceived monitoring probability. Taxpayers may update their beliefs regarding the location of the threshold either upwards or downwards, and may respectively increase or decrease their reported deductions because of the information mechanism. The overall effect on declared deductions and reported tax liability is uncertain when both mechanisms are in place. The introduction of an itemizing requirement divides taxpayers into two groups: the taxpayers who have made a deduction above a threshold, and the ones who have made a deduction below. The hassle cost only affects the latter group.

To test if the information mechanism exists, I analyze the introduction of an itemizing requirement for taxpayers with personal-expense deductions higher than $7,500 in Ecuador for the fiscal year 2008. For that year, Ecuadorians could deduct up to $10,250 of their expenses in health care, food, clothing, housing and education from their taxable income. The only cost for taking the deduction was a minor record-keeping cost (people were required to keep the receipts from their purchases in case the tax authority would like to check them in the future as part of an audit process). In Ecuador, the fiscal year coincides with the calendar year, and taxpayers are required to submit their tax returns by the end of March of the following year. For the fiscal year 2008, all taxpayers had declared their income tax by April 2009. In June 2009, the tax authority retroactively required itemization for people who had made a deduction over $7,500. The tax itself remained unchanged; only the reporting rules were affected.

The retroactive nature of this policy change provides a unique opportunity to study changes in reporting behavior, independent of any changes in real economic activity. I take advantage of the fact that all tax returns are timestamped and estimate the effect of the reform by comparing the original income tax return filed before June 1st (the day when the reform was made public) and the amended tax return filed after June 1st. I focus my analysis on employees because their employers report their income and payroll tax deduction, so the deduction for personal expenses is the only adjustable margin that is not third-party reported in their tax returns. I analyze the behavior of 61,239 employees who filed an income tax return both before and after the reform. They are equivalent to 3.6% of total employees, or 16.51% of employees who had income large enough to pay taxes.

The taxpayers who initially made a deduction lower than $7,500 are affected only by the information mechanism, because the itemizing rule is not binding for them and the record-keeping cost has not changed. These taxpayers may have had an incentive to increase their deductions because they updated their beliefs about the tax authority's audit procedure upwards. This group of taxpayers increased their deductions on average by $1,543, and lowered their reported tax liability of $160. Prior to the reform, they took a deduction equivalent to 23 cents of each dollar of taxable income before deductions; after the reform, they took 68 cents. The increase of the reported deductions of this group of taxpayer is evidence of the presence of the information mechanism.

The taxpayers who initially made a deduction higher than $7,500 are affected by both the information mechanism and the hassle cost. These taxpayers might decrease their deductions either because they have updated their beliefs downwards, or because the tax savings from reporting their total deductions are not large enough to compensate for the filing cost. These taxpayers decreased their reported deductions by an average of $2,497. Among taxpayers who decreased their deduction, some declare a value close to the threshold of $7,500. However, some of them made smaller adjustments of only around 1%, while others changed to amounts well below the threshold.

The overall effect of the introduction of the itemizing requirement was a net loss of $3.5 million dollars of reported tax liability. To ascertain the relative importance of the information and hassle cost mechanisms of the behavioral response around the itemizing threshold, I use the deductions declared on the original tax forms to create a counterfactual distribution of deductions, along with a bunching estimator. The excess number of taxpayers who increased their deduction to an amount near the itemizing threshold (and who were only affected by the information mechanism) was around 1,710. The taxpayers who initially made a deduction higher than $7,500 are affected by both mechanisms (information and hassle cost). The excess number of taxpayers who decreased their deduction to an amount near the threshold was around 459. Even if we assume that all the taxpayers who decreased their deductions do so solely because of the hassle cost, the response from the taxpayers who increased their deductions due to the information mechanism is several times larger.

This paper contributes most directly to the literature on how taxpayers respond to more burdensome tax reporting requirements. Prior work has found evidence that stronger reporting rules reduce reported deductions and increase tax liability (Wenzel and Taylor, 2004; Serocki and Murphy, 2015; Fack and Landais, 2016; Tazhitdinova, 2018; Gillitzer and Skov, 2018). I present evidence, with a conceptual model and unique natural experiment in Ecuador, that deduction thresholds can have unintended consequences by revealing information about tax auditing procedures. In my setting, the introduction of an itemizing threshold increased aggregate reported deductions and lowered aggregate tax liability. Consequently, my results imply that tax authorities must be cautious when implementing this type of policy.

While I focus on a tax benefit, I also contribute to a broader literature on ordeals, which are widely used to allocate benefits such that poorer recipients are targeted through a self-selection mechanism (Nichols and Zeckhauser, 1982; Kleven and Kopczuk, 2011; Alatas et al., 2016; Dupas et al., 2016). Requiring itemizing of deductions imposes an ordeal in order to receive a higher tax benefit. On one hand, the itemizing requirement self-selects lower-income individuals to receive a larger relative tax benefit through the imposition of

the hassle cost, because the opportunity cost of their time is lower. On other hand, I demonstrate that the design of the ordeal (in this case an itemizing requirement) can affect the selection mechanism in an unexpected way through an information mechanism. This is because individuals under the itemizing threshold may self-select into claiming a larger tax benefit upon receiving a signal about the likely auditing threshold.

The rest of the paper is organized as follows. Section 2 presents a literature review. Section 3 presents the conceptual framework. Section 4 presents an overview of the background and policy interventions I analyze. Section 5 lays out the identification strategy and 6 presents the results results. Section 7 concludes.

2 Literature Review

Income tax is calculated based on taxable income, that is, income less deductions. In principle, taxpayers manipulate their taxable income until the marginal cost of decreasing the taxable income by one dollar is equal to the marginal tax rate. Taxpayers have two ways to manipulate the taxable income: underreporting income, or overstating deductions. If those mechanisms were equivalent, the taxpayers would be indifferent between them. However, this does not seem to be the case. Over time, the underreporting of income has lost importance as an evasion mechanism due to the spread of third-party reporting information (e.g. Kleven et al., 2011, or see Slemrod, 2016 for a recent literature review).

The literature about deductions has explored how changes in the deductions' rules affect the taxable income elasticity, and how stronger reporting rules can generate a decrease in reported deductions. Two mechanisms explain that decrease. First, as the tax authority requires more information from taxpayers, the sheltering cost to overstate a deduction increases. Second, there is an indirect cost of reporting more information borne by the taxpayer: record-keeping and reporting costs. I build on this body of literature and explore how changes in the reporting rules can affect the taxpayers' perceptions about the tax authority's monitoring preferences. I demonstrate that stringent regulations can have an

unintended informational role, and can actually generate an increase in reported deductions due to this information mechanism.

There is a growing body of literature that studies changes in deductions rules because of their effect on taxable income elasticity. If claiming a deduction generates an externality, the taxable income elasticity is not a sufficient statistic for welfare calculations in the presence of deductions. In the absence of an externality, the elasticity of deductions with respect to the tax rate should be zero. Doerrenberg, Peichl, and Siegloch (2017) and Hamilton (2017) analyze the taxable income by its components (revenues and deductions) and demonstrate that the elasticity of deductions with respect to changes in the tax rate is negative and large in magnitude.

It has previously been documented that when the tax authority adds new requirements to take a deduction or requests more information from the taxpayers, the reported deductions decrease. One mechanism that contributes to this observation is how the cost to overstate a deduction increases. Wenzel and Taylor (2004) find that deductions decrease significantly for Australian taxpayers who have to send in their tax returns with itemized deductions from rental property income compared to those who do not. In their experiment, taxpayers received rental property schedules to itemize their deductions; some taxpayers had to return the tax forms, and some did not. Serocki and Murphy (2015) analyze the change in the reporting rule for non-cash donations in the United States. Since 1985, the IRS has required a qualified appraisal for donations larger than $5,000. They find an increase post-reform in the percentage of taxpayers claiming non-cash contributions just under the $5,001 threshold, arguably to avoid the more rigorous appraisal requirement. As part of the same reform, the IRS stopped requiring non-cash donations lower than $500 to be described. Tazhitdinova (2018) finds that lifting the requirement generated an increase of reported donations. A second mechanism is an increase in the indirect cost of reporting the deduction or hassle cost. A compelling case is the donation deduction in some European countries. While France imposed the hassle cost on the taxpayer, Denmark levies it on the receiving charities. In France before 1983, people were able to claim charitable contributions freely,

whereas after that year a receipt from the organization that received the donation needed to be included in the tax filing in order to make the deduction. The reform led to a drop in the number of donations reported (Fack and Landais, 2016). In Denmark, the tax authority required charities to report contributions by each donor since 2008. The taxpayers receive pre-populated individual tax returns. After the reform, the number of claims increased due to the lower compliance costs, which implies that before the reform taxpayers were forgoing tax savings to avoid the hassle cost (Gillitzer and Skov, 2018). Benzarti (2017) compares the standard deduction and the itemized deduction. He observes a missing mass in the density of deductions immediately to the right of the standard deduction threshold. He uses the tax change of 1988, when the standard deduction increased from $6,130 to $8,809, to estimate a counterfactual distribution and calculate the indirect cost of itemizing and finds that taxpayers are willing to pay on average $644 extra in taxes to avoid itemizing their deduction.

In summary, deductions are a significant margin for tax non-compliance. In general, additional requirements to take a deduction can potentially decrease the reported deductions due to changes in the cost of sheltering income through deductions or hassle cost of the reporting. In this paper, I show that the information requirements, in particular, the introduction of a threshold for itemizing deductions, can play the unintended role of affecting the taxpayers' perceptions about monitoring from the tax authority. Through that mechanism, some taxpayers increase their deductions when the reporting rules become stringent.

3 Conceptual Framework

In this section, I present a straightforward theoretical model that allows me to illustrate how the introduction of an itemizing rule based on a threshold can affect reported deductions. Before the change, taxpayers reported the deduction in their income tax return. If the tax authority audited them, they had to provide the documentation to support the deduction. The only cost is the record-keeping cost. I model the introduction of a reporting rule in the following form: taxpayers can make a deduction lower than or equal to an itemizing

threshold (h^*) with no filing requirement. If a taxpayer makes a deduction larger than the itemizing threshold (h^*), she has to itemize her deductions. There are two costs: the record-keeping cost and the filing cost. For simplicity, I normalize the record-keeping cost to zero and assume the filing cost to be constant (c). I assume a linear tax (t) levy on the taxable income (z), that is, income less deductions ($z = y - d$). The only choice variable for an employee is the deduction (d). The itemizing rule can affect the reported deductions through two mechanisms: imposing a cost for claiming the deductions and providing information about the tax authority's audit procedure. First, I analyze the effect of imposing the cost in a context with no evasion. Second, I analyze how the threshold can affect the reported deduction by changing the taxpayers' beliefs about the tax authority monitoring preference. Finally, I combine these two models.

3.1 Model with Hassle Cost

I start by considering a notch point created by the itemizing cost, the analysis of which was developed by Kleven and Waseem (2013). Taxpayers maximize their income after taxes. Their utility function is $U(z - T(z))$, where z is taxable income and $T(z)$ is the tax scheme. There is heterogeneity in income that translates into a smooth distribution of taxable income $b_0(z)$ [1] as well as a smooth distribution of deductions $b_0(d)$ before the introduction of the notch.[2] The tax scheme is a linear tax where the taxpayer is required to itemize and expend the cost c if her deduction is larger than the itemizing threshold–$T(z) = tz + c \cdot \mathbf{1}(d > d^*)$. When the notch is introduced at d^*, the tax liability increases by the filing cost without a change in the marginal tax rate. Figure 1 illustrates the changes generated by the notch on the budget set. Consider the taxpayer who in the absence of the itemizing cost will choose a deduction $d^* + \epsilon$. She is strictly better off taking a lower deduction and reporting $z^* = y - d^*$ because of the itemizing cost. The itemizing cost creates a region above the threshold that includes all taxpayers with taxable income in the interval $(z^*, z^* + \Delta z^*)$, which is strictly dominated by z^*. The taxpayer at $z^* + \Delta z^*$ is indifferent between either reporting z^* and not itemizing the deduction, or alternatively reporting $z^* + \Delta z^*$, itemizing the deduction, and covering the cost c. The taxpayers in the dominated region decrease their deduction as

[1] $b_0(\cdot)$ is the original distribution of the variable inside the parenthesis.

[2] Usually, this heterogeneity of income is the result of heterogeneity in ability.

a result of the introduction of the itemizing rule. The density distribution of the deductions exhibits an excess mass at d^* and a missing mass in the dominated region, as shown in Figure 2.

Figure 1: Budget Set

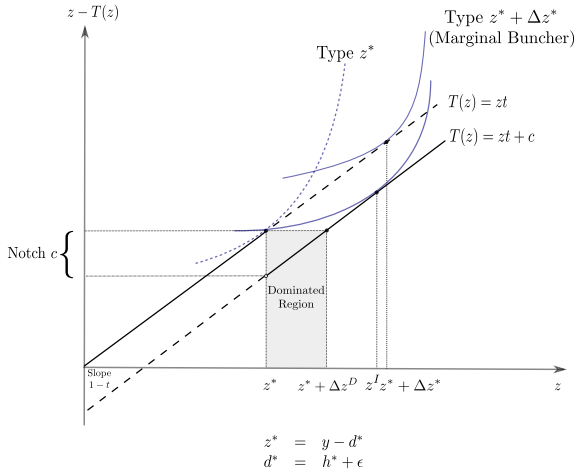
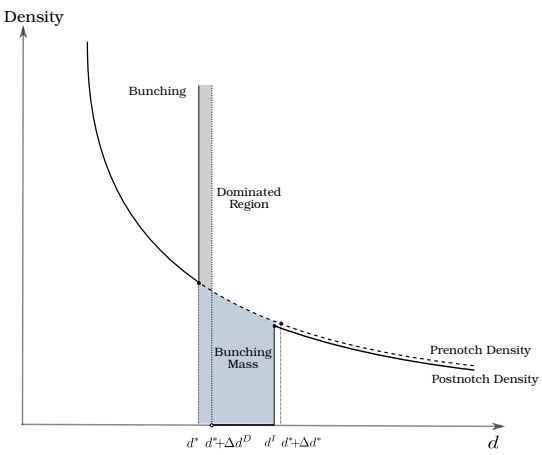


Figure 2: Density Distribution Diagram



3.2 Model with Evasion

Next I consider evasion alone. I use a version of the Allingham and Sandmo model with a risk-neutral taxpayer to illustrate the effect of the information mechanism on reported deductions. As before, the taxpayer's only choice variable is the reported deduction d. The reported deduction has two components: the deduction that the taxpayer can legally claim $\hat{d}$ (i.e. the taxpayer consumed the goods and services she is claiming and has the required paperwork) and the false claims e (i.e. evasion). This distinction is important because if the tax authority audits the taxpayer, the fine will be proportional to the tax on the false claims. I model the perceived detection probability as endogenous and as a function of the reported deduction $p(d)$. This is similar to how Kleven et al. (2011) model endogenous audit probability as a function of reported income. As in the previous case, the tax rate is t, and the penalty for evading is proportional to the evaded tax and is given by $\theta > 1$. The risk-neutral taxpayer chooses the level of evasion e to maximize the expected net-of-tax

income:

$$\mathbb{E}(U) = \underbrace{[1-p(d)]\left[(y-\hat{d})(1-t)+et\right]}_{\text{Expected return of not being audited}} + \underbrace{p(d)\left[(y-\hat{d})(1-t)-e\theta t\right]}_{\text{Expected return of being audited}} \tag{1}$$

The probability of detection is a function of the total deduction because the tax authority cannot differentiate among the legal and illegal claims $\hat{d}$ and e. However, the taxpayer can make that distinction, so the deduction is equal to the legal claim and evasion ($d = \hat{d}+e$), and $(y-\hat{d})$ can be written as $\bar{y}$. The corresponding first-order condition after some manipulation is:

$$p(d)(1+\theta) + \tfrac{\partial p(d)}{\partial d} e(1+\theta) = 1 \tag{2}$$

The left-hand side of Equation 2 represents the marginal cost for an extra falsely claimed dollar of deduction, and the right-hand side is the marginal benefit. Notice that the change in the probability of being audited depends on the reported deduction, legal and illegal claims, not only on evasion. The first order condition can be written as a function of the elasticity of detection probability with respect to the reported deduction $\eta_{p,d} = \frac{\partial p(d)}{\partial d}\frac{d}{p(d)}$.

$$\left[1 + \eta_{p,d} - \tfrac{\hat{d}}{p(d)}\tfrac{\partial p(d)}{\partial d}\right](1+\theta)p(d) = 1 \tag{2a}$$

Notice that if the probability of detection is exogenous the change of the probability with respect to the reported deduction would be zero ($\frac{\partial p(d)}{\partial d} = 0$), so both the elasticity and $\frac{\hat{d}}{p(d)}\frac{\partial p(d)}{\partial d}$ would be zero. The marginal benefit of evading an extra dollar would be equal to the expected penalty $p(1+\theta)$. Since the probability is endogenous to the reported deduction, the expected penalty has two extra components. The first one is the elasticity of detection with respect to the reported deduction $\eta_{p,d}$ that captures how the probability of detection

changes as the reported deduction changes. The second one captures the trade-off that the taxpayer faces between the legal claims she can make and evasion ($-\frac{\hat{d}}{p(d)}\frac{\partial p(d)}{\partial d}$), because the probability of detection is a function of the total reported deduction. Therefore, for a given level of total deduction, a taxpayer with a larger legal claim will choose a lower evasion level.

I propose a particular structure for the probability of detection. The taxpayer believes that there is a level of deduction (i.e., auditing threshold) that will invite attention from the tax authority, so the probability of detection has an S-shape around this threshold. In particular, if the declared deduction is lower (higher) than this threshold, the probability will be low (high). Each taxpayer holds a belief about where this auditing threshold is, and the implementation of the itemizing rule affects that belief. In the most extreme case, taxpayers think that the auditing threshold coincides with the itemizing threshold. Some taxpayers will increase their deductions after the itemizing rule is introduced. In particular, those taxpayers who update their belief upwards about the auditing threshold will report a higher deduction after the introduction of the itemizing requirement.

3.3 Model with Evasion and Hassle Cost

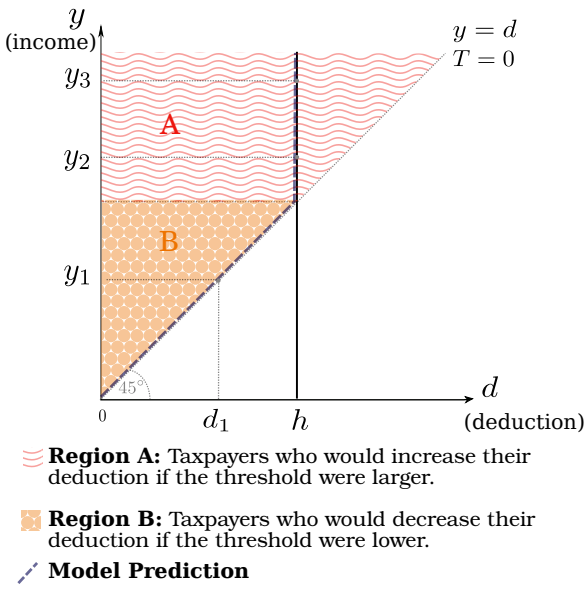
Finally, I combine the effects of both the hassle cost and the information mechanism into a single model. To illustrate the combined effect on the reported deductions, I make some simplifying assumptions. First, I consider a step function for the probability. The taxpayer believes that if her deduction is lower than the itemizing threshold, the probability is zero; and if it is larger or equal to the threshold, the probability will be one, as in Equation 3. Second, I assume that if the tax authority verifies the deduction, it will detect evasion. The notation is the same, y is income, d is the reported deduction, $\hat{d}$ is the legal claim, e is evasion, t is the tax rate and the penalty if a fine of $\theta > 1$ times the evaded tax.

$$p(d,h) = \begin{cases} 0 & if \quad d = \hat{d} + e \leq h \\ 1 & if \quad d = \hat{d} + e > h \end{cases} \tag{3}$$

In this simplified scenario, when the taxpayer reports her deduction, she implicitly

chooses the realization of the world where the tax authority will verify her deduction or not. Her objective remains to maximize her after-tax income. If she chooses a deduction lower than or equal to the itemizing threshold, the tax authority will not verify her deductions so that the payoff will be equal to her income less the tax. The tax is calculated over the reported income less the reported deduction $U = y - (y - d)t$. If her income is lower than the threshold, she will take a deduction equal to her income ($d = y$), so her tax liability will be zero ($T = 0$). If she chooses a deduction larger than the itemizing threshold, the tax authority will detect evasion with certainty, so she will not evade ($e = 0$) because of the penalty ($et\theta$), her declared deduction will be equal to the legal claim $d = \hat{d}$. It is easier to analyze this case in the space for income and deductions, as shown in Figure 3. Consider the area above the 45° line (Regions A and B). In these regions, the income is larger than the deduction $y > d$, so the threshold h for the change in probability affects the taxpayer's choice. When the income is larger than the threshold $y \geq h$, the taxpayer chooses the deduction equal to the threshold $d = h$ (Region A), for example incomes y_2 and y_3 in Figure 3. When the income is lower than the threshold $y < h$, the taxpayer chooses to eliminate any tax owed by making the deduction equal to her income $d = y$ (Region B), for example income y_1 in Figure 3. (See Appendix A.1.3 for an exhaustive description of the solution of the model.)

Figure 3: Space of Income and Deduction



The introduction of the itemizing rule affects the model in two ways. First, taxpayers know that the tax authority uses the itemized information to verify their deductions. In the most extreme case, all taxpayers would update their beliefs about the auditing threshold, so that h in the model would now coincide with the threshold of the itemizing rule. Second, taking a deduction larger than the itemizing threshold has a filing cost c.[3] When taking the deduction has a cost c, there are two rationales for adjusting the deductions: the possibility of the government detecting false claims, and the hassle cost of filling out the itemizing form. The false claim (e) depends on the relationship among the income (y), the legal claim of deduction the individual can make ($\hat{d}$), the threshold for itemized deductions (h^*), and the original auditing threshold the taxpayer had in mind before the reform (h). Now that the auditing threshold coincides with the itemizing threshold, the probability function becomes:

$$p(d,h) = \begin{cases} 0 & if \quad d = \hat{d} + e \leq h^* \\ 1 & if \quad d = \hat{d} + e > h^* \end{cases} \tag{4}$$

As before, the taxpayer chooses a scenario where the tax authority will verify her deductions, or a scenario where it will not, by choosing a deduction lower or larger than h^*. Her objective remains to maximize her after-tax income. If she chooses a deduction lower than or equal to the threshold h^*, the tax authority will not verify her deductions, and her payoff will be equal to her income, less the tax calculated over the income without the reported deduction–$U = y - (y - d)t$. If she chooses a deduction larger than the threshold, the tax authority will detect evasion with certainty, so she will declare only her legal claims as deduction–$e = 0$, $d = \hat{d}$–, and then she will have to itemize her deductions. So her payoff will be her income, less the tax calculated over the difference between her income and her legal claims, less the hassle cost of itemizing, $U = y - (y - \hat{d})t - c$. As before we can analyze the possible movements for the taxpayer in the space of income and deductions. Consider the case where the new threshold is larger than the original belief of the taxpayer ($h^* > h$): this taxpayer will initially make a deduction equal to h to avoid scrutiny from the

[3]There is a record keeping cost which does not change, and is normalized to zero.

tax authority, and once she realizes the threshold is larger than she originally thought, she will increase her deduction based on the new threshold h^*. In contrast, a taxpayer whose original belief was that the threshold was lower than h^* will decrease her deduction to the new threshold.

Finally, there is a group of taxpayers who could legally make a deduction larger than h^*, but face the cost c of itemizing their deductions. These taxpayers will itemize their deductions as long as their savings from reporting their legal claim is larger than the cost of itemizing the deduction–$c < (\hat{d} - h^*)t$. (See Appendix A.1.4 for an exhaustive description of the solution of the model.)

The introduction of the itemizing rule has an undetermined effect on the distribution of deductions. Some taxpayers will increase their deductions because they have updated their beliefs about the monitoring preferences of the tax authority upwards. These taxpayers increase their deductions in order to make their taxes zero as long as this deduction is lower than the itemizing threshold; otherwise, they would make a deduction equal to the threshold. As a result, an excess mass around the threshold appears. Second, the taxpayers who update their beliefs downwards will decrease their deduction for one of two reasons: either because they were making a false claim before and have updated their beliefs about the auditing threshold downwards (thus resulting in a decrease of evasion), or because the savings from making the extra deduction are lower than the cost of itemizing it (as illustrated in Figure 6.). The taxpayers who decrease their deductions could do so either to the level of deductions they can legally claim (for those paying the hassle cost), or to the auditing threshold. Due to the filing cost, an excess mass will also appear at the threshold from the taxpayers who are in the dominated region created by the filing cost.

Figure 4: Increase in Deduction from Taxpayers Initially Under the Itemizing Threshold

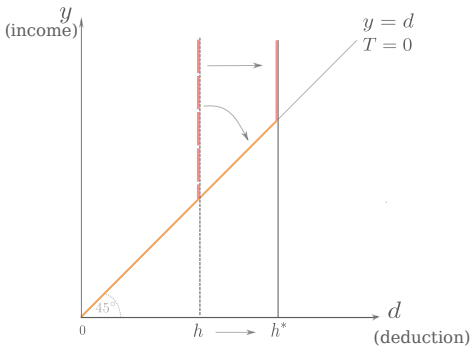


Figure 5: Decrease in Deduction from Taxpayers Initially Over the Itemizing Threshold

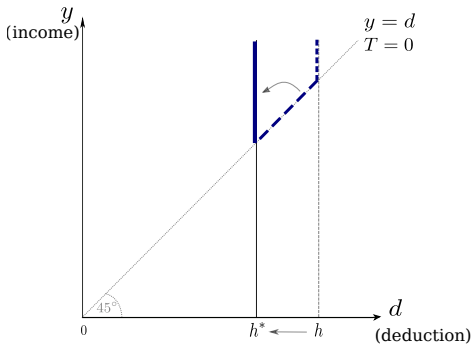
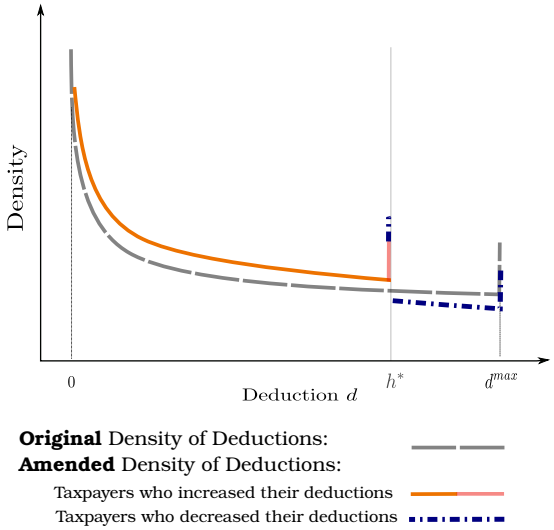


Figure 6: Change in the Distribution of the Deduction



4 Background and Policy Intervention

My empirical setting is a change in the reporting rule for deductions of personal expenses for the income tax in Ecuador in 2008. Ecuador has a progressive income tax with nine tax brackets and marginal tax rates from 0% to 30%. For the fiscal year 2008, everyone who had income less than $7,850[4] was in the first tax bracket and paid zero tax. The taxable income

[4]Ecuador has used the United States dollar as currency since 2000.

for employees is wage less the payroll tax (a flat rate of 9%) and less deductions. All taxpayers are entitled to a deduction for consumption in the categories of education, clothing, health care, housing, and food.[5] Before the reform, the deduction based on consumption was up to $10,205 for 2008, and there was no filing requirement, only the record-keeping cost of saving the invoices of the purchases in case of a future audit.

The tax year runs from January 1st to December 31st of each calendar year. Employers must withhold taxes from their employees as well as fill out a tax return in their name in February of the following year. People who worked for only one employer and whose withholdings cover their taxes do not have to fill out an extra tax return unless they are asking for a refund (refunds are not automatic, and the tax authority explicitly states that they will scrutinize requests for refunds closely). Everyone who does not fall into the previous category (i.e., those who have several sources of income, worked for more than one employer, or are asking for a refund) must fill out a tax return in March of the following year. Taxpayers can amend their tax returns as many times as needed.

In June 2009, the tax administration started requiring that all taxpayers who had made a deduction larger than $7,500 fill out an extra tax form for all years in the future and retroactively for 2008. This additional tax form required taxpayers to itemize their consumption for the total of their deduction (Figure A5 describes the timeline of the reform). In practical terms, taxpayers who made a deduction larger than $7,500 have to cover two costs: the same record-keeping cost as all taxpayers who take a deduction, and a hassle cost. The only change implemented by the reform was the creation of the itemizing form.

5 Data and Empirical Strategy

I use a rich set of administrative data for the income tax return for the fiscal year 2008 in Ecuador. I take advantage of the fact that the tax returns are timestamped and compare the tax return filed before June 1st (the day when the reform was made public) and the

[5] Seniors and disabled people are allowed additional flat deductions, which I subtract along with the payroll tax

amended tax return filed after June 1st[6]. Taxpayers made all economic choices of consumption and labor supply during 2008. All taxpayers are required to submit their tax returns by the end of March 2009. This tax return reflects the decisions regarding how much income and deductions to report under the institutional setting before the reform (when there was no itemizing requirement, only the record-keeping cost). The reform introduces a hassle cost for taxpayers with a deduction larger than $7,500, who under the new rules have to itemize all their deductions. Taxpayers learned about the new institutional setting and could amend their income tax returns. I estimate the effect of the reform by comparing the original income tax return reported before June 1st and the amended tax return reported after June 1st. The identifying assumption is that the taxpayers would not have amended their deduction in the absence of the reform (this is the same identification strategy used by Carrillo, Pomeranz, and Singhal (2017)).To be more precise, the exposure to the itemizing requirement can be described as a binary random variable $R = 1, 0$. The outcome of interest is the reported deduction d. If the taxpayer i is not exposed to the itemizing requirement, her reported deduction is d_{0i}. If she is exposed to the itemizing requirement, her reported deduction is d_{1i}. The retroactive nature of the reform and availability of the original and amended tax returns for the same taxpayers allows me to observe the same individual in both scenarios: when not exposed to the itemizing requirement and when exposed. If the taxpayers would not have amended their deductions in the absence of the reform, the original tax reform is the perfect counterfactual for not being exposed to the reform.

I compare the amendment rate by week for the fiscal year 2008 with the fiscal year 2007 to illustrate how the reforms affected amending behavior. Figure 7 shows the amendment rate by week for the fiscal year 2007 reported in 2008 (the period not affected by the reform) and the fiscal year 2008 reported in 2009 (affected by the reform). This graph compares the amending rate for the fiscal years 2007 and 2008 in the following calendar year once the filing period is over. Notice that the amendment rate has a similar pattern before the first week of June, but the amendment rate for 2008 increases after and in particular during the filing period of the itemizing tax form. Additionally, I compare the number of amended tax

[6]Only 1.29% of all taxpayers had more than two tax returns after the reform. In those cases, I use the last tax reform filed by the taxpayer before the reform, and the first tax return filed after the reform.

returns for the fiscal years 2007 and 2008 during the same period in 2009. If there had been any change that affected several fiscal years previously reported, the number of amended tax returns for 2007 would have shown an increase, but that is not the case as shown in Figure 8.

I focus my analysis on employees because their employers report their income and payroll tax deduction, so the deduction for personal expenses is the only adjustable margin in their tax returns. In practical terms, I exclude everyone who has some part or all of her income from self-employed work. Hence, I analyze the behavior of 61,239 employees that filled out an income tax return before (original tax return) and after (amended tax return) the reform. They are equivalent to 3.6% of total employees, or 16.51% of employees who have income larger than $7,850 and thus pay nonzero tax[7].

The taxpayers who amended their tax returns have a higher income than those who did not amend. This difference is reasonable because taxpayers with higher reported tax liability have incentives to amend their tax returns. Employees with wages lower than $7,850 pay zero tax, and 69% of the employees who amended their return made more than $7,850, while only 19% of the employees who did not amend earned more than that amount. The average annual wage of the employees who amended is $14,434 versus $5,035 for the employees who did not. The average deduction for personal expenses for the employees who did not amend is $424. The employees who amended their tax returns made a deduction on their original tax form of $2,037 on average. Descriptive statistics of both groups are presented in Table 1.

The itemizing rule affects the distribution of deductions through two mechanisms: conveying information about the tax authority's audit procedures and creating hassle cost. The taxpayers who initially made a deduction lower than $7,500 are affected only by the information mechanism, because the itemizing rule is not binding for them and the record-keeping cost has not changed. These taxpayers will increase their deductions because they have updated their beliefs about the monitoring preferences of the tax authority upwards. Com-

[7] In 2008, 1,843,425 people filed an income tax return; of those, 93.01% were employees and their income is third-party reported. 90,662 taxpayers changed their income tax return after the reform; of those, 67.55% were employees.

paring the deduction made in the original return with the deduction made in the amended tax return produces an estimate of the effect of the information mechanism on this group.

The taxpayers who initially made a deduction higher than $7,500 are affected by both the information mechanism and the hassle cost. These taxpayers will decrease their deductions because they have updated their beliefs downwards, or because the tax savings from reporting their total deductions are not large enough to compensate for the hassle cost they need to cover. Comparing the deductions in the original and the amended tax returns illustrates the effect of the two mechanisms.

In particular, I estimate the following equation:

$$Y_{it} = \beta_0 + \beta_1 Amendment_t + \gamma_i + \mu_{it} \tag{5}$$

where Y is my variable of interest, that is: deductions for personal expenses, or reported tax liability; $Amendment_t$ is a binary variable that is equal to one for the amended tax return and zero for the original tax return; γ_i are the individual fixed effects; and μ_{it} is the error term. I do the same exercise twice. I use the employees who had a deduction lower than or equal to the itemizing threshold of $7,500 on the original tax return to estimate the effect of the information mechanism, and the employees who had a deduction higher than the itemizing threshold to estimate the effect of the information and the hassle cost.

6 Results

This section is organized as follows: first, I demonstrate that the information mechanism was in play by analyzing the behavior of the individuals with original deductions lower or equal to $7,500. The cost of taking the deduction has not changed for these taxpayers, so in the absence of the information mechanism, they should not have changed their deduction. Second, I present the response of the individuals with original deductions higher than $7,500, whose response is a combination of two mechanisms: information and hassle cost. Finally, I

identify the relative importance of the two mechanisms by using a bunching estimator and taking the original distribution of deduction as a counterfactual.

6.1 Evidence of Increase in Deductions Due to the Information Mechanism

The taxpayers who made a deduction lower than or equal to $7,500 before the reform are only affected by the information mechanism because the cost of taking the deduction has not changed for them. If these taxpayers think that the monitoring probability depends on the amount of deduction they take, and before the reform they thought the threshold was lower than $7,500, they will increase their reported deductions but stay under the itemizing threshold. I estimate the effect of the information mechanism on deductions, and reported tax liability, using Equation 5 (see Table 2). The average increase in reported deductions was $1,543, resulting in an average decrease[8] of reported tax liability of $160. These changes are large for the Ecuadorian context: to give a sense of scale, the average original deduction was $882 and the average reported tax liability was $712.

Not all taxpayers who increase their deductions take a deduction at the itemizing threshold. In general, taxpayers have an incentive to report higher deductions until they reach a taxable income of $7,850 because the marginal tax rate becomes zero at that level. If the employees made the deduction to minimize their reported tax liability but stay under the itemizing threshold, the deduction should be equal to the taxable income before deduction, or $7,500, whichever is lower. I calculate the taxable income before the deduction: wage less the payroll tax, the deduction for disability and old age, and the tax-free income of $7,850. If the taxpayers had increased their deductions to minimize their tax liability, they should have made a deduction equal to that taxable income before the deduction. In practical terms, the introduction of the itemizing threshold affected the beliefs about monitoring of

[8] There is a small number of taxpayers (3,947) who made a deduction lower than $7,500 before the reform and larger than $7,500 after. One possible explanation for this group is that they had originally had an incomplete understanding of the deduction, and became aware of it following the announcement of the policy change. The creation of the itemizing form was well-publicized, as can be seen in the Google trends of that year (Figure A7). More than half of these remaining taxpayers had an original deduction equal to zero, supporting this interpretation.

the taxpayers, who updated their perceived probability of being audited downwards. As a result, taxpayers should adjust their deduction more aggressively to pay zero tax on their amended tax return as compared with their original tax return (but no more than that, since a refund request generates increased scrutiny, or at least so the Ecuadorian tax authority claims in the refund request form). Figure 10 shows a scatter plot of the claim deduction and the reported tax liability before the deduction. There is a clear cluster of employees around the 45° line where the amended deduction is equal to the taxable income before the deduction. This pattern is not discernable with the original deduction in Figure 9. On the original tax return, 37% of taxpayers made a deduction within $250 of the taxable income before the deduction or $7,500, while on the amended tax return that percentage increase to 56%. On the original tax return, only 8% of taxpayers claim a deduction larger than their taxable income before the deduction, while 20% do so in the amended tax return. I analyze this behavior in two parts. For the taxpayers whose taxable income before the deduction is lower than $7,500, I estimate how predictive the taxable income before the deduction is for the claimed deduction in the original tax return and in the amended tax return. Also, I estimate the probability of claiming a deduction close to the $7,500 to capture the behaviour of taxpayers with taxable income before deductions larger than $7,500.

Formally, I estimate the following for the taxpayers who originally made a deduction lower than or equal to $7,500 and have a taxable income before the deduction lower than $7,500:

$$d^{original} = \beta_0 + \beta_1 TI + X\beta + \mu \tag{6}$$

$$d^{amended} = \beta_0 + \beta_1 TI + X\beta + \mu \tag{7}$$

where d is the reported (original or amended) deduction, TI is the taxable income before the deduction, and X is a vector of demographic characteristics. A coefficient of β_1 equal to one would mean that the taxpayer has made the exact deduction that would make her reported tax liability zero. Conditional on making a deduction lower than or equal to $7,500 on the original tax return and having a taxable income lower than $7,500, for each dollar

of taxable income before the deduction the employees on average made a deduction of 23 cents on the original tax return and 68 cents on the amended tax return (See Table 4). Among the civil servants, women made lower deductions on average, while married and older people made higher ones.

The employees whose taxable income before the deduction is higher than or equal to $7,500 are not able to minimize their reported tax liability by taking a deduction without itemizing their consumption. Therefore, these taxpayers have incentives to make a deduction right around the itemizing threshold. I estimate the probability of making a deduction in an interval around the itemizing threshold ($P(d \in (h^* - \delta, h^*] \,|\, \boldsymbol{Amendment} = 1)$). The probability that an employee would make a deduction around the itemizing threshold on the original tax return is less than 1% and in the amended tax return is around 5% (see Table 3).

The introduction of the itemizing threshold effectively decreases the uncertainty over the auditing threshold. Therefore, a larger share of taxpayers minimize their reported tax liability using the deduction, as can be illustrated by a scatter plot of taxable income before the deduction and the amended deduction.

6.2 Evidence of a Decrease in Deductions Due to the Information and Hassle Cost Mechanisms

The taxpayers who made a deduction higher than $7,500 before the reform and changed their deduction after the reform are affected by two mechanisms. On the one hand, there is a group of taxpayers who think that the monitoring probability depends on the amount of deduction they take, and before the reform, they thought the threshold was higher than $7,500. These taxpayers will decrease their deduction. On the other hand, the taxpayers with legitimate expenses would face a hassle cost if they decided to keep their original deduction. I estimate the effect of both mechanisms (information and hassle cost) on deductions using Equation 5 (Table 5). The average decrease in reported deductions was $2,497. The taxpayers who made a deduction larger than the itemizing threshold in the original tax form can be divided into two groups. Some employees (48%) amended their deduction

to an amount lower than or equal to the itemizing threshold, and the rest (52%) amended their deduction by a small amount, staying over the itemizing threshold.

Of the taxpayers who decreased their deduction, some declare a value close to $7,500, but they also declare smaller amounts, as shown in Figure 11. This heterogeneous response illustrates the presence of the hassle cost and information mechanisms. The taxpayers who had documentable expenses but decreased their deductions solely because of the filing cost have the information to report the itemizing deduction, so even if the tax authority found the decrease in the deduction suspicious and audited these taxpayers, they would have all the required receipts. Therefore, there is no reason to make a deduction far from the threshold. In contrast, the taxpayers who decreased their deduction because of the information mechanism could be concerned about the reaction of the tax authority and make a deduction lower than the threshold. If the only mechanism in play were the hassle cost, no taxpayer should make a deduction far from the threshold. The taxpayers who made an original deduction over the itemizing threshold and an amended deduction under it decreased their reported deduction on average by $5,098 (See Table 6).

The group of taxpayers who made a deduction over the itemizing threshold on both tax returns (i.e., original and amended) made smaller adjustments: on average, they decreased their deduction by $87, which is equivalent to a change of 1% (See Table A4). These taxpayers had probably made a rough estimate of their deduction the first time they filed their income tax, which was corrected once they had to go over all the receipts for filling out the itemizing form.

6.3 Relative Importance of Information and Hassle Cost

In June 2009, the tax administration started requiring that all taxpayers who had made a deduction larger than $7,500 itemize their consumption. There was no other contemporary reform that affected the deductions. Before the reform the $7,500 threshold was not meaningful in any way: there was no reason to believe that making a deduction just below $7,500 was different from making a deduction just above that value (see Figures A8 and

A9). The filing requirement created a notch in the monitoring. Ideally, the distribution of the deductions before the reform should be compared with a placebo distribution that had not been exposed to the reform. The retroactive nature of the reform for the fiscal year 2008 creates this placebo distribution. I compare the original income tax return for the fiscal year 2008 with the amended tax return, filed after the reform, for the same fiscal year. As shown in the previous section, two mechanisms drive the behavioral response of the employees. First, the employees who initially made a deduction lower than $7,500 increased their deduction due to the information mechanism. As a result, an excess mass around the threshold appears. This excess mass represents employees who would have made a larger deduction if the threshold had been higher (as illustrated in Figure 6). Second, the employees who initially made a deduction larger than $7,500 decrease their deduction because they were making a false claim before (information mechanism), or because the savings from making the extra deduction are lower than the hassle cost (as illustrated in Figure 6.)

Both movements, employees' increasing or decreasing their deductions after the reform, create an excess mass of employees just below the threshold for itemizing the deduction. I use a bunching estimator and the original declaration as a counterfactual distribution to ascertain the relative importance of each group. First, I estimate the excess mass from the employees who increase their deductions on the amended tax return. Then I repeat the exercise with the employees who decreased their deduction.

I combine the empirical distribution of the original deductions and the amended deductions by using the information from the amended tax returns for the employees who initially made a deduction lower than or equal to $7,500 and the information from the original tax form for the remaining employees. Then I closely follow a standard bunching estimation as in Chetty et al. (2011). I start by subtracting $7,500 from the reported deduction and create the bins from the distribution to center the bunching at zero. For instance, for bins with a width of $125, the bin -125 has the count of employees who reported a deduction larger than $7,375 and lower than or equal to $7,500 on their amended tax form, and the

bin +125 has the count of employees who reported a deduction larger than $7,500 and lower than or equal to $7,625 on their original tax form. I use the binned data to fit a polynomial, excluding the data near the kink to construct a counterfactual distribution. I compare that result with the polynomial created including the excluded area, and I iterate the process as described below.

I estimate Equation 8 and compare it with the estimation of Equation 9.

$$C_j = \sum_{i=0}^{q} \beta_i^0 (D_j)^i + \varepsilon_j^0 \tag{8}$$

$$C_j = \sum_{i=0}^{q} \beta_i^0 (D_j)^i + \sum_{i=-R}^{R} \gamma_i^0 \cdot 1[D_j = i] + \varepsilon_j^0 \tag{9}$$

where C_j is the number of employees in the deduction bin j, D_j is the deduction relative to the threshold of $7,500 in US dollars, q is the order of the polynomial, and R is the width of the excluded region in US dollars. The excess number of employees (B_N) is the difference between Equation 9 and Equation 8 with some caveats. The initial estimation for the counterfactual distribution is $\hat{C}_j^0 = \sum_{i=0}^{q} \hat{\beta}_i^0 (D_j)^i$, and the initial excess number of employees is the difference between the count on the bin and the contrafactual count ($B_N^0 = C_j - \hat{C}_j^0 = \sum_{i=-R}^{R} \gamma_i^0$). This initial estimate does not account for the fact that the excess of employees under the threshold would otherwise be located over the threshold, so the counterfactual distribution is moved to the right until the number of employees within R of the threshold is the same (integration constraint). The counterfactual distribution ($\hat{C}_j = \sum_{i=0}^{q} \hat{\beta}_i (D_j)^i$) is the fitted value of the following estimation:

$$C_j \cdot \left(1 + 1[j > R] \frac{\hat{B_N}}{\sum_{j=R+1}^{\infty} C_j} \right) = \sum_{i=0}^{q} \beta_i (D_j)^i + \sum_{i=-R}^{R} \gamma_i \cdot 1[D_j = i] + \varepsilon_j \tag{10}$$

where $\hat{B}_N = C_J - \hat{C}_j = \sum_{i=-R}^{R} \gamma_i$. In Equation 10 the dependent variable depends on the estimation of the estimates on the right-hand side, so Equation 10 is estimated by plug-

ging the estimate of $\hat{B}_N$ of the previous estimation[9] until a fixed point is reached. Finally, and following the bunching literature, I define the excess mass around the kink relative to the average density of the counterfactual distribution of deductions between $-R$ and $+R$ as:

$$\hat{b} = \frac{\hat{B}_N}{\frac{\sum_{j=-R}^{R} \hat{C}_j}{2R+1}} \tag{11}$$

The standard errors for $\hat{b}$ are calculated using a bootstrapping procedure. In order to get a sense of scale concerning all the employees, not just those who amended their returns, I add the frequency of employees who did not amend to the bin and repeat the procedure. The excess number of employees who increased their deduction and were only affected by the information mechanism is around 1,710, which is equivalent to 5.4 times the average height of the counterfactual distribution for the employees who changed their tax return, or 1.7 times the total number of employees in that area. (See Figures 12 and 13 and Table 7)

The employees who initially made a deduction higher than $7,500 are affected by two mechanisms (information and hassle costs). Part of the excess mass of employees under the threshold corresponds to these employees. I follow the same procedure as before, but I use the information from the amended tax forms for the employees who initially made a deduction larger than $7,500 and the information from the original tax form for the rest. As before, I subtract $7,500 from the reported deduction and create the bins from the distribution. For instance, for a bin with a width of $125, the bin -125 has the count of employees who reported a deduction larger than $7,375 and lower than or equal to $7,500 in their original tax return, as well as the employees who initially had taken a deduction larger than $7,500 and later took a deduction within that range on the amended tax form. The bin $+125$ has the count of employees who reported a deduction larger than $7,500 and lower than or equal to $7,625 in their amended tax form. I also repeated the procedure adding the frequency of the employees who did not amend their tax return to the bins depending on their original deduction to have a sense of scale.

[9] Starting from $\hat{B}_N^0$ calculated with Equations 8 and 9.

The excess number of employees who decreased their deduction and were affected by the information mechanism and the hassle cost is around 459, which is equivalent to 2.3 times the average height of the counterfactual distribution for the employees who changed their tax return, or 0.7 times the total of employees in that area. (See Figures 14 and 15 and Table 8).

In the case of the creation of the itemizing rule for personal expenses in Ecuador, the information mechanism generated a substantial part of the behavioral response of employees who bunch at the threshold of the itemizing rule. Even if we assume that all the employees who decrease their deductions do so because of the hassle cost, the response from the employees who increase their deductions due to the information mechanism is several times larger.

The overall effect of requiring employees with deductions larger than $7,500 to itemize the deduction was an increase in the overall reported deduction. When comparing the reported tax liability from the original tax return and the amended tax return, the net effect was a loss of around $3.5 million dollars across the 61,239 employees who amended their return[10]. As shown in the previous subsections, the behavioral response has two components: the taxpayers who bunched around the itemizing threshold and the taxpayers who increase/decrease their deductions far from the threshold. The employees who initially made a deduction lower than $7,500 increase their reported deductions on average, while the employees who initially made a deduction higher than $7,500 decrease their reported deductions on average. The overall effect on reported tax liability is driven by the fact that far more employees increased their deductions than decreased their deduction.

[10]This is the difference between the reported tax liability on the original and amended tax returns. It is possible that an employee owed tax in the original tax return but amended it, and in the new tax return, the tax due is zero. Under the Ecuadorian Tax Code, the original debt disappears.

7 Conclusions

Thresholds in the requirements for itemizing deductions are an important instrument for tax authorities to reduce the rate and magnitude of reported deductions. However, there is a nontrivial opposing side effect: increased deductions by taxpayers below the threshold. Depending on the context, this effect could be sizable. The presence of the threshold implicitly reveals the tax authority's audit procedure, creating an opportunity for some taxpayers to increase their claimed deductions (up to the value of the itemizing threshold), either by including purchases that are of questionable legitimacy or outright fabrication.

I take advantage of a natural experiment in Ecuador, in which the itemizing rule was changed retroactively after all tax returns had been filed. Taxpayers were allowed to amend their returns. I estimate the effect of the reform by comparing the original income tax return reported before the reform and the amended tax return reported afterward for the same individuals for the same year. Hence, I observed the same individuals both not exposed and exposed to the reform. The original tax reform is the perfect counterfactual for not being exposed to the reform. While many taxpayers did reduce their deductions (as generally expected), I find that the majority of taxpayers amended their returns to report an increased deduction, on average more than doubling their deductions. The overall effect was a decrease in reported tax liability.

Imposing a non-monetary cost to access a larger tax benefit can be a useful tool to focus the benefit. However, taxpayers adjust their behavior to the structure of the tax system. Countries with weak enforcement capacity should be aware that changes in the monitoring around a threshold can be interpreted as a decrease in the monitoring under the threshold.

References

[1] Alatas, Vivi, Purnamasari, Ririn, Wai-Poi, Matthew, Banerjee, Abhijit, Olken, Benjamin A., and Hanna, Rema. "Self-Targeting: Evidence from a Field Experiment in Indonesia". In: *Journal of Political Economy* 124.2 (Apr. 2016), pp. 371–427.

[2] Allingham, Michael G. and Sandmo, Agnar. "Income tax evasion: a theoretical analysis". In: *Journal of Public Economics* 1.34 (Nov. 1972), pp. 323–338.

[3] Benzarti, Youssef. *How Taxing Is Tax Filing? Using Revealed Preferences to Estimate Compliance Costs.* Working Paper 23903. National Bureau of Economic Research, Oct. 2017.

[4] Carrillo, Paul, Pomeranz, Dina, and Singhal, Monica. "Dodging the Taxman: Firm Misreporting and Limits to Tax Enforcement". In: *American Economic Journal: Applied Economics* 9.2 (Apr. 2017), pp. 144–164.

[5] Chetty, Raj, Friedman, John N., Olsen, Tore, and Pistaferri, Luigi. "Adjustment Costs, Firm Responses, and Micro vs. Macro Labor Supply Elasticities: Evidence from Danish Tax Records". In: *The Quarterly Journal of Economics* 126.2 (May 2011), pp. 749–804.

[6] Doerrenberg, P., Peichl, A., and Siegloch, S. "The elasticity of taxable income in the presence of deduction possibilities". In: *Journal of Public Economics* 151 (2017), pp. 41–55.

[7] Dupas, Pascaline, Hoffmann, Vivian, Kremer, Michael, and Zwane, Alix Peterson. "Targeting health subsidies through a nonprice mechanism: A randomized controlled trial in Kenya". en. In: *Science* 353.6302 (Aug. 2016), pp. 889–895.

[8] Fack, G. and Landais, C. "The effect of tax enforcement on tax elasticities: Evidence from charitable contributions in France". In: *Journal of Public Economics* 133 (2016), pp. 23–40.

[9] Gillitzer, Christian and Skov, Peer Ebbesen. "The use of third-party information reporting for tax deductions: evidence and implications from charitable deductions in Denmark". en. In: *Oxford Economic Papers* 70.3 (July 2018), pp. 892–916.

[10] Hamilton, Steven. *Optimal deductibility: Theory, and evidence from a bunching decomposition*. Working Paper. Oct. 2017.

[11] Kleven, Henrik J. and Waseem, Mazhar. "Using Notches to Uncover Optimization Frictions and Structural Elasticities: Theory and Evidence from Pakistan". In: *The Quarterly Journal of Economics* 128.2 (May 2013), pp. 669–723.

[12] Kleven, Henrik Jacobsen and Kopczuk, Wojciech. "Transfer Program Complexity and the Take-Up of Social Benefits". en. In: *American Economic Journal: Economic Policy* 3.1 (Feb. 2011), pp. 54–90.

[13] Kleven, Henrik Jacobsen, Knudsen, Martin B., Kreiner, Claus Thustrup, Pedersen, Soren, and Saez, Emmanuel. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark". In: *Econometrica* 79.3 (May 2011), pp. 651–692.

[14] Nichols, Albert L. and Zeckhauser, Richard J. "Targeting Transfers through Restrictions on Recipients". In: *American Economic Review* 72.2 (May 1982), pp. 372–377.

[15] Serocki, James S. and Murphy, Kevin J. "The Effect of the U.S. Federal Income Tax Appraisal Requirement on Noncash Charitable Contributions for Individuals". In: *Journal of Economics and Finance* 39.1 (Jan. 2015), pp. 171–188.

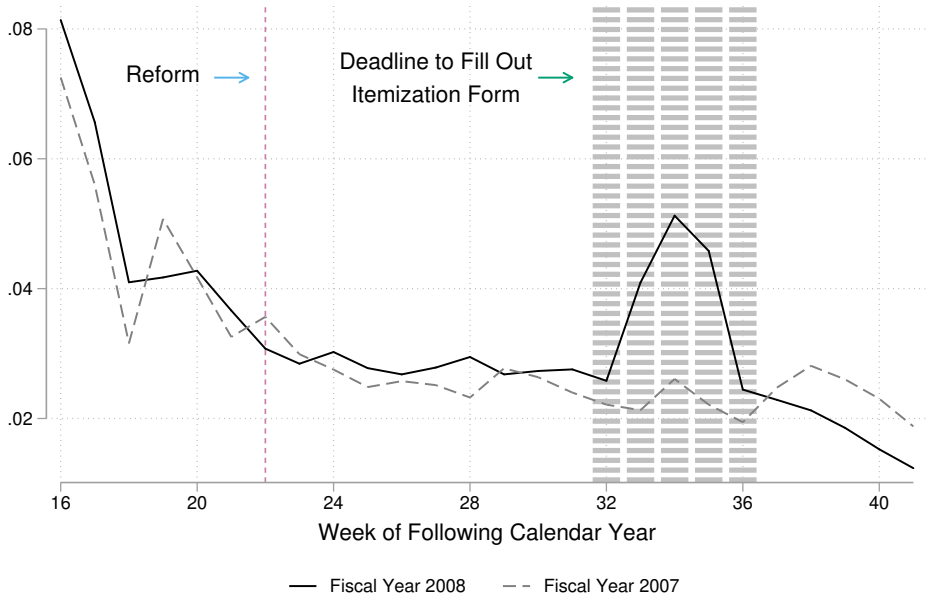
[16] Slemrod, Joel B. *Tax Compliance and Enforcement: New Research and Its Policy Implications*. SSRN Scholarly Paper ID 2726077. Rochester, NY: Social Science Research Network, Jan. 2016.

[17] Tazhitdinova, Alisa. "Reducing evasion through self-reporting: Evidence from charitable contributions". In: *Journal of Public Economics* 165 (Sept. 1, 2018), pp. 31–47.

[18] Wenzel, Michael and Taylor, Natalie. "An Experimental Evaluation of Tax-Reporting Schedules: A Case of Evidence-Based Tax Administration". In: *Journal of Public Economics* 88.12 (Dec. 2004), pp. 2785–2799.

8 Figures

Figure 7: Income Tax Amendment Rate for Fiscal Year 2008 vs 2007 in the Following Year



Amended forms filed each week / Total of amendment forms filed after tax season

Figure 8: Number of Amended Tax Returns for Fiscal Year 2008 vs 2007 During 2009

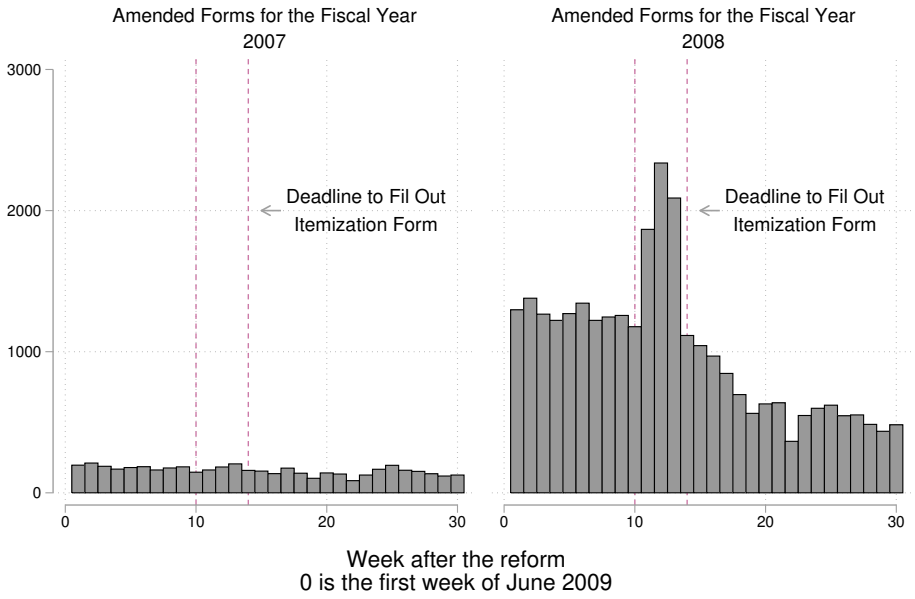


Figure 9: Scatter plot of Deductions from the Original Tax Return
(Includes Employees with $d^{original} \leq 7,500$)

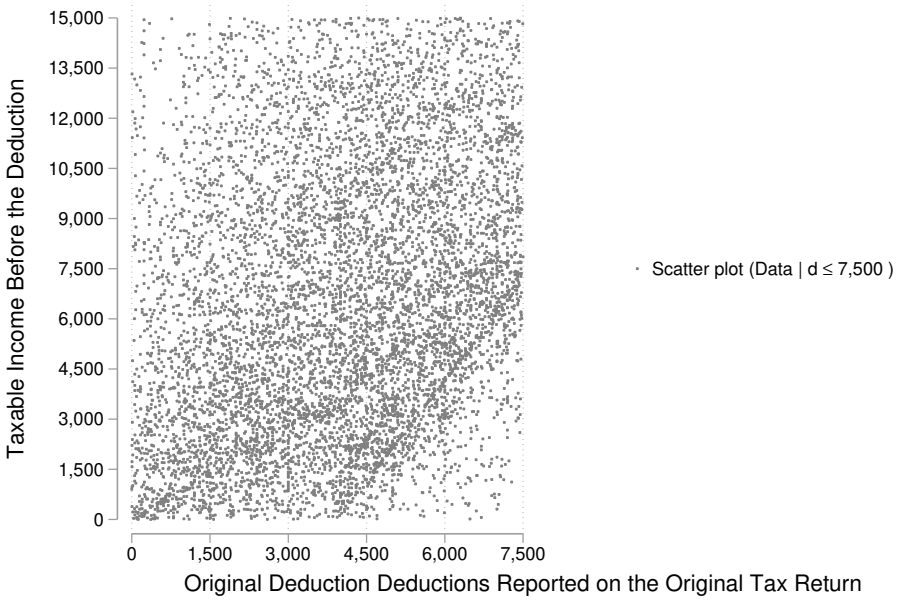


Figure 10: Scatter Pplot of Deductions from the Amended Tax Return
(Includes Employees with original deductions lower than or equal to $\$d^{original} \leq 7,500$)

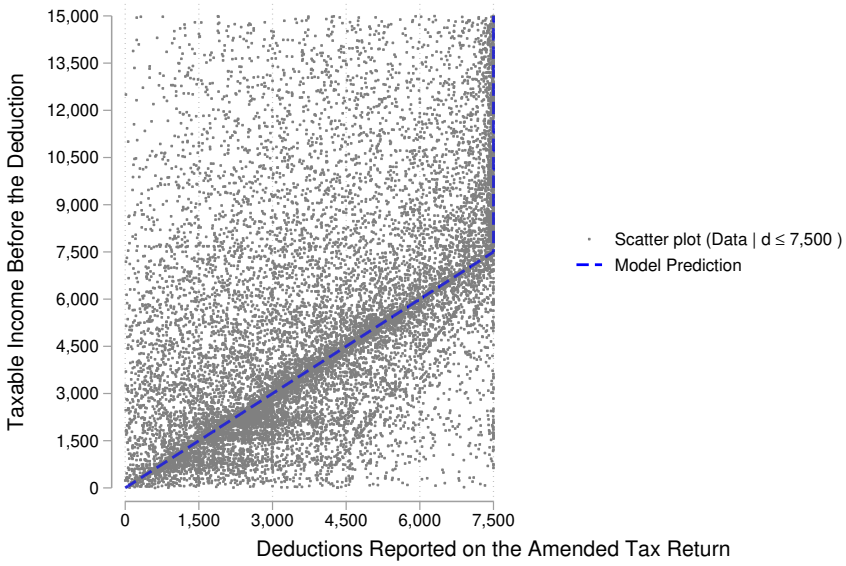
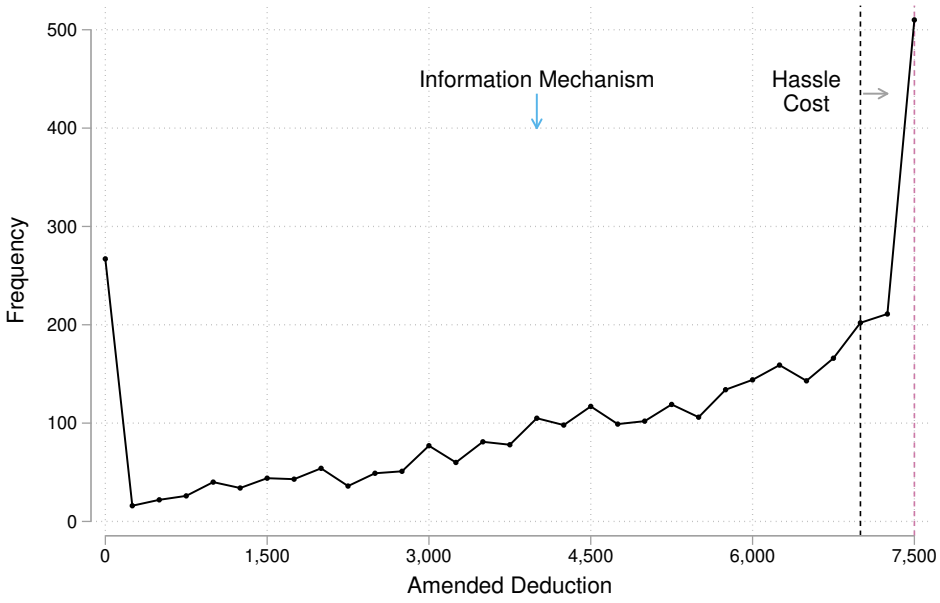
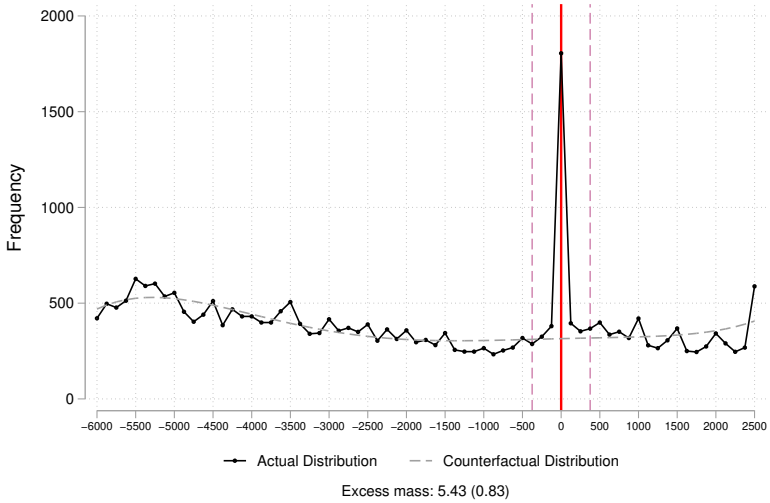


Figure 11: Frequency of Deductions Reported on the Amended Tax Return (Includes Employees with $d^{original} > 7,500$ and $d^{amended} \leq 7,500$)



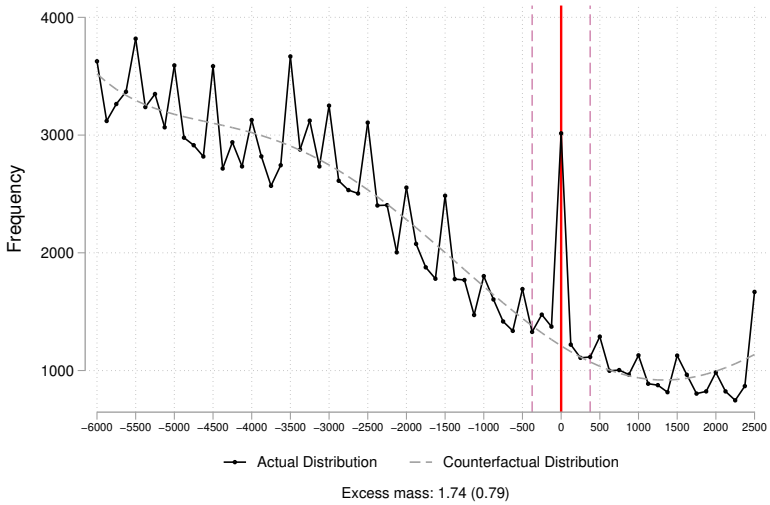
Six hundred nine observations were dropped before constructing the bins because they correspond to taxpayers with no deduction or taxable income.

Figure 12: Bunching Estimator for the Employees Affected Only by the Information Mechanism (Only Employees who Amended their Tax Return)



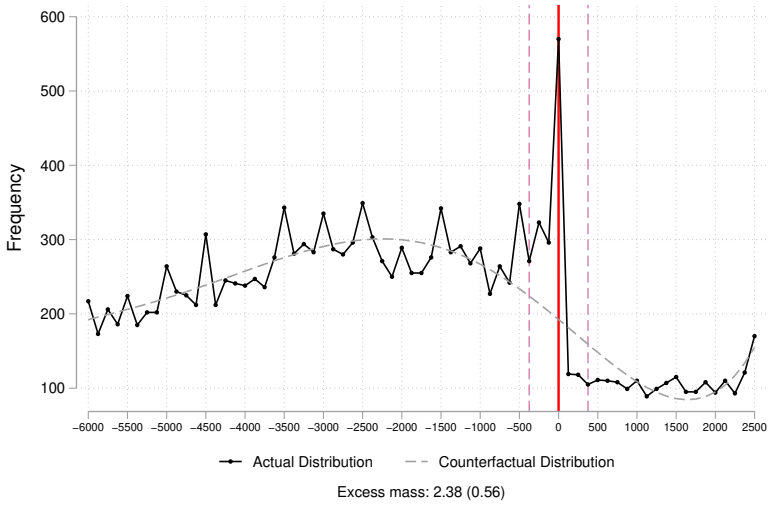
The binned data includes the amended deductions of the employees who initially made a deduction lower than or equal to $7,500 and the information from the original tax form for the rest of the taxpayers.

Figure 13: Bunching Estimator for the Employees Affected Only by the Information Mechanism (Includes All Employees)



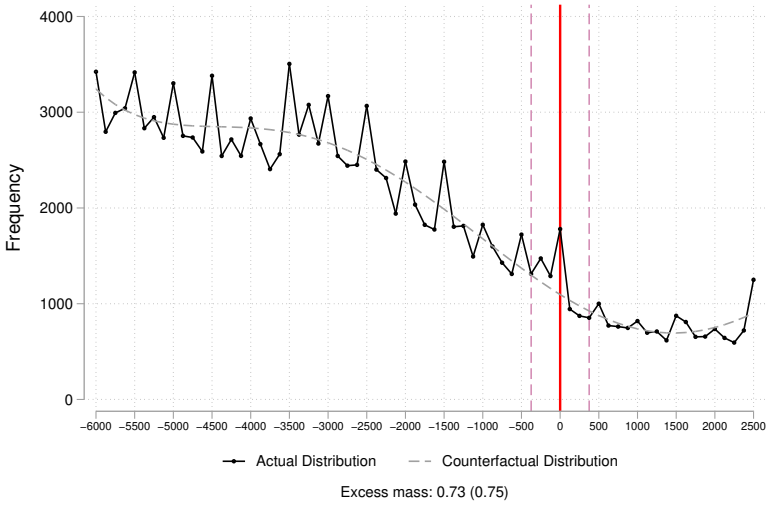
The binned data includes the amended deductions of the employees who initially made a deduction lower than or equal to $7,500 and the information from the original tax form for the rest of the taxpayers. The taxpayers who only filled in a tax return before the reform are included in the bins too.

Figure 14: Bunching Estimator for the Employees Affected by the Information and Hassle Cost Mechanisms
(Includes Only Employees who Amended their Tax Return)



The binned data includes the amended deductions of the employees who initially made a deduction higher than $7,500 and the information from the original tax form for the rest of the taxpayers.

Figure 15: Bunching Estimator for the Taxpayers Affected by the Information and Hassle Cost Mechanisms
(Includes All Employees)



The binned data includes the amended deductions of the employees who initially made a deduction higher than $7,500 and the information from the original tax form for the rest of the taxpayers. The taxpayers who only filled in a tax return before the reform are included in the bins, too.

9 Tables

Table 1: Descriptive Statistics from the Original 2008 Tax Return

	(1) Non-amending Employees Mean/S.D./Median	(2) Employees Earning more than $7,850 Mean/S.D./Median	(3) Amending Employees Mean/S.D./Median
From the tax return:			
Wage	5,035.33	15,426.51	14,433.85
	(7,289.15)	(11,915.84)	(13,930.96)
	[3,066.66]	[11,666.57]	[12,222.45]
Personal Expenses Deduction	424.08	1,877.19	2,037.36
	(1,578.78)	(2,975.38)	(3,425.40)
	[0.00]	[0.00]	[0.00]
Taxable Income	4,884.83	12,260.60	13,152.52
	(6,869.65)	(10,367.92)	(13,288.59)
	[3,148.18]	[9,407.14]	[10,065.48]
Tax Liability	148.43	615.23	918.70
	(1,153.62)	(2,162.85)	(2,636.24)
	[0.00]	[77.86]	[114.55]
Withhold	161.68	620.78	1,001.17
	(2,361.09)	(5,503.91)	(10,828.09)
	[0.00]	[78.88]	[170.71]
Wage larger than $7,850	0.19	1.00	0.69
	(0.40)	(0.00)	(0.46)
	[0.00]	[1.00]	[1.00]
Demographic characteristics:			
Women	0.35	0.34	0.29
	(0.48)	(0.47)	(0.45)
	[0.00]	[0.00]	[0.00]
Married	0.42	0.58	0.60
	(0.49)	(0.49)	(0.49)
	[0.00]	[1.00]	[1.00]
Age	36.97	42.92	43.11
	(12.27)	(11.43)	(10.72)
	[34.00]	[42.00]	[43.00]
Observations	1,632,225	360,467	61,239

Means are reported along with standard deviations in parentheses and medians in brackets. Non-amending employees are those who filled out a tax return before June 1st (when the itemizing rule was established) and did not fill out an amended tax return. Amending employees are those who filled out a tax return before June 1st and amended it afterward. Monetary amounts are in US dollars.

Table 2: Treatment Effect of the Information Mechanism on Reported Deductions, and Tax Liability - Includes Employees with $d^{original} \leq 7,500$

	(1) Deductions	(2) Tax Liability
Amended Tax Form	1,542.92***	-160.31***
	(13.27)	(6.11)
Constant	882.50***	712.37***
	(6.63)	(3.05)
Individual Fixed Effects	Yes	Yes
Num. Observations	105,832	105,832
Num. Individuals	52,916	52,916

The dependent variables are in the column title. Amended tax form is a binary variable that takes the value of one if the income tax form was filled out after the creation of the itemizing deduction form; otherwise, zero for the original tax return.
Employees who made a deduction lower or equal to $7,500 in the original tax return are included.
Monetary amounts are in US dollars.
Robust standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 3: Probability of Making a Deduction Just Below the Itemizing Threshold - Includes Employees with $d^{original} \leq 7,500$

	(7,400;7,500]	(7,300;7,500]	(7,200;7,500]	(7,100;7,500]	(7,000;7,500]
Deductions Reported on:					
The Original Tax Return	0.003***	0.005***	0.008***	0.011***	0.014***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
The Amended Tax Return	0.029***	0.039***	0.044***	0.048***	0.053***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Num. Observations	105,832	105,832	105,832	105,832	105,832
Num. Individuals	52,916	52,916	52,916	52,916	52,916

The dependent variable is a binary variable that takes the value of one if the reported deduction falls in the interval described in the column row.
Employees who made a deduction lower or equal to $7,500 in the original tax return are included.
The probability was calculated with a Probit Model.
Standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 4: Reported Deduction and Taxable Income Before the Deduction
Includes Employees with $d^{original} < 7,500$ and Taxable Income Lower than $7,500

	Original Tax Return		Amended Tax Return	
Taxable Income Before the Deduction	0.21***	0.23***	0.68***	0.68***
	(0.00)	(0.00)	(0.01)	(0.01)
Civil Servant		-278.71***		-114.48***
		(16.14)		(18.60)
Female		133.38***		-178.23***
		(17.03)		(19.84)
Married		56.61***		84.22***
		(15.49)		(18.47)
Age		7.67*		41.28***
		(4.04)		(5.24)
Age Squared		-0.04		-0.45***
		(0.04)		(0.06)
Finished High School		169.06***		124.93***
		(21.77)		(28.64)
Have a College Degree		387.93***		-67.61**
		(22.37)		(29.70)
Constant	236.24***	-248.43***	582.32***	-265.03**
	(7.14)	(88.20)	(9.85)	(113.08)
Num. Observations	40,690	40,671	40,690	40,671

The dependent variable is the deduction. Taxable income before the deduction is equal to: the wage less the payroll tax, the deduction for disability and old age, and the tax free income of $7,850. Only the employees with taxable income lower than $7,500 are included.
Monetary amounts are in US dollars.
Robust standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 5: Treatment Effect of the Information and Hassle Cost Mechanisms on Reported Deductions, and Tax Liability - Includes Employees with $d^{original} > 7,500$

	(1) Deductions	(2) Tax Liability
Amended Tax Form	-2,497.25***	4.42
	(36.40)	(18.92)
Constant	9,379.77***	2,230.48***
	(18.20)	(9.46)
Individual Fixed Effects	Yes	Yes
Num. Observations	16,646	16,646
Num. Individuals	8,323	8,323

The dependent variables are in the column title. Amended tax form is a binary variable that takes the value of one if the income tax form was filled out after the creation of the itemizing deduction form; otherwise, zero for the original tax return.
Employees who made a deduction larger than $7,500 in the original tax return are included.
Monetary amounts are in US dollars.
Robust standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 6: Treatment Effect of the Information and Hassle Cost Mechanisms on Reported Deductions, and Tax Liability
- Subgroup Analysis: Includes Employees with $d^{original} > 7,500$ and $d^{amended} \leq 7,500$

	(1) Deductions	(2) Tax Liability
Amended Tax Form	-5,097.95***	54.55*
	(47.80)	(29.41)
Constant	9,183.21***	1,565.10***
	(23.90)	(14.70)
Individual Fixed Effects	Yes	Yes
Num. Observations	8,006	8,006
Num. Individuals	4,003	4,003

The dependent variables are in the column title. Amended tax form is a binary variable that takes the value of one if the income tax form was filled out after the creation of the itemizing deduction form; otherwise, zero for the original tax return.
Employees who made a deduction larger than $7,500 in the original tax return and lower or equal to $7,500 in the amended tax return are included.
Monetary amounts are in US dollars.
Robust standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 7: Bunching Estimator - Employees Affected Only by the Information Mechanism

Excess Mass Around the Kink $\hat{b}$	**Bootstrap SE** $\hat{b}_{SE}$	**Excess Num. of Taxpayer** B_N	**Excluded Area Around The Kink**	**Range**	**Bandwidth**	**Polynomial Degree**	**Num. of Bins**	**Num. Taxpayers in Range**
			Taxpayers who amended their tax form					
5.44***	(0.87)	1,710	±375	[−6000, 2500]	125	5	69	27,173
4.81***	(0.67)	1,593	±375	[−6000, 2500]	125	7	69	27,173
4.62***	(0.79)	1,737	±450	[−6300, 2550]	150	5	60	28,287
3.86***	(0.64)	1,553	±450	[−6300, 2550]	150	7	60	28,287
4.81***	(0.89)	1,779	±450	[−5850, 2550]	150	5	57	26,905
4.25***	(0.64)	1,650	±450	[−5850, 2550]	150	7	57	26,905
			All Taxpayers					
1.74**	(0.78)	2,114	±375	[−6000, 2500]	125	5	69	146,655
1.45*	(0.78)	1,824	±375	[−6000, 2500]	125	7	69	146,655
1.55**	(0.71)	2,297	±450	[−6300, 2550]	150	5	60	155,380
1.46*	(0.73)	2,185	±450	[−6300, 2550]	150	7	60	155,380
1.72**	(0.73)	2,497	±450	[−5850, 2550]	150	5	57	143,495
1.72**	(0.74)	2,491	±450	[−5850, 2550]	150	7	57	143,495

The distribution of deduction that was binned is the combination of the empirical distribution of the deduction reported on the original and amended tax returns. For the sample of taxpayers who amended their tax form, it includes the amended deduction for the taxpayers who initially made a deduction lower or equal to $7,500 and the information of the original tax form for the rest of taxpayers. The sample of all taxpayers also includes deduction reported before the reform for the rest of the taxpayers. I subtract $7,500 from the deduction to make the reference point zero. Bootstrapped standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Table 8: Bunching Estimator - Employees Affected by the Information and Hassle Cost Mechanisms

Excess Mass Around the Kink $\hat{b}$	**Bootstrap SE** $\hat{b}_{SE}$	**Excess Num. of Taxpayer** B_N	**Excluded Area Around The Kink**	**Range**	**Bandwidth**	**Polynomial Degree**	**Num. of Bins**	**Num. Taxpayers in Range**
			Taxpayers who amended their tax form					
2.39***	(0.55)	459	±375	[−6000, 2500]	125	5	69	15,364
2.3***	(0.6)	446	±375	[−6000, 2500]	125	7	69	15,364
2.38***	(0.47)	541	±450	[−6300, 2550]	150	5	60	15,886
2.46***	(0.57)	554	±450	[−6300, 2550]	150	7	60	15,886
2.34***	(0.51)	534	±450	[−5850, 2550]	150	5	57	15,207
2.47***	(0.56)	556	±450	[−5850, 2550]	150	7	57	15,207
			All Taxpayers					
0.73	(0.75)	808	±375	[−6000, 2500]	125	5	69	134,846
0.54	(0.79)	612	±375	[−6000, 2500]	125	7	69	134,846
0.77	(0.65)	1,033	±450	[−6300, 2550]	150	5	60	142,979
0.83	(0.72)	1,108	±450	[−6300, 2550]	150	7	60	142,979
0.9	(0.71)	1,182	±450	[−5850, 2550]	150	5	57	131,797
1.02	(0.71)	1,320	±450	[−5850, 2550]	150	7	57	131,797

The distribution of deduction that was binned is the combination of the empirical distribution of the deduction reported on the original and amended tax returns. For the sample of taxpayers who amended their tax form, it includes the amended deduction for the taxpayers who initially made a deduction higher or equal to $7,500 and the information of the original tax form for the rest of taxpayers. The sample of all taxpayers also includes deduction reported before the reform for the rest of the taxpayers. I subtract $7,500 from the deduction to make the reference point zero. Bootstrapped standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

A Appendix

A.1 Conceptual Framework - Appendix

A.1.1 Model with Evasion

Figure A1: Probability of Detection with a Threshold

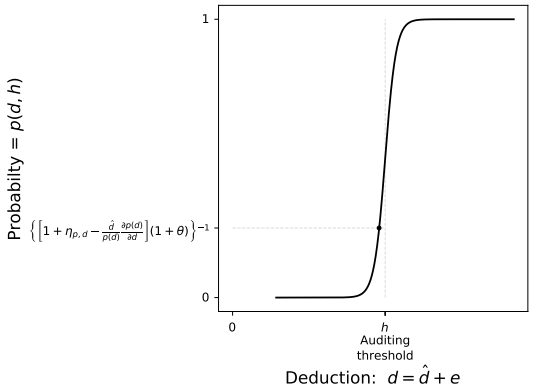
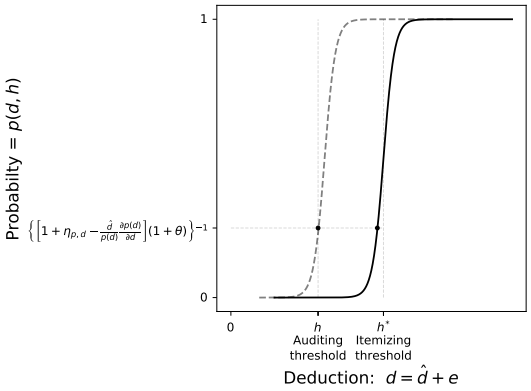


Figure A2: Probability of Detection with Change of Threshold



A.1.2 Evasion and Itemizing Cost

Figure A3: Probability of Detection with a Threshold - Step Function

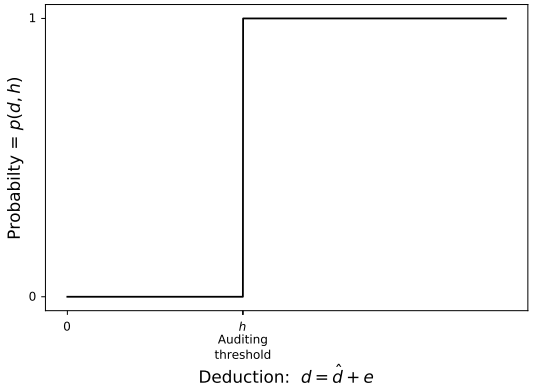
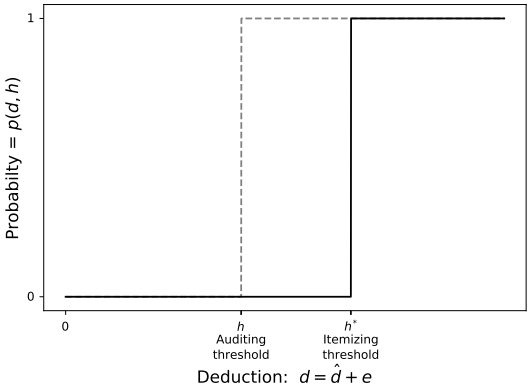


Figure A4: Probability of Detection with a Change of Threshold - Step Function



A.1.3 Model Before the Reform - Appendix

Before the reform each taxpayer holds a belief about the auditing threshold where the tax authority will revise the deductions claims. Taking the deduction is without cost. A false claim (e) depends on the relation between the income (y), the legal claim of deduction the individual could make ($\hat{d}$), and her belief of where the auditing threshold is for the change in the probability. The legal claims $\hat{d}$ and the false claims e are known for the taxpayer and not observable for the tax authority, who only observes the total deductions d. Depending on the relative values of the income y, legal claim $\hat{d}$, and the maximum deduction d^{max}, the taxpayer will choose the evasion or false claim e that minimizes her tax.

There are six possible situations in which a taxpayer can find herself depending on her past labor and consumption decision. These situations are presented in the following table as cases described by a set of conditions and solutions. Case 1 and Case 2 describe the situations in which a taxpayer can make a legal deduction larger than the deduction she needs to minimize her tax. In these cases, the taxpayer will always take the deduction that minimizes her tax. Cases from 3 to 6 describe the situations in which the taxpayer has incentives to evade taxes by making a false claim. Case 3 describes the situation in which the taxpayer thinks that the auditing threshold is lower than her legal claim, so she decides to take a deduction equal to her legal claim. Cases from 4 to 6 describes the opposite conditions: the taxpayer thinks the auditing threshold is larger than her total legal claim, so she has incentive to declare a deduction equal to her believed auditing threshold. Case 4 describes the situation in which the taxpayer thinks that the auditing threshold is somewhere in between her legal claim and her income. In this case, she will take a deduction equal to the auditing threshold. In Case 5 the taxpayer thinks that the auditing threshold is larger than her income, which means she will take a deduction equal to her income. Finally and for completeness, Case 6 describes the situation in which the taxpayer thinks that the tax authority does not care about the deductions at all: in the model, this is equivalent to thinking that the auditing threshold is larger than the maximum deduction.

Table A1: Model with Step Probability Function - Before the Reform
Description for All Possible Cases

Description	Conditions	Solutions
Case 1: People who can make a deduction large enough to pay zero tax without making a false claim.	$y \leq \hat{d} < d^{max}$ $y \quad \hat{d} \quad d^{max}$ $y \leq d^{max} \leq \hat{d}$ $y \quad d^{max} \quad \hat{d}$	$d = y$ $e = 0$ $T = 0$
Case 2: People who can make the maximum deduction without making a false claim.	$d^{max} \leq y \leq \hat{d}$ $d^{max} \quad y \quad \hat{d}$ $d^{max} \leq \hat{d} \leq y$ $d^{max} \quad \hat{d} \quad y$	$d = d^{max}$ $e = 0$ $T = (y - d^{max})t$
Case 3: People who think the auditing threshold is lower than their total legal claim.	$h \leq \hat{d} \leq y \leq d^{max}$ $h \quad \hat{d} \quad y \quad d^{max}$ $h \leq \hat{d} \leq d^{max} \leq y$ $h \quad \hat{d} \quad d^{max} \quad y$	$d = \hat{d}$ $e = 0$ $T = (y - \hat{d})t$
Case 4: People who think the auditing threshold is lower than their income but larger than their total legal claim.	$\hat{d} < h \leq y \leq d^{max}$ $\hat{d} \quad h \quad y \quad d^{max}$ $\hat{d} < h \leq d^{max} \leq y$ $\hat{d} \quad h \quad d^{max} \quad y$	$d = h$ $e = h - \hat{d}$ $T = (y - h)t$
Case 5: People who think the auditing threshold is larger than their income but need to make a false claim to pay zero.	$\hat{d} \leq y \leq h \leq d^{max}$ $\hat{d} \quad y \quad h \quad d^{max}$ $\hat{d} \leq y \leq d^{max} \leq h$ $\hat{d} \quad y \quad d^{max} \quad h$	$d = y$ $e = y - \hat{d}$ $T = 0$
Case 6: People who think the probability is always zero because deductions are small relative to their income.	$\hat{d} \leq d^{max} \leq h \leq y$ $\hat{d} \quad d^{max} \quad h \quad y$ $\hat{d} \leq d^{max} \leq y \leq h$ $\hat{d} \quad d^{max} \quad y \quad h$	$d = d^{max}$ $e = d^{max} - \hat{d}$ $T = (y - d^{max})t$

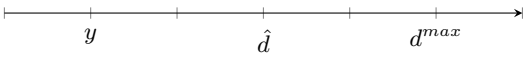
A.1.4 Model After the Reform - Appendix

Case 1:

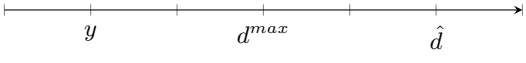
This group of people can legally claim a deduction large enough to pay zero. This group might be affected only by the hassle cost of itemizing deductions resulting from the change in the law. The solution for this group of taxpayers before the change in the law is to take a deduction equal to their taxable income before the deduction, so both the false claim and tax are zero.

Conditions Before the Law:

$$y \leq \hat{d} < d^{max}$$



$$y \leq d^{max} \leq \hat{d}$$

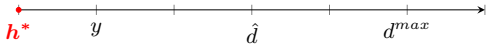
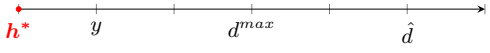


Solution Before the Law:

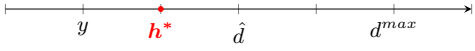
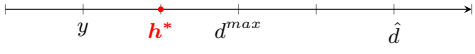
$$\begin{aligned} d &= y \\ e &= 0 \\ T &= 0 \end{aligned}$$

There are three possible cases in this group depending on where the \$7,500 itemizing threshold (h^*) falls within the other categories.

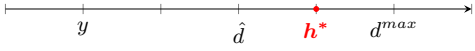
- The itemizing threshold h^* is less than the income before the deduction. This group of taxpayers paid zero in their income tax declaration before the change and had a deduction larger than the \$7,500. They could decide to keep their original deduction and fill out the itemizing form or amend their income tax form and not fill out the itemizing form. The individuals who itemized their deductions reveal that their original deductions were legal and their savings from taking the deduction are larger than the hassle cost. The individuals who move to the itemizing threshold h^* have a hassle cost larger than the savings in taxes they would receive by filling out the form.

Conditions After the Law:	*Solutions*		
	Before the Law:	*After the Law:*	
$h^* \leq y \leq \hat{d} < d^{max}$		if $(y - h^*)t > c$	if $(y - h^*)t \leq c$
	$d = y$	$d = y$	$d = h^*$
$h^* \leq y \leq d^{max} \leq \hat{d}$	$e = 0$	$e = 0$	$e = 0$
	$T = 0$	$T = 0$	$T = (y - h^*)t$
		Itemize: Yes	Itemize: No

- The itemizing threshold h^* is higher than the income and lower than the legal deduction they could take. These taxpayers keep their previously reported deduction equal to their income.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$y \leq h^* \leq \hat{d} < d^{max}$		
	$d = y$	$d = y$
$y \leq h^* \leq d^{max} \leq \hat{d}$	$e = 0$	$e = 0$
	$T = 0$	$T = 0$
		Itemize: No

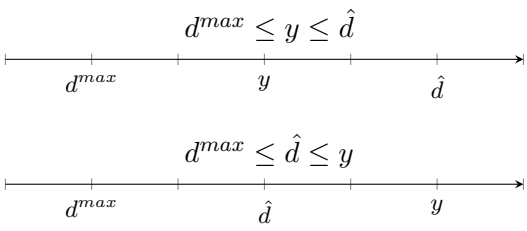
- The itemizing threshold is larger than the income and the legal deduction. As before, these taxpayers keep the previously reported deduction equal to their income.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$y \leq \hat{d} \leq h^* < d^{max}$	$d = y$	$d = y$
	$e = 0$	$e = 0$
	$T = 0$	$T = 0$
		Itemize: No

Case 2:

The taxpayers in this group can claim a legal deduction larger than the maximum allowed, so they take the maximum deduction before the reform. The change in the regulation can only generate a change for this group of taxpayers through the hassle cost.

Conditions Before the Law:

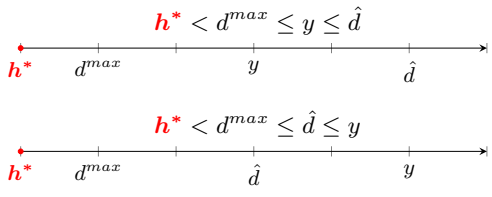


Solution Before the Law:

$$\begin{aligned} d &= d^{max} \\ e &= 0 \\ T &= (y - d^{max})t \end{aligned}$$

- The taxpayers with a high cost for filling out the form will move from the maximum deduction to the itemizing threshold $(d^{max} - h^*)t \leq c$.

Conditions After the Law:



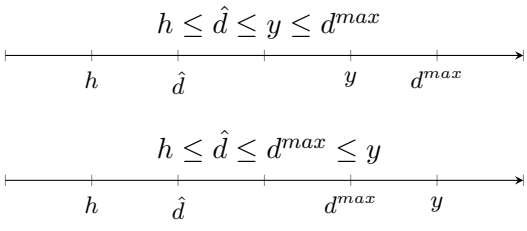
Solutions

Before the Law:	*After the Law:*	
	if $(d^{max} - h^*)t > c$	if $(d^{max} - h^*)t \leq c$
$d = d^{max}$	$d = d^{max}$	$d = h^*$
$e = 0$	$e = 0$	$e = 0$
$T = (y - d^{max})t$	$T = (y - d^{max})t$	$T = (y - h^*)t$
	Itemize: Yes	Itemize: No

Case 3:

This group of taxpayers need to make a false claim to pay zero tax and think that the auditing threshold is lower than their legal claim. Before the reform, these taxpayers did not report a false claim, and their total deduction is equal to the legal claim they can make.

Conditions Before the Law:



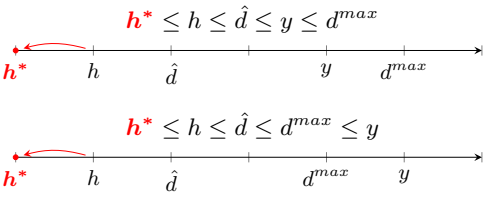
Solution Before the Law:

$$\begin{aligned} d &= \hat{d} \\ e &= 0 \\ T &= (y - \hat{d})t \end{aligned}$$

Depending on where the itemizing threshold falls in relation to the other monetary amounts of the taxpayer's tax form, there are four possible scenarios for a change.

- The itemizing threshold is lower than the taxpayer's previously believed auditing threshold, the legal deduction and the income. In this case, the taxpayer can either assume the cost of filling out the itemizing form and keep declaring $\hat{d}$ or make a deduction of h^*.

Conditions After the Law:

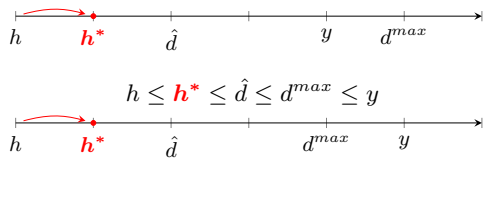


Solutions

Before the Law:	*After the Law:*	
	if $(\hat{d} - h^*)t > c$	if $(\hat{d} - h^*)t \leq c$
$d = \hat{d}$	$d = \hat{d}$	$d = h^*$
$e = 0$	$e = 0$	$e = 0$
$T = (y - \hat{d})t$	$T = (y - \hat{d})t$	$T = (y - h^*)t$
	Itemize: Yes	Itemize: No

- The itemizing threshold is higher than the taxpayer's previous believed auditing threshold, but lower than her legal claim. As before, the taxpayer can either assume the cost of filling out the itemizing form and keep declaring d or make a deduction of h^*.

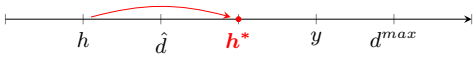
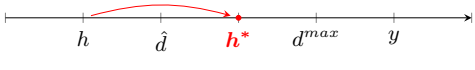
Conditions After the Law:



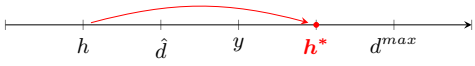
Solutions

Before the Law:	*After the Law:*	
	if $(\hat{d} - h^*)t > c$	if $(\hat{d} - h^*)t \leq c$
$d = \hat{d}$	$d = \hat{d}$	$d = h^*$
$e = 0$	$e = 0$	$e = 0$
$T = (y - \hat{d})t$	$T = (y - \hat{d})t$	$T = (y - h^*)t$
	Itemize: Yes	Itemize: No

- The itemizing threshold is higher than the taxpayer's believed auditing threshold from before the reform and higher than her legal claim, but lower than her income. This taxpayer has incentive to report a deduction equal to the itemizing threshold.

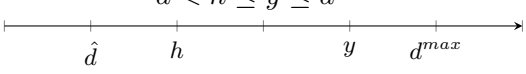
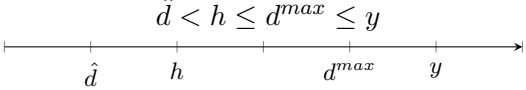
Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$h \leq \hat{d} \leq \boldsymbol{h^*} \leq y \leq d^{max}$ 	$d = \hat{d}$	$d = h^*$
	$T = (y - \hat{d})t$	$T = (y - h^*)t$
$h \leq \hat{d} \leq \boldsymbol{h^*} \leq d^{max} \leq y$ 	$e = 0$	$e = h^* - \hat{d}$
		Itemize: No

- The itemizing threshold is higher than the taxpayer's previous believed auditing threshold, legal claim, and income. This taxpayer has incentive to report a deduction equal to her income.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$h \leq \hat{d} \leq y \leq \boldsymbol{h^*} \leq d^{max}$ 	$d = \hat{d}$	$d = y$
	$T = (y - \hat{d})t$	$T = 0$
	$e = 0$	$e = y - \hat{d}$
		Itemize: No

Case 4:

For this group of taxpayers, their belief about the auditing threshold before the reform was binding. Their believed auditing threshold falls between their legal claim and their income.

Conditions Before the Law:	*Solution Before the Law:*
$\hat{d} < h \leq y \leq d^{max}$ 	$d = h$
	$e = h - \hat{d}$
$\hat{d} < h \leq d^{max} \leq y$ 	$T = (y - h)t$

Depending on where the itemizing threshold falls in relation to the other monetary amounts of the taxpayer's tax form, there are four possible scenarios for a change.

- The itemizing threshold is lower than the legal deduction the taxpayer can make, the taxpayer's previous believed auditing threshold, and the income. In this case,

the taxpayer can either assume the cost of filling out the itemizing form and keep declaring $\hat{d}$ or make a deduction equal to h^*.

Conditions After the Law:	*Solutions*		
	Before the Law:	*After the Law:*	
		if $(\hat{d}-h^*)t > c$	if $(\hat{d}-h^*)t \leq c$
$\boldsymbol{h^*} \leq \hat{d} < h \leq y \leq d^{max}$	$d = h$	$d = \hat{d}$	$d = h^*$
$\boldsymbol{h^*} \leq \hat{d} < h \leq d^{max} \leq y$	$e = h - \hat{d}$	$e = 0$	$e = 0$
	$T = (y-h)t$	$T = (y-\hat{d})t$	$T = (y-h^*)t$
		Itemize: Yes	Itemize: No

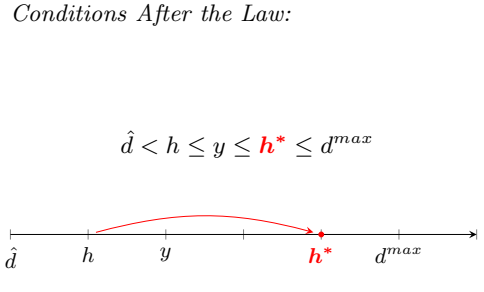
- The itemizing threshold is higher than the legal deduction the taxpayer can make but lower than the belief she used to hold about the auditing threshold and her income. The taxpayer decreases her deduction to the itemizing threshold because she cannot justify the false claims she made previously.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} \leq \boldsymbol{h^*} < h \leq y \leq d^{max}$	$d = h$	$d = h^*$
$\hat{d} \leq \boldsymbol{h^*} < h \leq d^{max} \leq y$	$e = h - \hat{d}$	$e = h^* - \hat{d}$
	$T = (y-h)t$	$T = (y-h^*)t$
		Itemize: No

- The itemizing threshold is higher than their legal claim and the belief the taxpayer holds about the auditing threshold before, but lower than her income. This taxpayer has incentive to report a deduction equal to the itemizing threshold.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} < h \leq \boldsymbol{h^*} \leq y \leq d^{max}$	$d = h$	$d = h^*$
$\hat{d} < h \leq \boldsymbol{h^*} \leq d^{max} \leq y$	$e = h - \hat{d}$	$e = h^* - \hat{d}$
	$T = (y-h)t$	$T = (y-h^*)t$
		Itemize: No

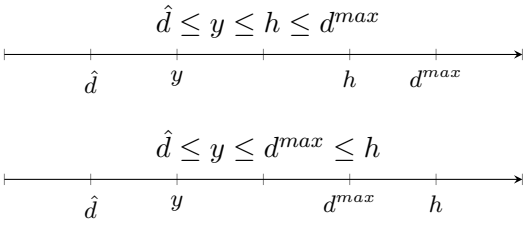
- The itemizing threshold is higher than the taxpayers legal claim, previously believed auditing threshold, and income. This taxpayer has incentive to report a deduction equal to her income.



Solutions		
	Before the Law:	*After the Law:*
	$d = h$	$d = y$
	$e = h - \hat{d}$	$e = y - \hat{d}$
	$T = (y - h)t$	$T = 0$
		Itemize: No

Case 5:

This group of taxpayers initially believed that the auditing threshold was larger than their income, so they were making a total deduction equal to their income and paid zero tax before the reform.

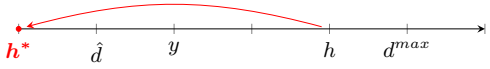
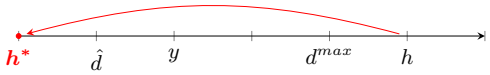


Solution Before the Law:

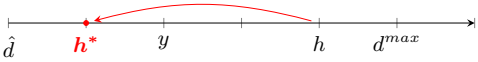
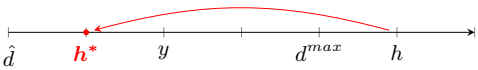
$$\begin{aligned} d &= y \\ e &= y - \hat{d} \\ T &= 0 \end{aligned}$$

Depending on where the itemizing threshold falls in relation of the other amounts of the taxpayers tax form there are four possible scenarios for a change.

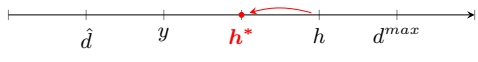
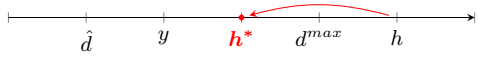
- The threshold of the itemizing rule is lower than the legal deduction the taxpayer can make, her income, and her believed auditing threshold from before the reform. In this case, the taxpayer can either assume the cost of filling out the itemizing form and keep declaring $\hat{d}$ or make a deduction equal to h^*.

Conditions After the Law:	*Solutions*		
	Before the Law:	*After the Law:*	
$h^* \leq \hat{d} \leq y \leq h \leq d^{max}$		if $(\hat{d} - h^*)t > c$	if $(\hat{d} - h^*)t \leq c$
	$d = y$	$d = \hat{d}$	$d = h^*$
$h^* \leq \hat{d} \leq y \leq d^{max} \leq h$	$e = y - \hat{d}$	$e = 0$	$e = 0$
	$T = 0$	$T = (y - \hat{d})t$	$T = (y - h^*)t$
		Itemize: Yes	Itemize: No

- The itemizing threshold is higher than the legal deduction the taxpayer can make, but lower than her income and the belief they used to hold about the threshold. The taxpayer decreases her deduction to the itemizing threshold because she cannot justify the false claims she made previously.

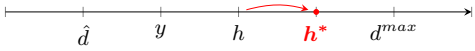
Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} \leq h^* \leq y \leq h \leq d^{max}$	$d = y$	$d = h^*$
	$e = y - \hat{d}$	$e = h^* - \hat{d}$
$\hat{d} \leq h^* \leq y \leq d^{max} \leq h$	$T = 0$	$T = (y - h^*)t$
		Itemize: No

- The itemizing threshold is higher than the legal deduction the taxpayer can make but lower than her income, and her previously believed auditing threshold. The taxpayer decreases her deduction to the itemizing threshold because she cannot justify the false claims she made previously.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} \leq y \leq h^* \leq h \leq d^{max}$	$d = y$	$d = y$
	$e = y - \hat{d}$	$e = y - \hat{d}$
$\hat{d} \leq y \leq h^* \leq d^{max} \leq h$	$T = 0$	$T = 0$
		Itemize: No

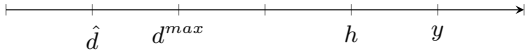
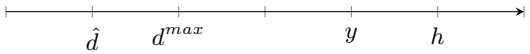
- The itemizing threshold is higher than the taxpayer's legal claim, income, and previously believed auditing threshold. Since this taxpayer was already paying zero tax

and believes the tax authority will not check her deductions, she has no incentive to change her tax form.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} \leq y \leq h \leq \boldsymbol{h^*} \leq d^{max}$	$d = y$	$d = y$
	$e = y - \hat{d}$	$e = y - \hat{d}$
	$T = 0$	$T = 0$
		Itemize: No

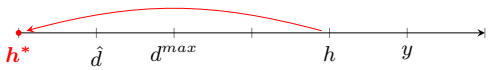
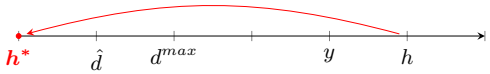
Case 6:

The taxpayers in this group think that the deduction is not large enough relative to their income to call the attention of the tax authority. Hence, they think the probability of detection is always zero and were already taking the maximum deduction before.

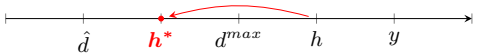
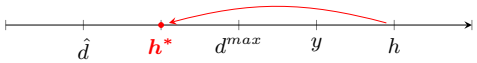
Conditions Before the Change:	*Solution Before the Change:*
$\hat{d} \leq d^{max} \leq h \leq y$	$d = d^{max}$
	$e = d^{max} - \hat{d}$
$\hat{d} \leq d^{max} \leq y \leq h$	$T = (y - d^{max})t$
	

Depending on where the itemizing threshold falls in relation to the other monetary amounts of the taxpayer's tax form, there are two possible scenarios for a change.

- The itemizing threshold is lower than the legal deduction the taxpayer can make, her income, and her believed auditing threshold from before the reform. In this case, the taxpayer can either assume the cost of filling out the itemizing form and keep declaring d^{max} or make a deduction equal to h^*.

Conditions After the Law:	*Solutions*		
	Before the Law:	*After the Law:*	
$\boldsymbol{h^*} \leq \hat{d} \leq d^{max} \leq h \leq y$ 		if $(y - h^*)t > c$	if $(y - h^*)t \leq c$
$\boldsymbol{h^*} \leq \hat{d} \leq d^{max} \leq y \leq h$ 	$d = d^{max}$	$d = \hat{d}$	$d = h^*$
	$e = d^{max} - \hat{d}$	$e = 0$	$e = 0$
	$T = (y - d^{max})t$	$T = (y - \hat{d})t$	$T = (y - h^*)t$
		Itemize: Yes	Itemize: No

- The itemizing threshold is higher than the legal deduction the taxpayer can make, but lower than her income and her previously believed auditing threshold. The taxpayer decreases her deduction to the itemizing threshold because she cannot justify the false claims she made previously.

Conditions After the Law:	*Solutions*	
	Before the Law:	*After the Law:*
$\hat{d} \leq \boldsymbol{h^*} \leq d^{max} \leq h \leq y$ 	$d = d^{max}$	$d = h^*$
	$e = d^{max} - \hat{d}$	$e = h^* - \hat{d}$
$\hat{d} \leq \boldsymbol{h^*} \leq d^{max} \leq y \leq h$ 	$T = (y - d^{max})t$	$T = (y - h^*)t$
		Itemize: No

B Figures

Figure A5: Timeline of the Reform

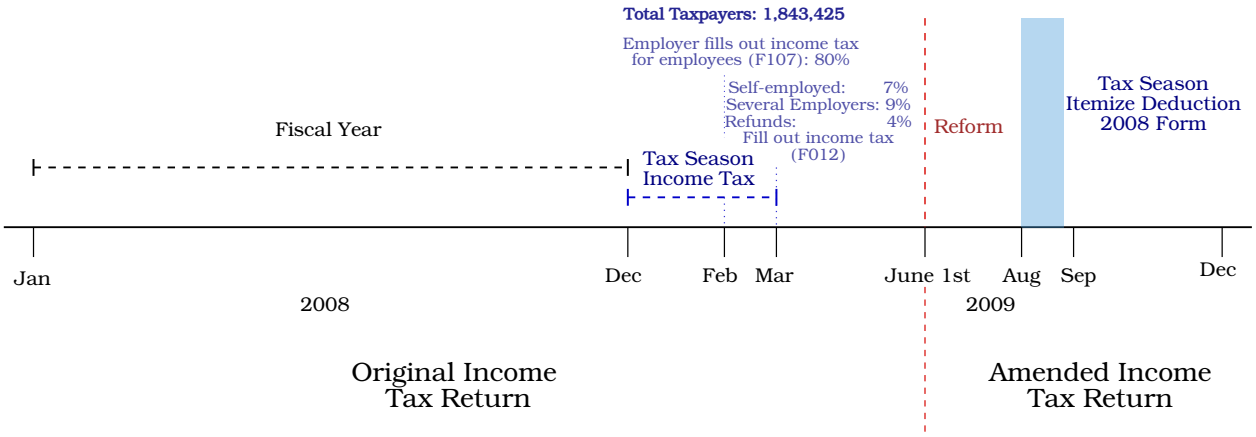
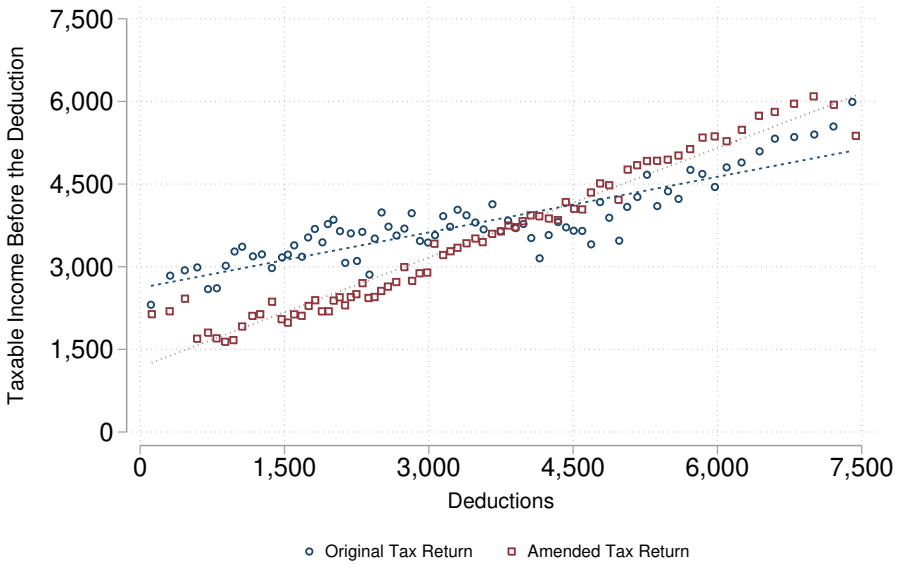
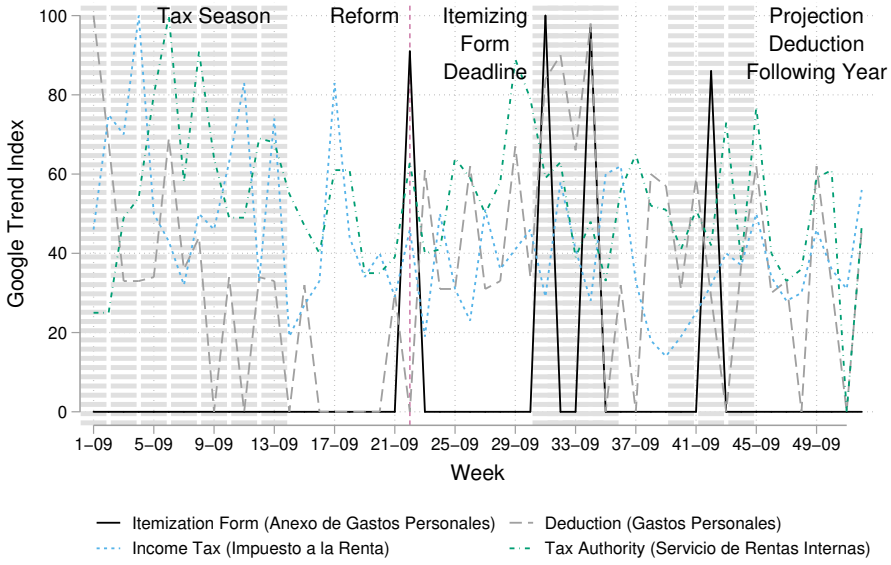


Figure A6: Binned Scatter Plot of the Deductions Reported on the Original and Amended Tax Returns (Includes Employees with $d^{original} \leq 7,500$)



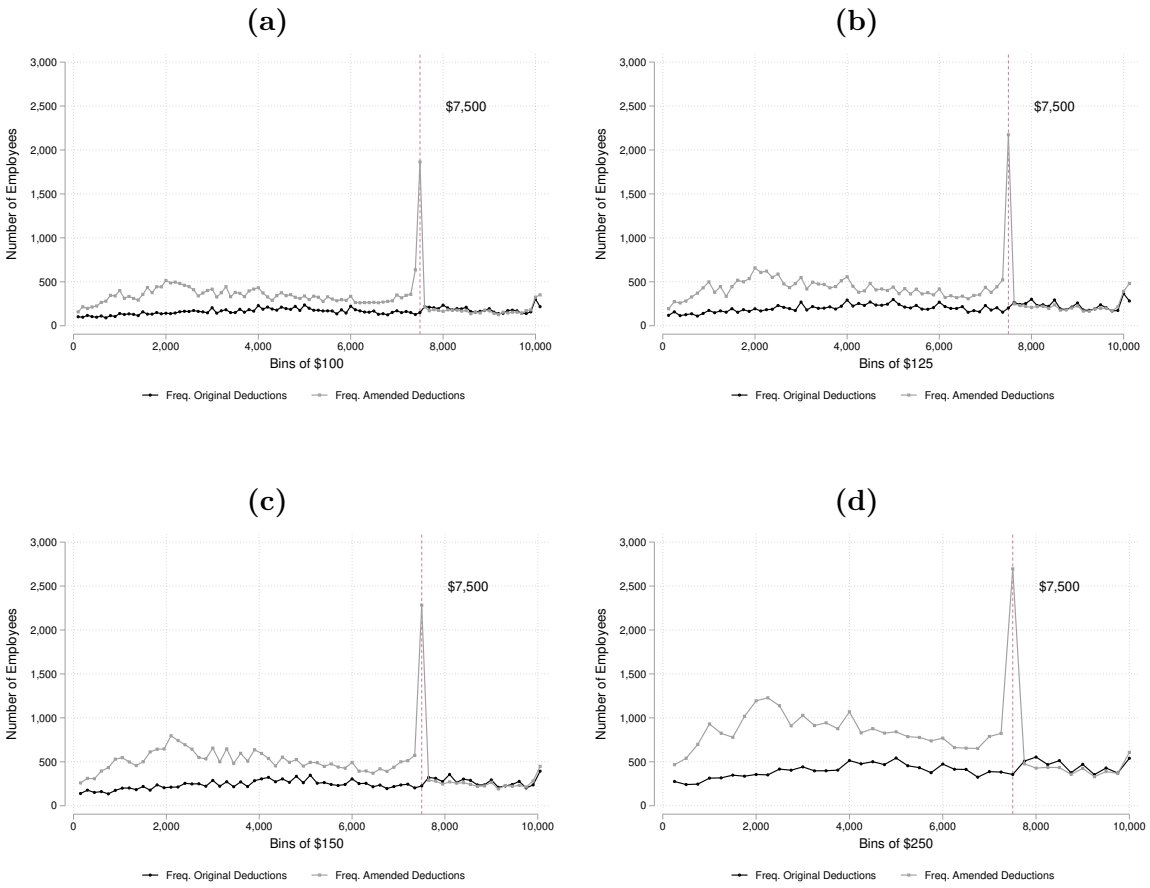
The observations were divided into 75 equally-sized bins for the deductions. Each dot on the graph is the mean for the deduction and taxable income for each bin.

Figure A7: Google Trends 2009



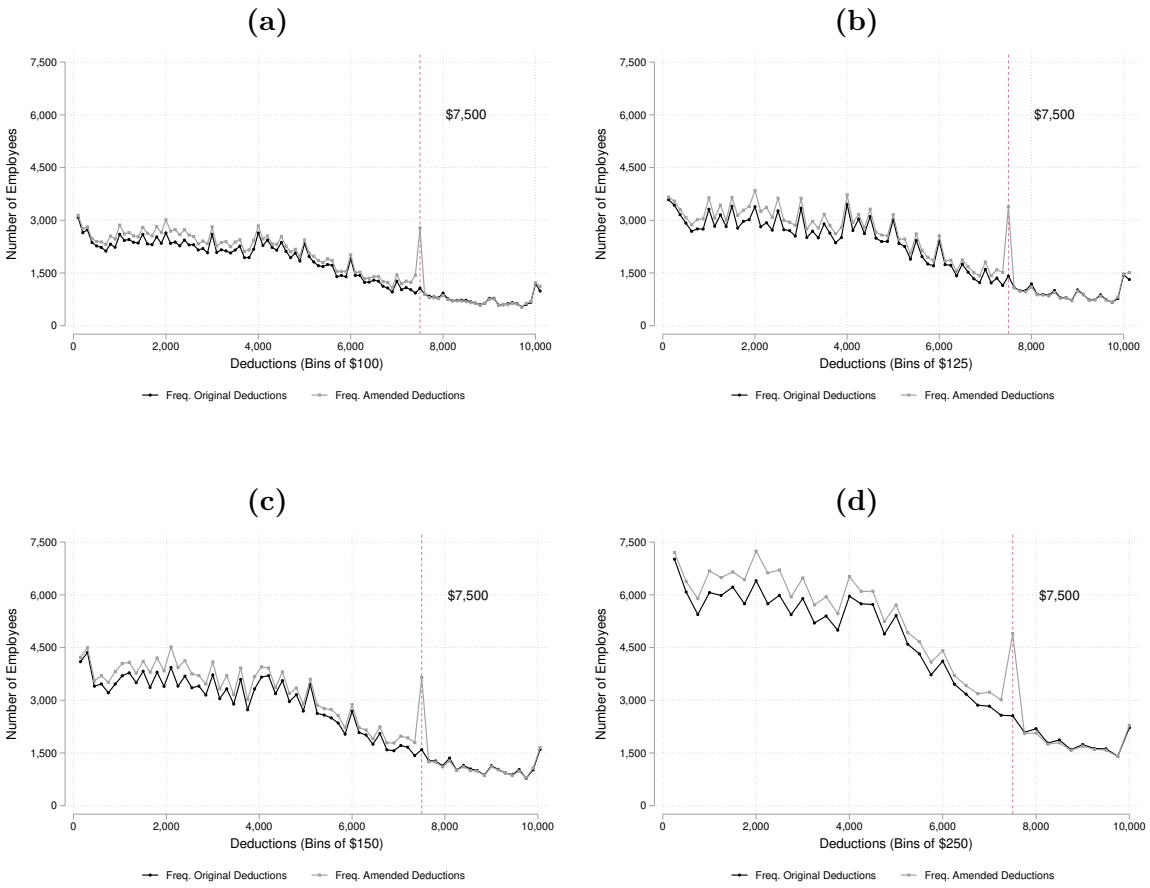
The numbers represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term (Google Trends).

Figure A8: Frequency of the Deductions on the Original and Amended Tax Returns
(Includes Employees Who Amended)



The bins for zero deduction and the maximum deduction are excluded from the graph.

Figure A9: Frequency Deductions on the Original and Amended Tax Returns
Includes All Employees



The employees who did not amend their income tax return are assigned a deduction for the amendment equal to the deduction in the original tax return. The bins for zero deduction and maximum deduction are excluded from the graph.

C Tables

Table A2: Number of Employees by Deduction Range

	Amended Tax Return		
Original Tax Return	$d \leq 7,500$	$d > 7,500$	Total
$d \leq 7,500$	48,969	3,947	52,916
	(92.54)	(7.46)	(100.00)
$d > 7,500$	4,003	4,320	8,323
	(48.10)	(51.90)	(100.00)
Total	52,972	8,267	61,239
	(86.50)	(13.50)	(100.00)

For each category, the first value is the number of observations, the second value in parentheses is the row percentage.

Table A3: Percentage of Taxpayers who Made a Deduction Close to the Model Prediction

	(1) Original Tax Return mean	(2) Amended Tax Return mean
Deduction within \$100 of TI_d	0.35	0.52
Deduction within \$150 of TI_d	0.36	0.53
Deduction within \$200 of TI_d	0.36	0.55
Deduction within \$250 of TI_d	0.37	0.56
Deduction $> TI_d$	0.08	0.23
Deduction within \$200 of TI_d^{zero}	0.01	0.03
Observations	52,916	52,916

This table includes employees who filled out a tax return before June 1st and amended it afterward and reported a deduction lower than or equal to \$7,500 in the original tax form.
TI_d : Taxable income before the deduction. If the deduction were equal to this value, the tax liability would become zero.
TI_d^{zero} : Taxable income before the deduction, such as the taxpayer's tax base is zero. If the deduction were equal to this value, the tax base would become zero.
Monetary amounts are in US dollars.

Table A4: Adjustment on the Tax Return for Employees that Miscalculated the Deduction - Includes Employees with $d^{original} > 7,500$ and $d^{amended} > 7,500$

	(1) Deductions	(2) Tax Liability
Amended Tax Form	-87.39***	-42.03*
	(12.68)	(24.18)
Constant	9,561.90***	2,847.04***
	(6.34)	(12.09)
Individual Fixed Effects	Yes	Yes
Num. Observations	8,640	8,640
Num. Individuals	4,320	4,320

The dependent variables are in the column title. Amended tax form is a binary variable that takes the value of one if the income tax form was filled out after the creation of the itemizing deduction form; otherwise, zero for the original tax return.
Employees who made a deduction larger than $7,500 in the original and amended tax returns are included.
Monetary amounts are in US dollars.
Robust standard errors are in parentheses.
$*p < 0.10$, $**p < 0.05$, $***p < 0.01$