

# Casting a Wider Tax Net:

## Experimental Evidence from Costa Rica

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Online Appendix

### 1 A Simple Tax Filing Model

#### 1.1 Model Set-up and Taxpayer Behavior

This section presents a simple tax filing model based on [Keen and Slemrod \(2017\)](#). Consider a taxpayer  $i$  who earns an income (gross profit)  $y_i$ , with  $y_i \sim G(y)$ , incurs a tax filing cost  $f$ , and is taxed at a rate  $t$  on income above a threshold  $T \geq 0$ . All taxpayers are required to file a tax declaration. This also applies to taxpayers below the exemption threshold, as they may provide valuable information to the tax authority. A taxpayer who does not file is inspected with probability  $p(a)$  where  $p_a > 0$ ,  $a$  being the administrative enforcement level,<sup>1</sup> and inspected non-filers suffer a penalty  $\theta$  proportional to their income  $y_i$ . The non-filing penalty  $\theta y_i$  may represent the monetary and reputational cost of a temporary shop closure, a bribe to avoid a shop closure or fine, or the fear of an inspection. The implicit assumption

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<sup>1</sup>Without affecting the core results, one can bring the model closer to the data by assuming that larger firms are more likely to be inspected (and hence more likely to file),  $p_y > 0$ . In this case, it would also be reasonable to assume  $p_{ya} > 0$ .

that the government collects no revenue from inspected non-filers is close to reality.<sup>2</sup> To further simplify the exposition, we assume that taxpayers are risk-neutral and that  $y_i$  is the income detectable by the tax authority. Filers thus always declare  $y_i$  and we can ignore the intensive margin of compliance.

Assuming  $f > p\theta T > tT$ ,  $\exists \bar{y} \equiv \frac{f-tT}{p\theta-t} > T$  such that taxpayers file if  $y_i > \bar{y}$ . The government thus has to set (or create the perception that)  $p(a)\theta > t$  to ensure that at least a fraction of taxpayers file voluntarily. The filing propensity then increases in the non-filing penalty and the probability of detection, and decreases in the tax rate, filing cost, and exemption threshold. Heterogeneity in filing costs  $f$  could yield a situation in which there are non-filers and filers among both firms above and below the exemption threshold, as is empirically the case.<sup>3</sup>

## 1.2 Welfare Considerations

Given a continuum of taxpayers of mass one, the share of filers is  $1 - G(\bar{y}) = 1 - G(f, t, \theta, T, a)$ . We assume that all taxpayers derive a value  $v(g)$  from the public good  $g$  which the government provides. The government budget constraint is  $g + a = R = t \int_{\bar{y}}^{\infty} \max(y - T, 0) dy$ . Given this constraint, the government maximizes social welfare

$$W = \int y \cdot dy - R - (1 - G(\bar{y})) \cdot f - p\theta \int_0^{\bar{y}} y \cdot dy + v(R - a).$$

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<sup>2</sup>Allowing the government to instead collect a fine from non-filers would complicate the model, but, provided some parameter restrictions that ensure that the government would prefer firms to file voluntarily rather than pay the fine, the model would still yield the same results.

<sup>3</sup>The higher initial non-filing rate among corporations compared to the self-employed in Costa Rica, despite the the absence of an exempt income amount for corporations, could be explained by the higher average income levels and a negative correlation between firm size and filing costs.

A discrete investment in administrative enforcement  $\Delta a$  increases  $p(a)$  by  $\Delta p$  from  $p_0$  to  $p_1$ , lowers  $\bar{y}$  from  $\bar{y}_0$  to  $\bar{y}_1$ , and hence increases tax filing and payment, assuming  $\bar{y}_0 > T$ . The filers have to pay the filing cost and those with  $y_i > \bar{y}_1$  have to pay the tax, but they no longer face the risk of the non-filing penalty. The remaining non-filers, in contrast, face a larger expected penalty, which generates no benefit to the government. The intervention  $\Delta a$  is welfare enhancing if it generates a sufficiently large gross revenue increase  $\Delta R = t \int_{\bar{y}_1}^{\bar{y}_0} \max(y - T, 0) dy$ :

$$\Delta W = W_1 - W_0 = -\Delta R - \int_{\bar{y}_1}^{\bar{y}_0} (f - p_0 \theta y) dy - \int_0^{\bar{y}_1} \Delta p \theta y \cdot dy + v' \Delta R - v' \Delta a > 0.$$

### 1.3 Extensions

We consider two extensions relevant to our empirical application:

- **Filers with  $y < T$  provide valuable information to tax authority:** If filers below the exemption threshold provide information, e.g., about transactions with clients and suppliers, to the tax authority, and this information reduces the cost of future tax enforcement  $a$  or increases the detectable income level  $y$ , even an intervention that pushes  $\bar{y}$  (further) below  $T$  could generate positive welfare gains. This is especially likely if filing costs fall discontinuously at  $y_i = T$ , because firms that file but do not make a payment avoid an additional errand (going to the bank).
- **Deregistration:** Firms with high filing costs might decide to deregister in response to an increase in enforcement. Assume that a deregistered yet still active firm faces a punishment (detection probability and fine)  $q(a) \cdot \phi y <$

$p(a) \cdot \theta y$  and incurs a loss  $k_i$  due to lost access to some public services. A firm deregisters in response to an increase in  $p$  (which leaves  $q$  unaffected) if its filing cost  $f$  is sufficiently high and its valuation for the public good  $k_i$  is sufficiently low (compared to firm size), i.e.,

$$(1 - p_0\theta)y_i > (1 - q\phi)y_i - k_i > (1 - t)y_i - f_i$$

and

$$(1 - q\phi)y_i - k_i > (1 - p_1\theta)y_i > (1 - t)y_i - f_i.$$

## 2 Potential Value of Additional Third-Party Information

To calculate the potential value of additional third-party information generated by the intervention, we make the following considerations. The tax authority uses third-party reports in desk audits targeted at taxpayers who reported sales lower than third-party reported sales or costs. Third-party reported sales are more conventionally used as a lower bound for the sales the taxpayer should self-report, but cost reports could conceivably play a similar role. In our case, the experiment generates new reports about treated firms' suppliers (which are sales reports for the reportee) and reports about clients (which are cost reports for the reportee). We thus calculate the additional value of both types of reports separately.

We assume that, when contacted by the tax authority and informed about the new third-party information, firms increase reported sales by the amount of the new third-party report, but compensate by increasing reported costs so as to keep the reported profit rate constant. This means the reported profit rate on the newly declared sales is the same as the initially reported profit rate. This is consistent with the results from desk audits reported in [Brockmeyer and Hernandez \(2018\)](#) and similar to the assumption made in that paper in the calculation of tax revenue lost due to under-reporting.

In our calculation, we use the estimates from Table 4 in the paper, as well as estimates from regressions in which we separately consider unmatched reports about suppliers and unmatched reports about clients as outcome variables (results available upon request). To be conservative, we consider only unmatched reports about

under-reporters (as defined in the footnote to Table 4) as valuable, and ignore the new reports about non-filers.

We also use the average transaction amount reported in third-party reports about clients and suppliers (which does not significantly differ by treatment status conditional on filing a third-party report) and the average reported profit rate among our experiment firms' clients and suppliers that are the subject of unmatched reports,<sup>4</sup> and we assume that firms' income is such that they pay a marginal tax rate of 15%.

- Value of new reports about clients:  $0.008$  [number of new unmatched reports about under-reporters] \*  $12,515$  \*  $2/3$  [treated sample] \*  $11500000$  [avg. transaction amount] \*  $0.13$  [avg. profit rate] \*  $15\%$  [hypothesized marginal tax rate] = 17 million CRC.
- Value of new reports about suppliers:  $0.019$  [number of new unmatched reports about under-reporters] \*  $12,515$  \*  $2/3$  [treated sample] \*  $3291500$  [avg. transaction amount] \*  $0.51$  [avg. profit rate] \*  $15\%$  [hypothesized marginal tax rate] = 10 million CRC.

These figures amount to 20% and 12% of the total return of the experimental treatment. As the increase in unmatched reports about misreporting suppliers was positive but not statistically significant, we retain the conservative result that the generation of new third-party reports could increase the return of the experiment by up to 20%, under the assumptions laid out in this section.

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<sup>4</sup>These results are similar when using the profits rate of all experiment firms' suppliers or clients respectively, and winsorizing the profit rate distribution in different ways.

### 3 Tables

Table A1: Summary of Filers and Nonfilers, Firm Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2014 On-Time Filers	2014 On-Time Filers (Below Median Sales)	2014 On-Time Filers (Below Median Sales if Positive)	2014 Non-Filers	2014 Non-Filers (Above Median Sales)	2014 Non-Filers (with TPI)	2014 Non-Filers (without TPI)
Sales	40.50 (0.208)	1.253 (0.00375)	3.250 (0.00656)	5.497 (0.193)	10.99 (0.383)	12.23 (0.606)	3.235 (0.156)
Costs	37.46 (0.203)	0.885 (0.0207)	2.050 (0.0230)	5.251 (0.194)	10.46 (0.384)	11.56 (0.596)	3.132 (0.162)
Profit rate	0.538 (0.00177)	0.605 (0.00299)	1.041 (0.00367)	0.203 (0.00343)	0.408 (0.00656)	0.314 (0.00815)	0.165 (0.00366)
TPI reportee in 2014	0.599 (0.000808)	0.376 (0.00113)	0.652 (0.00124)	0.252 (0.00195)	0.441 (0.00315)	1 (0)	0 (0)
Third-party reported sales	19.59 (0.0968)	0.719 (0.00309)	1.831 (0.00605)	2.043 (0.0774)	4.082 (0.154)	8.096 (0.301)	0.00905 (0.00244)
Corporation	0.327 (0.000774)	0.225 (0.000974)	0.146 (0.000923)	0.234 (0.00190)	0.206 (0.00257)	0.140 (0.00310)	0.265 (0.00229)
San José	0.420 (0.000818)	0.421 (0.00116)	0.401 (0.00129)	0.490 (0.00224)	0.492 (0.00317)	0.489 (0.00447)	0.491 (0.00259)
Observations	367,488	183,744	146,577	49,774	24,887	12,515	37,259

Note: This table displays summary statistics for firms that filed income tax in 2014 by the filing deadline versus firms that did not and that were part of our experiment sample (i.e., had an email address on file). The rows display means, with standard errors in parentheses. Amounts are in million CRC. Columns 2 and 3 restrict the sample to below or above median sales. For non-filers, sales in the most recent period is the maximum of sales reported in the most recently available tax declaration and the most recent third-part report (as far back as 2010). For filers, we use the maximum of the most recent sales report and the current third-party report. The results are robust to alternative sales definitions.

Table A2: Summary of Filers and Nonfilers, Past Compliance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2014 On-Time Filers	2014 On-Time Filers (Below Median Sales)	2014 On-Time Filers (Below Median Sales if Positive)	2014 Non-Filers	2014 Non-Filers (Above Median Sales)	2014 Non-Filers (with TPI)	2014 Non-Filers (without TPI)
Year First Registered	2007.4 (0.00404)	2007.6 (0.00614)	2007.7 (0.00704)	2008.2 (0.0126)	2008.1 (0.0172)	2008.4 (0.0274)	2008.1 (0.0141)
No. of Years Declared 2010-2013	2.956 (0.00234)	2.685 (0.00354)	2.623 (0.00405)	0.904 (0.00549)	1.359 (0.00825)	1.059 (0.0119)	0.851 (0.00613)
Most Recent Gross Liability Conditional on Declaring	0.355 (0.00202)	0.00684 (0.0000753)	0.0245 (0.000188)	0.0603 (0.00301) [22,819]	0.0816 (0.00406) [16,868]	0.127 (0.00852) [6,394]	0.0345 (0.00253) [16,425]
Most Recent Payment Conditional on Declaring	0.104 (0.000614)	0.00380 (0.0000577)	0.0125 (0.000121)	0.0189 (0.000995) [ 22,819]	0.0255 (0.00134) [16,868]	0.0319 (0.00248) [6,394]	0.0138 (0.000988) [16,425]
No. of Years Presented D151 Report 2010-2013	1.729 (0.00273)	0.956 (0.00313)	1.317 (0.00393)	0.324 (0.00345)	0.609 (0.00622)	0.503 (0.00871)	0.263 (0.00351)
No. of Years Covered by Third-Party Report 2010-2013	1.936 (0.00268)	1.305 (0.00338)	1.726 (0.00406)	0.802 (0.00513)	1.487 (0.00773)	1.389 (0.0124)	0.605 (0.00504)
Observations	367,488	183,744	146,577	49,774	24,887	12,515	37,259

Note: This table displays summary statistics for firms that filed income tax in 2014 by the filing deadline versus firms that did not and that were part of our experiment sample (i.e., had an email address on file). The rows display means, with standard errors in parentheses. Where different from the column total, the number of observations is displayed in *brackets*. Amounts are in million CRC. Columns 2 and 3 restrict the sample to below or above median sales. For non-filers, sales in the most recent period is the maximum of sales reported in the most recently available tax declaration and the most recent third-part report (as far back as 2010). For filers, we use the maximum of the most recent sales report and the current third-party report. The results are robust to alternative sales definitions.



Table A3: Experiment Timeline

<b>Extraction of non-filers list</b> ( $N = 49,757$ )	February 15
<b>Emails to taxpayers with third-party information</b> ( $N = 12,515$ )	March 4–10
No message control group T1: Baseline email T2: Information email (mentions amount of largest third-party information report)	
<b>Emails to taxpayers without third-party information</b> ( $N = 37,242$ )	April 7–23
No message control group T1: Baseline email T2: Information email (emphasizes tax authority's use of third-party information)	

Note: This table present the experiment timing, as discussed in section II. The treatment messages are displayed in Figures A2 and A3. To determine which firms were covered by third-party information, the tax authority considered all reports by other firms, by state institutions, and by credit/debit card companies. A small number of firms in the study shared the same primary email address, either because they had a common owner or shared a common legal representative. For this reason, firms were grouped into clusters based on their primary email address and randomization took place at the cluster level. Throughout our analysis, we use standard errors that are robust to within-cluster correlation, and the results are robust to limiting the sample to clusters with only one firm (98% of clusters). The mean number of firms per cluster is 1.04 and the median is 1.

Table A4: Enforcement Activities, 2008-2015

Type of activity	Number of taxpayers contacted									
	2008	2009	2010	2011	2012	2013	2014	2015		
Full audits	825	897	817	829	895	847	880	662		
Shop closures*	n/a	n/a	120	43	75	166	293	167		
Invitation of “suspicious taxpayers” for interviews				680	2,293					
Control of provision of receipts	994	1,415	1,319				1,226	1,141		
Control of mega events		117	102	30	25			12		
Preventive controls (undefined)								559		
Checks of discrepancies (desk audit)	2,864	2,470	2,400			5,150	6,197	7,099		
Checks on suppliers to state institutions		748								
Checks on importers		386								
Follow-up on complaints about taxpayers (visits to taxpayer address)	865	1,608	969				5,522	8,130		
Messages to non-filers for informative declaration	2,304	2,924	3,344			2,130	1,190	1,024		
Messages to non-filers for income and sales tax	4,318	4,284	4,788	17,500	4,586	9,220	9,685	7,963		
Publication of sales tax non-filers								7,104		
Of which, also income tax non-filers								1,376		

Note: Authors’ compilation based on tax authority’s annual enforcement plans and their evaluations. This table contains a non-exhaustive list of documented enforcement activities conducted by the extensive control unit. It does not include interventions conducted by the units for payment arrears and taxpayer services. “Checks” and “follow-ups” follow a detailed protocol underpinned by the tax administration regulations. They usually begin with a phone call, which (in case of no response by the taxpayer) is followed by an official notification with justification, a personal visit, the shop closure or administrative determination of amount to pay (as per a formula and all available information), and finally the transmission of the case to payment arrears (unless the amount owed is below a certain threshold) or to the audit department. The delay between each of these steps is specified by the regulation. Tax declarations presented or rectified in this process are checked by the assigned tax officer for consistency with third-party information and sector-specific average profit margins. “Messages” are done by email or SMS. Given data availability and the desire to have comparable information across years and types of activities, the figures in this table refer to planned activities (except for control of public events where only realized numbers were available). The execution rate varies between 70% and 150% and is on average close to the planned rate. The activities presented in this list are similar to control activities found in other low- and middle-income countries (e.g., Dominican Republic, Guatemala, and Senegal).

\*Out of the shop closures, about one half to one third are for non-filing, the remainder for non-emission of receipt or non-payment of declared taxes.

Table A5: Balance of Randomization, Firm Characteristics

	Firms with Third-Party Information (Experiment 1)					Firms without Third-Party Information (Experiment 2)				
	(1) Control	(2) D1: Control - Baseline email	(3) D2: Control - Information email	(4) D1=D2=0 F-statistic	(5) D1=D2=0 p-value	(6) Control	(7) D1: Control - Baseline email	(8) D2: Control - Information email	(9) D1=D2=0 F-statistic	(10) D1=D2=0 p-value
Corporation	0.142 (0.00561)	-0.00276 (0.00789)	-0.00360 (0.00794)	0.113	0.893	0.262 (0.00445)	0.0111 (0.00786)	-0.00209 (0.00655)	1.434	0.238
Has legal representative	0.607 (0.00808)	-0.00215 (0.0114)	0.00354 (0.0115)	0.126	0.882	0.659 (0.00469)	0.00915 (0.00694)	-0.00114 (0.00690)	1.240	0.289
Has second email	0.0562 (0.00359)	0.00131 (0.00506)	0.00292 (0.00514)	0.162	0.851	0.0542 (0.00205)	-0.00112 (0.00290)	0.00207 (0.00294)	0.602	0.547
Located in San José	0.490 (0.00795)	-0.00202 (0.0113)	0.000361 (0.0114)	0.0256	0.975	0.488 (0.00484)	0.00408 (0.00753)	0.00366 (0.00699)	0.197	0.821
Was contacted early	0.117 (0.00503)	0.00554 (0.00716)	-0.00215 (0.00713)	0.612	0.543	0.00202 (0.000405)	0.000453 (0.000601)	0.000723 (0.000621)	0.715	0.489
TPI > 2.5 million CRC	0.346 (0.00794)	-0.00485 (0.0111)	-0.0188* (0.0110)	1.585	0.205					
TPI > 6 million CRC	0.182 (0.00692)	0.00774 (0.00976)	-0.00626 (0.00932)	1.131	0.323					
Made advance payment in 2014	0.0233 (0.00235)	0.00139 (0.00334)	0.0000564 (0.00332)	0.114	0.892	0.00462 (0.000671)	0.000738 (0.000936)	-0.000818 (0.000869)	1.674	0.188
Filed in 2013	0.329 (0.00745)	0.00716 (0.0104)	-0.00477 (0.0106)	0.660	0.517	0.174 (0.00355)	-0.00974* (0.00506)	-0.00740 (0.00498)	2.035	0.131
Reported net liability > 0 in 2013	0.0853 (0.00441)	0.000409 (0.00620)	0.00608 (0.00630)	0.579	0.561	0.0156 (0.00112)	0.000752 (0.00161)	0.0000480 (0.00158)	0.135	0.873
Made payment in 2013	0.0533 (0.00356)	-0.00165 (0.00494)	0.0000129 (0.00500)	0.0763	0.927	0.0106 (0.000923)	0.000339 (0.00133)	-0.000103 (0.00130)	0.0604	0.941
Was third-party informant in 2013	0.190 (0.00634)	-0.00707 (0.00875)	-0.0116 (0.00881)	0.875	0.417	0.0457 (0.00190)	-0.000366 (0.00270)	-0.00155 (0.00269)	0.182	0.834
Observations	4,128	4,260	4,127			12,350	12,516	12,376		

Note: This table shows the balance of randomization in terms of firm characteristics, as measured before the experiment start. The rows correspond to the different variables. Columns 1-5 (6-10) correspond to the sample of firms with (without) third-party information, i.e., experiment 1 (2). Column 1 (6) displays the mean for the control group, columns 2 and 3 (7 and 8) show the mean difference between the control group and treatment groups 1 and 2, respectively, column 4 (9) reports an F-statistic from a test of the hypothesis that the two treatment groups are jointly equal to the control group, and column 5 (10) provides the corresponding p-value. Robust standard errors clustered by email address are in parentheses. TPI stands for third-party information (third-party reported sales), meaning the sum of sales reported by clients (D151), state institutions (D150), and credit/debit card companies (D153). The cutoffs of 2.5 million and 6 million CRC correspond to priority group designations used by the tax authority. When treated firms had two email addresses on file, the tax authority sent the same email to both. We ensure that the proportion of firms with two email addresses is balanced across control and treatment groups, and we control for second email addresses when we estimate treatment effects. As one regional tax office deviated from the experiment design and contacted firms prior to the start of the experiment date through phone calls and emails (different from the experimental emails presented in the previous sections), we also consider whether the occurrence of such early communication is balanced across treatment groups.

Table A6: Balance of Randomization, Outcomes at Baseline

	Firms with Third-Party Information (Experiment 1)					Firms without Third-Party Information (Experiment 2)				
	(1) Control	(2) D1: Control - Baseline email	(3) D2: Control - Information email	(4) D1=D2=0 F-statistic	(5) D1=D2=0 p-value	(6) Control	(7) D1: Control - Baseline email	(8) D2: Control - Information email	(9) D1=D2=0 F-statistic	(10) D1=D2=0 p-value
Filed	0.0567 (0.00370)	0.00411 (0.00532)	0.00195 (0.00522)	0.298	0.742	0.0131 (0.00102)	0.000545 (0.00148)	0.000296 (0.00152)	0.0686	0.934
Had positive net liability	0.0167 (0.00202)	0.00324 (0.00294)	0.00243 (0.00293)	0.667	0.513	0.000648 (0.000229)	0.000950** (0.000453)	0.000483 (0.000379)	2.420	0.0889
Made payment	0.00751 (0.00134)	0.00282 (0.00205)	0.00170 (0.00200)	0.985	0.373	0.000405 (0.000181)	0.000474 (0.000340)	0.000161 (0.000280)	0.976	0.377
Log payment	0.0857 (0.0154)	0.0343 (0.0238)	0.0185 (0.0229)	1.056	0.348					
Was third-party informant	0.164 (0.00586)	-0.00343 (0.00818)	-0.00699 (0.00844)	0.342	0.710	0.0117 (0.000967)	0.000165 (0.00138)	0.00103 (0.00146)	0.273	0.761
No. months decl. sales tax	0.619 (0.0381)	-0.0396 (0.0524)	-0.0607 (0.0521)	0.692	0.501	0.243 (0.0131)	-0.0249 (0.0183)	0.00361 (0.0188)	1.431	0.239
No. months paid sales tax	0.126 (0.0153)	-0.0227 (0.0204)	-0.0264 (0.0204)	0.940	0.390	0.0148 (0.00248)	0.00643 (0.00421)	0.00441 (0.00393)	1.347	0.260
Sales tax payment	108900.9 (62816.2)	-75006.4 (64536.4)	-64056.2 (65884.1)	0.716	0.489	736.7 (208.0)	1416.5 (1728.3)	245.1 (483.3)	0.444	0.641
Deregistered	0.00388 (0.00102)	-0.00106 (0.00131)	0.00000939 (0.00141)	0.486	0.615	0.00372 (0.000548)	-0.000768 (0.000731)	-0.00130* (0.000704)	1.705	0.182
Deregistered (sales tax)	0.000727 (0.000420)	-0.0000225 (0.000584)	-0.000242 (0.000542)	0.132	0.876	0.000891 (0.000268)	-0.000491 (0.000322)	-0.000487 (0.000324)	1.355	0.258
Switched to simplified tax regime	0.000242 (0.000242)	-0.000242 (0.000242)	-0.000242 (0.000242)	1.000	0.317					
Observations	4,128	4,260	4,127			12,350	12,516	12,376		

Note: This table shows the balance of randomization in terms of outcomes, as measured by the day before the experiment start. The rows correspond to the different variables for fiscal year 2014. The number of months that a taxpayer filed and paid sales tax, and the sales tax payment are calculated over July 2013 until June 2014. Columns 1-5 (6-10) correspond to the sample of firms with (without) third-party information, i.e., sub-experiment 1 (2). Column 1 (6) displays the mean for the control group, columns 2 and 3 (7 and 8) show the mean difference between the control group and treatment groups 1 and 2, respectively, column 4 (9) reports an F-statistic from a test of the hypothesis that the two treatment groups are jointly equal to the control group, and column 5 (10) provides the corresponding p-value. Robust standard errors clustered by email address are in parentheses.

Table A7: Impact on Income Tax Compliance, Firms with Third-Party Information (No Controls)

	OLS				
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.211*** (0.00896)	0.0447*** (0.00508)	0.0307*** (0.00387)	0.341*** (0.0441)	8354.8*** (2521.5)
T2: Information email	0.227*** (0.00916)	0.0511*** (0.00524)	0.0366*** (0.00408)	0.401*** (0.0458)	10121.6*** (2873.3)
Constant	0.115*** (0.00507)	0.0339*** (0.00284)	0.0172*** (0.00202)	0.194*** (0.0230)	5015.8*** (1354.3)
Control group avg.	0.115	0.0339	0.0172	0.194	5015.8
T1=T2 p-value (Wald test)	0.136	0.292	0.223	0.273	0.593
Observations	12,515	12,515	12,515	12,515	12,515

Note: This table displays estimates of the treatment effect on tax filing and payment, without controlling for firm characteristics. It is otherwise identical to Table 1, Panel A, in the paper.

Table A8: Impact on Income Tax Compliance, Firms with Third-Party Information (All Controls)

	OLS				
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.211*** (0.00873)	0.0444*** (0.00480)	0.0307*** (0.00377)	0.341*** (0.0428)	8352.9*** (2449.8)
T2: Information email	0.230*** (0.00889)	0.0519*** (0.00494)	0.0373*** (0.00397)	0.409*** (0.0444)	10441.2*** (2823.7)
Corporation	-0.00417 (0.0157)	0.0443*** (0.0116)	0.00724 (0.00846)	0.116 (0.0997)	11589.0 (7276.9)
Has legal representative	-0.000636 (0.00809)	-0.00119 (0.00422)	0.00263 (0.00341)	0.0412 (0.0376)	2819.4 (2083.4)
Has second email	0.0500** (0.0220)	-0.00527 (0.0168)	0.0128 (0.0124)	0.169 (0.151)	13804.4 (13278.5)
Located in San José	0.00844 (0.00770)	-0.00224 (0.00424)	0.00369 (0.00343)	0.0567 (0.0385)	8170.2*** (2331.9)
TPI > 2.5 million CRC	0.0593*** (0.0113)	0.0384*** (0.00632)	0.0286*** (0.00538)	0.297*** (0.0574)	-1035.9 (1846.5)
TPI > 6 million CRC	0.00816 (0.0150)	0.0717*** (0.0104)	0.0230*** (0.00824)	0.335*** (0.0932)	28358.5*** (5297.4)
Made advance payment for 2014	0.143*** (0.0315)	0.126*** (0.0292)	0.114*** (0.0260)	1.303*** (0.305)	67205.6** (27609.5)
Filed in 2013	0.104*** (0.0104)	-0.000137 (0.00558)	0.00274 (0.00455)	0.000274 (0.0509)	-7209.5*** (2385.0)
Reported net liability > 0 in 2013	-0.0677*** (0.0250)	0.117*** (0.0212)	-0.0155 (0.0114)	-0.213* (0.126)	-17826.7*** (4711.1)
Made payment in 2013	0.107*** (0.0305)	0.0453* (0.0275)	0.137*** (0.0189)	1.679*** (0.219)	96446.0*** (16718.6)
Was third-party informant in 2013	0.0504*** (0.0133)	0.00722 (0.00832)	-0.00905 (0.00664)	-0.0744 (0.0754)	8708.7** (4035.9)
Constant	0.0397*** (0.00809)	-0.0133*** (0.00436)	-0.00983*** (0.00352)	-0.136*** (0.0396)	-12384.2*** (2780.4)
Control group avg.	0.115	0.0339	0.0172	0.194	5015.8
T1=T2 p-value (Wald test)	0.074	0.189	0.159	0.195	0.514
Observations	12,515	12,515	12,515	12,515	12,515

Note: This table displays estimates of the treatment effect on tax filing and payment, controlling for firm characteristics. It is identical to Table 1, Panel A, in the paper, but displays the coefficients on all control variables, as noted in the table rows. TPI stands for third-party information (third-party reported sales), meaning the sum of sales reported by clients (D151), state institutions (D150), and credit/debit card companies (D153). The cutoffs of 2.5 million and 6 million CRC correspond to the priority group designations used by the tax authority.

Table A9: Impact on Income Tax Compliance, Firms with Third-Party Information (Probit, OLS, PPML)

	Probit			OLS	PPML
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.213*** (0.00866)	0.0460*** (0.00460)	0.0312*** (0.00367)	0.341*** (0.0428)	8188.9*** (2399.3)
T2: Information email	0.232*** (0.00886)	0.0537*** (0.00478)	0.0377*** (0.00388)	0.409*** (0.0444)	10101.2*** (2701.3)
Corporation	-0.00219 (0.0147)	0.0341*** (0.00803)	0.00776 (0.00617)	0.116 (0.0997)	6598.5* (3422.9)
Has legal representative	-0.000437 (0.00811)	-0.00220 (0.00445)	0.00173 (0.00358)	0.0412 (0.0376)	3346.1 (2524.6)
Has second email	0.0448** (0.0210)	-0.000555 (0.00842)	0.00712 (0.00798)	0.169 (0.151)	2269.0 (3427.9)
Located in San José	0.00806 (0.00765)	-0.00341 (0.00415)	0.00242 (0.00336)	0.0567 (0.0385)	7295.1*** (2201.9)
TPI > 2.5 million CRC	0.0639*** (0.0111)	0.0508*** (0.00632)	0.0325*** (0.00515)	0.297*** (0.0574)	6499.4** (2695.3)
TPI > 6 million CRC	0.00712 (0.0136)	0.0407*** (0.00760)	0.0136** (0.00569)	0.335*** (0.0932)	14622.1*** (3717.2)
Made advance payment for 2014	0.123*** (0.0300)	0.0529*** (0.0159)	0.0508*** (0.0147)	1.303*** (0.305)	6656.9* (3788.3)
Filed in 2013	0.104*** (0.0102)	0.00398 (0.00558)	0.00450 (0.00452)	0.000274 (0.0509)	-6652.1 (5233.2)
Reported net liability > 0 in 2013	-0.0554*** (0.0193)	0.0717*** (0.0148)	-0.00755 (0.00846)	-0.213* (0.126)	-9350.7 (8021.1)
Made payment in 2013	0.0950*** (0.0294)	0.0228* (0.0125)	0.106*** (0.0259)	1.679*** (0.219)	77753.5** (33929.4)
Was third-party informant in 2013	0.0463*** (0.0124)	0.00393 (0.00619)	-0.00728 (0.00478)	-0.0744 (0.0754)	4734.4* (2774.4)
Constant				-0.136*** (0.0396)	
Control group avg.	0.115	0.0339	0.0172	0.194	5015.8
T1=T2 p-value (Wald test)	0.069	0.169	0.162	0.195	0.531
Observations	12,515	12,515	12,515	12,515	12,515

Note: This table displays estimates of the treatment effect on tax filing and payment, controlling for firm characteristics, using probit, OLS, and Poisson pseudo-maximum likelihood (PPML) models. It is identical to Table 1, Panel A, in the paper. Average partial effects are reported for probit and PPML.

Table A10: Impact on Income Tax Compliance, Firms without Third-Party Information (No Controls)

	OLS				
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.149*** (0.00421)	0.00661*** (0.000915)	0.00478*** (0.000783)	0.0500*** (0.00840)	270.5*** (60.33)
T2: Information email	0.148*** (0.00410)	0.00581*** (0.000869)	0.00428*** (0.000744)	0.0409*** (0.00759)	166.6*** (52.08)
Constant	0.0393*** (0.00176)	0.00178*** (0.000380)	0.00130*** (0.000324)	0.0142*** (0.00356)	96.15*** (27.29)
Control group avg.	0.0393	0.00178	0.00130	0.0142	96.15
T1=T2 p-value (Wald test)	0.872	0.487	0.611	0.365	0.136
Observations	37,242	37,242	37,242	37,242	37,242

Note: This table displays estimates of the treatment effect on tax filing and payment, without controlling for firm characteristics. It is otherwise identical to Table 1, Panel B, in the paper.



Table A11: Impact on Income Tax Compliance, Firms without Third-Party Information (All Controls)

	OLS				
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.151*** (0.00410)	0.00651*** (0.000897)	0.00475*** (0.000773)	0.0496*** (0.00829)	265.1*** (59.38)
T2: Information email	0.149*** (0.00405)	0.00587*** (0.000862)	0.00431*** (0.000740)	0.0411*** (0.00754)	168.9*** (51.54)
Corporation	-0.0129*** (0.00496)	0.00164 (0.00113)	0.00140 (0.000974)	0.0167 (0.0104)	195.9** (81.09)
Has legal representative	-0.000571 (0.00407)	0.000727 (0.000811)	-0.0000674 (0.000723)	0.00297 (0.00722)	87.05** (43.00)
Has second email	0.0281*** (0.00893)	0.00245 (0.00252)	0.00296 (0.00224)	0.0330 (0.0246)	196.9 (191.9)
Located in San José	-0.00133 (0.00369)	-0.000892 (0.000799)	-0.00101 (0.000693)	-0.0111 (0.00722)	-68.24 (50.74)
Made advance payment for 2014	0.0976*** (0.0344)	0.0476** (0.0203)	0.0127 (0.0141)	0.153 (0.156)	1627.1 (1335.7)
Filed in 2013	0.132*** (0.00652)	0.00144 (0.00143)	0.000816 (0.00124)	0.00563 (0.0130)	-22.34 (86.75)
Reported net liability > 0 in 2013	-0.00941 (0.0299)	0.0528*** (0.0167)	-0.00400 (0.00689)	-0.0477 (0.0779)	-564.1 (648.3)
Made payment in 2013	0.0435 (0.0365)	0.0440* (0.0228)	0.0749*** (0.0160)	0.801*** (0.176)	5627.5*** (1459.9)
Was third-party informant in 2013	0.0164 (0.0121)	0.00274 (0.00410)	0.000828 (0.00328)	0.0162 (0.0359)	148.8 (288.9)
Constant	0.0177*** (0.00363)	-0.000710 (0.000755)	0.000336 (0.000619)	0.00134 (0.00647)	-51.26 (45.24)
Control group avg.	0.0393	0.00178	0.00130	0.0142	96.15
T1=T2 p-value (Wald test)	0.809	0.565	0.649	0.397	0.161
Observations	37,242	37,242	37,242	37,242	37,242

Note: This table displays estimates of the treatment effect on tax filing and payment, controlling for firm characteristics. It is identical to Table 1, Panel B, in the paper, but displays the coefficients on all control variables, as noted in the table rows.

Table A12: Impact on Income Tax Compliance, Firms without Third-Party Information (Probit, OLS, PPML)

	Probit			OLS	PPML
	(1) Filed	(2) Positive net liability	(3) Positive payment	(4) Log payment	(5) Payment
T1: Baseline email	0.150*** (0.004)	0.006*** (0.001)	0.005*** (0.001)	0.050*** (0.008)	262.430*** (59.096)
T2: Information email	0.149*** (0.004)	0.006*** (0.001)	0.004*** (0.001)	0.041*** (0.008)	166.064*** (52.392)
Corporation	-0.013*** (0.005)	0.002* (0.001)	0.002 (0.001)	0.017 (0.010)	177.133** (73.143)
Has legal representative	-0.000 (0.004)	0.001 (0.001)	-0.000 (0.001)	0.003 (0.007)	103.848** (49.538)
Has second email	0.027*** (0.009)	0.001 (0.002)	0.002 (0.002)	0.033 (0.025)	98.140 (105.699)
Located in San José	-0.002 (0.004)	-0.001 (0.001)	-0.001 (0.001)	-0.011 (0.007)	-60.903 (50.039)
Made advance payment for 2014	0.075*** (0.028)	0.014* (0.007)	0.003 (0.004)	0.153 (0.156)	151.766 (171.565)
Filed in 2013	0.132*** (0.006)	0.002* (0.001)	0.001 (0.001)	0.006 (0.013)	-3.763 (92.633)
Reported net liability > 0 in 2013	-0.009 (0.020)	0.032*** (0.012)	-0.003 (0.004)	-0.048 (0.078)	-315.752 (426.717)
Made payment in 2013	0.031 (0.028)	0.006 (0.005)	0.086 (0.082)	0.801*** (0.176)	13,505.357 (21,428.248)
Was third-party informant in 2013	0.015* (0.009)	0.002 (0.002)	0.001 (0.002)	0.016 (0.036)	75.884 (143.009)
Constant				0.001 (0.006)	
Control group avg.	0.0393	0.00178	0.00130	0.0142	96.15
T1=T2 p-value (Wald test)	0.807	0.617	0.613	0.397	0.160
Observations	37,242	37,242	37,242	37,242	37,242

Note: This table displays estimates of the treatment effect on tax filing and payment, controlling for firm characteristics, using probit, OLS, and Poisson pseudo-maximum likelihood (PPML) models. It is identical to Table 1, Panel B, in the paper. Average partial effects are reported for probit and PPML.

Table A13: Impact on Other Compliance Outcomes (No Controls)

OLS											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	No. months decl. sales tax	No. months paid sales tax	Sales tax payment	Deregistered (sales tax)	Deregistered	Switched to simplified regime	Filed income tax for 2013	Paid income tax for 2013	Presented informative declaration	Reported supplier	Reported client
A: Firms with Third-Party Information											
T1: Baseline email	-0.0303 (0.0535)	-0.0217 (0.0210)	-9319.0 (8142.6)	0.000167 (0.00104)	0.0115*** (0.00268)	0.000462 (0.000473)	0.0384*** (0.0107)	0.000341 (0.000514)	0.0265*** (0.00880)	0.00323 (0.00649)	0.0258*** (0.00788)
T2: Information email	-0.0524 (0.0531)	-0.0271 (0.0211)	-6488.6 (8551.0)	-0.000484 (0.000968)	0.0111*** (0.00268)	0.000485 (0.000485)	0.0180* (0.0108)	0.00244 (0.00521)	0.0456*** (0.00910)	0.00681 (0.00662)	0.0398*** (0.00818)
Constant	0.637*** (0.0386)	0.133*** (0.0157)	29095.0*** (6600.3)	0.00218*** (0.000726)	0.00921*** (0.00152)	0.000242 (0.000242)	0.350*** (0.00757)	0.0572*** (0.00367)	0.177*** (0.00605)	0.0928*** (0.00463)	0.128*** (0.00531)
Control group avg.	0.637	0.133	29095.0	0.00218	0.00921	0.000242	0.350	0.0572	0.177	0.0928	0.128
T1=T2 p-value (Wald test)	0.670	0.787	0.696	0.506	0.922	0.969	0.059	0.685	0.040	0.586	0.103
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515
B: Firms without Third-Party Information											
T1: Baseline email	-0.0212 (0.0190)	0.00682 (0.00444)	7.568 (88.42)	0.0000380 (0.000714)	0.0199*** (0.00187)	0.000238 (0.000212)	0.0409*** (0.00555)	0.00161 (0.00138)	0.00103 (0.00147)	-0.000444 (0.00122)	0.00178* (0.000925)
T2: Information email	0.00973 (0.0197)	0.00481 (0.00413)	35.74 (90.62)	0.00129 (0.000783)	0.0207*** (0.00189)	0.000646** (0.000280)	0.0419*** (0.00542)	0.000543 (0.00134)	0.00272* (0.00157)	0.000788 (0.00133)	0.00177* (0.000920)
Constant	0.255*** (0.0135)	0.0159*** (0.00260)	357.5*** (63.08)	0.00316*** (0.000505)	0.0121*** (0.000986)	0.000162 (0.000115)	0.189*** (0.00366)	0.0109*** (0.000933)	0.0129*** (0.00102)	0.00939*** (0.000868)	0.00437*** (0.000594)
Control group avg.	0.255	0.0159	357.5	0.00316	0.0121	0.000162	0.189	0.0109	0.0129	0.00939	0.00437
T1=T2 p-value (Wald test)	0.113	0.677	0.754	0.111	0.735	0.190	0.864	0.442	0.291	0.349	0.991
Observations	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242

Note: This table displays OLS estimates of the treatment effect on a variety of compliance outcomes, as per the column titles. It is identical to Tables 2 and 3 in the paper, but does not control for firm characteristics and displays separate treatment coefficients in Panel B.

Table A14: Impact on Other Compliance Outcomes (Controls)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	No. months decl. sales tax	No. months paid sales tax	Sales tax payment	Deregistered (sales tax)	Deregistered	Switched to simplified regime	Filed income tax for 2013	Paid income tax for 2013	Presented informative declaration	Reported supplier	Reported client
OLS											
A: Firms with Third-Party Information											
T1: Baseline email	-0.0393 (0.0504)	-0.0231 (0.0205)	-9751.5 (7965.0)	0.000170 (0.00103)	0.0115*** (0.00268)	0.000471 (0.000476)	0.0321*** (0.00406)	0.00194 (0.00152)	0.0276*** (0.00784)	0.00357 (0.00586)	0.0264*** (0.00713)
T2: Information email	-0.0418 (0.0493)	-0.0231 (0.0203)	-5568.2 (8331.9)	-0.000525 (0.000963)	0.0111*** (0.00267)	0.000484 (0.000483)	0.0228*** (0.00387)	0.00229 (0.00156)	0.0514*** (0.00827)	0.00966 (0.00597)	0.0444*** (0.00762)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.637	0.133	29095.0	0.00218	0.00921	0.000242	0.350	0.0572	0.177	0.0928	0.128
T1=T2 p-value (Wald test)	0.960	0.999	0.563	0.481	0.885	0.982	0.048	0.837	0.006	0.305	0.024
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515
B: Firms without Third-Party Information											
T1: Baseline email	-0.0158 (0.0185)	0.00701 (0.00441)	8.135 (87.94)	0.00000922 (0.000713)	0.0200*** (0.00187)	0.000238 (0.000212)	0.0500*** (0.00257)	0.00126*** (0.000373)	0.00101 (0.00142)	-0.000539 (0.00119)	0.00184** (0.000916)
T2: Information email	0.0168 (0.0191)	0.00535 (0.00413)	45.88 (90.15)	0.00130* (0.000782)	0.0207*** (0.00188)	0.000643** (0.000280)	0.0488*** (0.00252)	0.000635** (0.000300)	0.00300* (0.00154)	0.00102 (0.00130)	0.00186** (0.000914)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.255	0.0159	357.5	0.00316	0.0121	0.000162	0.189	0.0109	0.0129	0.00939	0.00437
T1=T2 p-value (Wald test)	0.086	0.731	0.674	0.100	0.745	0.194	0.703	0.156	0.200	0.228	0.980
Observations	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242

Note: This table displays OLS estimates of the treatment effect on a variety of compliance outcomes, as per the column titles. It is identical to Tables 2 and 3 in the paper, but displays separate treatment coefficients in Panel B.

Table A15: Impact on Other Compliance Outcomes (Probit, OLS, PPML)

	Probit			OLS			PPML				
	(1) No. months decl. sales tax	(2) No. months paid sales tax	(3) Sales tax payment	(4) Deregistered (sales tax)	(5) Deregistered	(6) Switched to simplified regime	(7) Filed income tax for 2013	(8) Paid income tax for 2013	(9) Presented informative declaration	(10) Reported supplier	(11) Reported client
A: Firms with Third-Party Information											
T1: Baseline email	-0.0393 (0.0504)	-0.0231 (0.0205)	-10482.6 (7582.8)	0.000124 (0.000964)	0.0114*** (0.00268)	0.000443 (0.000449)	0.0312*** (0.00388)	0.00188 (0.00145)	0.0296*** (0.00773)	0.00396 (0.00571)	0.0283*** (0.00700)
T2: Information email	-0.0418 (0.0493)	-0.0231 (0.0203)	-5688.8 (8325.7)	-0.000416 (0.000936)	0.0108*** (0.00264)	0.000456 (0.000464)	0.0226*** (0.00366)	0.00252* (0.00152)	0.0540*** (0.00827)	0.00977* (0.00586)	0.0475*** (0.00762)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.637	0.133	29095.0	0.00218	0.00921	0.000242	0.350	0.0572	0.177	0.0928	0.128
T1=T2 p-value (Wald test)	0.960	0.999	0.480	0.569	0.840	0.980	0.060	0.700	0.005	0.324	0.016
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515
B: Firms without Third-Party Information											
T: Any email	0.000373 (0.0162)	0.00619* (0.00353)	24.85 (76.90)	0.000659 (0.000632)	0.0205*** (0.00149)	0.000435** (0.000194)	0.0492*** (0.00196)	0.000959*** (0.000252)	0.00188 (0.00124)	0.000393 (0.00103)	0.00170** (0.000761)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.255	0.0159	357.5	0.00316	0.0121	0.000162	0.189	0.0109	0.0129	0.00939	0.00437
Observations	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242

Note: This table displays OLS estimates of the treatment effect on a variety of compliance outcomes, as per the column titles. It is identical to Tables 2 and 3 in the paper, but uses probit, OLS, and PPML models as per the column titles.

Table A16: Medium-Term Impact on Compliance Outcomes and Third-Party Reports in 2015 and 2016 (No Controls)

	By filing deadline					Latest data				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
	Filed income tax	Paid income tax	Reported client	Reported supplier	No. of clients reported	No. of suppliers reported	Reported by state institution	Reported by private client or supplier	Reported by card company	
A: Firms with Third-Party Information										
T effect in 2015: Any 2014 email	0.064*** (0.009)	0.006 (0.004)	0.017*** (0.007)	0.002 (0.006)	0.015** (0.006)	0.000 (0.005)	-0.003 (0.004)	-0.008 (0.009)	0.002 (0.005)	
Control group avg. 2015	0.337	0.044	0.129	0.093	0.107	0.071	0.041	0.691	0.085	
T effect in 2016: Any 2014 email	0.018** (0.009)	0.009** (0.004)	0.005 (0.007)	-0.001 (0.006)	0.006 (0.006)	-0.002 (0.005)		-0.016* (0.009)		
Control group avg. 2016	0.371	0.053	0.155	0.106	0.128	0.079		0.613		
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	
B: Firms without Third-Party Information										
T effect in 2015: Any 2014 email	0.070*** (0.004)	0.002 (0.001)	0.004** (0.002)	0.003* (0.001)	0.003** (0.002)	0.002 (0.001)				
Control group avg. 2015	0.154	0.010	0.024	0.017	0.021	0.015				
T effect in 2016: Any 2014 email	0.013*** (0.005)	0.002 (0.001)	0.001 (0.002)	0.002 (0.002)	0.000 (0.002)	0.001 (0.002)				
Control group avg. 2016	0.192	0.017	0.040	0.027	0.035	0.022				
Observations	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	37,242	

Note: This table displays OLS estimates of the treatment effect on tax compliance in the medium-term. It is identical to Tables 5 and 6 in the paper, except that it does not control for firm characteristics.

Table A17: Medium-Term Impact on Compliance Outcomes and Third-Party Reports in 2015 and 2016 (Controls Except Follow-Up)

	By filing deadline				Latest data					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
	Filed income tax	Paid income tax	Reported client	Reported supplier	No. of clients reported	No. of suppliers reported	Reported by state institution	Reported by private client or supplier	Reported by card company	
A: Firms with Third-Party Information										
T effect in 2015: Any 2014 email	0.066*** (0.009)	0.007* (0.004)	0.019*** (0.006)	0.004 (0.005)	0.016*** (0.006)	0.001 (0.004)	-0.003 (0.004)	-0.007 (0.009)	0.002 (0.005)	
Control group avg. 2015	0.337	0.044	0.129	0.093	0.107	0.071	0.041	0.691	0.085	
T effect in 2016: Any 2014 email	0.019*** (0.009)	0.009** (0.004)	0.007 (0.007)	-0.000 (0.006)	0.007 (0.006)	-0.002 (0.005)		-0.015 (0.009)		
Control group avg. 2016	0.371	0.053	0.155	0.106	0.128	0.079		0.613		
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	
A: Firms without Third-Party Information										
T effect in 2015: Any 2014 email	0.072*** (0.004)	0.002* (0.001)	0.004** (0.002)	0.003* (0.001)	0.003** (0.002)	0.002 (0.001)				
Control group avg. 2015	0.154	0.010	0.024	0.017	0.021	0.015				
T effect in 2016: Any 2014 email	0.015*** (0.004)	0.002 (0.001)	0.001 (0.002)	0.002 (0.002)	0.000 (0.002)	0.001 (0.002)				
Control group avg. 2016	0.192	0.017	0.040	0.027	0.035	0.022				
Observations	37,242	37,242	37,242	37,242	37,242	37,242				

Note: This table displays OLS estimates of the treatment effect on tax compliance in the medium-term. It is identical to Tables 5 and 6 in the paper, except that it controls only for firm characteristics but not for whether or not the firm was subject to a follow-up activity.

Table A18: Medium-Term Impact on Compliance Outcomes and Third-Party Reports in 2015 and 2016 (Probit, PPML)

	By filing deadline						Latest data			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
	Filed income tax	Paid income tax	Reported client	Reported supplier	No. of clients reported	No. of suppliers reported	Reported by state institution	Reported by private client or supplier	Reported by card company	
A: Firms with Third-Party Information										
T effect in 2015: Any 2014 email	0.066*** (0.009)	0.007* (0.004)	0.020*** (0.006)	0.004 (0.005)	0.016*** (0.006)	0.001 (0.004)	-0.003 (0.004)	-0.007 (0.009)	0.002 (0.005)	
Control group avg. 2015	0.337	0.044	0.129	0.093	0.107	0.071	0.041	0.691	0.085	
T effect in 2016: Any 2014 email	0.019*** (0.009)	0.010** (0.004)	0.007 (0.007)	-0.000 (0.006)	0.007 (0.006)	-0.002 (0.005)		-0.015 (0.009)		
Control group avg. 2016	0.371	0.053	0.155	0.106	0.128	0.079		0.613		
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515	
B: Firms without Third-Party Information										
T effect in 2015: Any 2014 email	0.072*** (0.004)	0.002 (0.001)	0.004** (0.002)	0.003** (0.001)	0.003** (0.002)	0.002 (0.001)				
Control group avg. 2015	0.154	0.010	0.024	0.017	0.021	0.015				
T effect in 2016: Any 2014 email	0.015*** (0.004)	0.002 (0.001)	0.001 (0.002)	0.002 (0.002)	0.000 (0.002)	0.001 (0.002)				
Control group avg. 2016	0.192	0.017	0.040	0.027	0.035	0.022				
Observations	37,242	37,242	37,242	37,242	37,242	37,242				

Note: This table displays OLS estimates of the treatment effect on tax compliance in the medium-term. It is identical to Tables 5 and 6 in the paper, but uses probit, OLS, and PPML models as per the column titles. Average partial effects are reported.



Table A19: Impact on Income Tax Compliance, LATE

Subsample:	Corporations				Positive liability in 2013				Paid in 2013			
	(1) Positive net liability	(2) Positive payment	(3) Log payment	(4) Payment	(5) Positive net liability	(6) Positive payment	(7) Log payment	(8) Payment	(9) Positive net liability	(10) Positive payment	(11) Log payment	(12) Payment
A: Firms with Third-Party Information												
T1: Baseline email	0.0905*** (0.0209)	0.0481*** (0.0145)	0.592*** (0.175)	32776.1** (14505.2)	0.146*** (0.0309)	0.0893*** (0.0235)	1.062*** (0.278)	51713.2** (22835.9)	0.170*** (0.0402)	0.124*** (0.0348)	1.506*** (0.413)	76880.7*** (36706.4)
T2: Information email	0.0901*** (0.0209)	0.0707*** (0.0154)	0.879*** (0.185)	48928.3*** (16336.6)	0.174*** (0.0306)	0.110*** (0.0235)	1.308*** (0.281)	76168.4*** (27139.4)	0.238*** (0.0408)	0.175*** (0.0360)	2.087*** (0.431)	112442.3*** (43345.4)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.113	0.0427	0.498	18322.9	0.176	0.0767	0.894	34273.1	0.168	0.105	1.218	52755.0
T1=T2 p-value (Wald test)	0.987	0.185	0.165	0.373	0.392	0.440	0.430	0.386	0.128	0.212	0.231	0.440
Observations	1,750	1,750	1,750	1,750	1,094	1,094	1,094	1,094	660	660	660	660
B: Firms without Third-Party Information												
T1: Baseline email	0.0105*** (0.00217)	0.00752*** (0.00184)	0.0837*** (0.0205)	611.5*** (171.8)	0.108*** (0.0268)	0.0507*** (0.0202)	0.518*** (0.219)	2711.1 (1728.6)	0.134*** (0.0350)	0.0704*** (0.0293)	0.708*** (0.316)	3236.8 (2508.6)
T2: Information email	0.00754*** (0.00200)	0.00558*** (0.00169)	0.0555*** (0.0178)	312.9** (141.0)	0.0880*** (0.0257)	0.0520*** (0.0207)	0.538*** (0.222)	3584.3*** (1791.0)	0.0975*** (0.0334)	0.0636*** (0.0305)	0.637* (0.326)	3826.9 (2699.1)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	0.00278	0.00185	0.0208	159.2	0.0259	0.0155	0.176	1322.8	0.0305	0.0305	0.348	2871.5
T1=T2 p-value (Wald test)	0.260	0.392	0.249	0.133	0.563	0.961	0.943	0.700	0.407	0.857	0.861	0.858
Observations	9,875	9,875	9,875	9,875	592	592	592	592	398	398	398	398

Note: This table displays OLS estimates of the treatment effect on income tax payment. It reproduces columns 2-5 of Table 1 in the paper for different subsamples, as noted in the column titles.

Table A20: Impact on Other Compliance Outcomes, LATE

Subsample:	Previously filed sales tax		Small or inactive firm <sup>1</sup>		Likely to file for 2013 <sup>2</sup>		Self-Employed		Likely to file informative declaration <sup>3</sup>			
	(1) No. months decl. sales tax	(2) No. months paid sales tax	(3) Sales tax payment	(4) Deregistered (sales tax)	(5) Deregistered	(6) Switched to simplified regime	(7) Filed income tax for 2013	(8) Paid income tax for 2013	(9) Paid income tax for 2013	(10) Presented informative declaration	(11) Reported supplier	(12) Reported client
Outcome:												
A: Firms with Third-Party Information, Treatments Separated												
T1: Baseline email	-0.0653 (0.278)	-0.111 (0.163)	-51874.0 (65860.6)	0.00339 (0.00802)	0.0211*** (0.00452)	0.000612 (0.000615)	0.0704*** (0.0123)	0.00130 (0.00423)	0.00234 (0.00150)	0.0334** (0.0166)	0.00925 (0.0130)	0.0384*** (0.0149)
T2: Information email	-0.324 (0.278)	-0.171 (0.158)	-41774.1 (70312.8)	-0.00322 (0.00719)	0.0164*** (0.00408)	0.000580 (0.000578)	0.0627*** (0.0122)	0.00656 (0.00508)	0.00271* (0.00153)	0.0922*** (0.0210)	0.0196 (0.0147)	0.0866*** (0.0190)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Control group avg.	5.567	1.161	257583.4	0.0129	0.00613	0	0.0298	0.00777	0.0409	0.0439	0.0317	0.0293
T1=T2 p-value (Wald test)	0.370	0.706	0.873	0.413	0.385	0.970	0.613	0.304	0.831	0.009	0.499	0.022
Observations	1,385	1,385	1,385	1,385	5,016	5,016	2,325	2,325	10,765	1,204	1,204	1,204
B: Firms with Third-Party Information, Treatments Pooled												
T: Any email	-0.192 (0.238)	-0.140 (0.139)	-46944.7 (60281.3)	0.00166 (0.00647)	0.0187*** (0.00334)	0.000596 (0.000422)	0.0667*** (0.00967)	0.00386 (0.00390)	0.00252** (0.00124)	0.0616*** (0.0151)	0.0142 (0.0115)	0.0616*** (0.0134)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Control group avg.	5.567	1.161	257583.4	0.0129	0.00613	0	0.0298	0.00777	0.0409	0.0439	0.0317	0.0293
Observations	1,385	1,385	1,385	1,385	5,016	5,016	2,325	2,325	10,765	1,204	1,204	1,204
C: Firms without Third-Party Information												
T: Any email	0.0737 (0.117)	0.0578* (0.0325)	173.5 (699.5)	0.00696 (0.00467)	0.0203*** (0.00160)	0.000429* (0.000223)	0.0763*** (0.00415)	0.00192*** (0.000512)	0.000357 (0.000275)	-0.00203 (0.0192)	0.00478 (0.0180)	-0.00682 (0.00683)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Control group avg.	2.382	0.146	3249.5	0.0169	0.0109	0.000197	0.0173	0.000270	0.00834	0.0377	0.0314	0.00629
Observations	3,794	3,794	3,794	3,794	30,797	30,797	11,090	11,090	27,367	465	465	465

Note: This table displays OLS estimates of the treatment effect on a variety of compliance outcomes. It reproduces Tables 2 and 3 in the paper for different subsamples, as noted in the column titles.

<sup>1</sup> A firm is considered small or inactive if it had third-party reported sales less than \$2.5 million CRC and it did not file an income tax declaration for 2013.

<sup>2</sup> A firm is considered likely to file for 2013 if it filed an income or sales tax declaration at any time in the three years before 2013 or it made an advance payment but did not file for 2013.

<sup>3</sup> A firm is considered likely to file an informative declaration if it filed one in a previous year, it was the subject of a firm-to-firm informative declaration by the start of the experiment, and it had not yet filed one for the current year. (The reason that there are some observations who satisfy this condition for Panel C is that although firms were separated into two groups—those with and without TPI—for this experiment, a modest number of non-TPI firms (20%) were the subjects of firm-to-firm declarations after this separation. The fraction of non-TPI firms that were covered by a firm-to-firm informative declaration by the start of the experiment is balanced across treatment and control groups.)

Table A21: Medium-Term Impact on Compliance Outcomes in 2015 and 2016, LATE

	Did not file income tax in 2013		No liability or payment in 2013		Did not file informative declaration in 2013		
	(1) Filed income tax	(2) Paid income tax	(3) Reported client	(4) Reported supplier	(5) No. of clients reported	(6) No. of suppliers reported	
A: Firms with Third-Party Information							
T effect in 2015: Any 2014 email	0.095*** (0.011)	0.011*** (0.004)	0.023*** (0.006)	0.007 (0.005)	0.023*** (0.006)	0.006 (0.004)	
Control group avg. 2015	0.256	0.035	0.091	0.059	0.078	0.045	
T effect in 2016: Any 2014 email	0.027** (0.011)	0.015*** (0.004)	0.003 (0.007)	0.000 (0.006)	0.005 (0.007)	0.000 (0.005)	
Control group avg. 2016	0.304	0.043	0.126	0.079	0.109	0.060	
Observations	8,267	11,417	10,210	10,210	10,210	10,210	
B: Firms without Third-Party Information							
T effect in 2015: Any 2014 email	0.069*** (0.004)	0.001 (0.001)	0.005*** (0.002)	0.003** (0.001)	0.004** (0.002)	0.002 (0.001)	
Control group avg. 2015	0.115	0.009	0.021	0.013	0.019	0.012	
T effect in 2016: Any 2014 email	0.018*** (0.005)	0.002 (0.001)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	0.001 (0.001)	
Control group avg. 2016	0.151	0.016	0.037	0.023	0.033	0.019	
Observations	30,825	36,646	35,565	35,565	35,565	35,565	

Note: This table displays OLS estimates of the treatment effect on tax compliance in the medium-term. It reproduces Table 5 in the paper for different subsamples, as noted in the column titles.

Table A22: Medium-Term Impact on Third-Party Report Coverage in 2015 and 2016, LATE

	Previously reported by third party <sup>1</sup>			Below median TPI			Unlikely to file informative declaration <sup>2</sup>		
	(1) Reported by state institution	(2) Reported by private client or supplier	(3) Reported by card company	(4) Reported by state institution	(5) Reported by private client or supplier	(6) Reported by card company	(7) Reported by state institution	(8) Reported by private client or supplier	(9) Reported by card company
	Firms with Third-Party Information								
T effect in 2015: Any 2014 email	0.001 (0.030)	-0.005 (0.009)	0.010 (0.034)	-0.004 (0.004)	-0.017 (0.013)	0.006 (0.008)	-0.002 (0.004)	-0.007 (0.011)	0.007 (0.007)
Control group avg. 2015	0.308	0.697	0.549	0.020	0.631	0.092	0.033	0.654	0.091
T effect in 2016: Any 2014 email		-0.013 (0.010)			-0.020 (0.013)			-0.013 (0.012)	
Control group avg. 2016		0.618			0.551			0.563	
Observations	1,279	12,298	1,104	6,689	6,689	6,689	8,267	8,267	8,267

Note: This table displays OLS estimates of the treatment effect on tax compliance in the medium-term. It reproduces Table 6 in the paper for different subsamples, as noted in the column titles.

<sup>1</sup> For columns 1-3, each regression is limited to firms that were the subject of the relevant third party report, i.e., firms that were previously reported by a state institution for column 1, by a private client or supplier for column 2, and by a card company for column 3.

<sup>2</sup> A firm is considered unlikely to file an informative declaration if it did not file one (before the experiment began) for any year 2010–2014.

Table A23: Heterogeneity of Treatment Effects by Firm Characteristics

	Outcome: Declared Income Tax for 2014					Outcome: Paid Income Tax for 2014				
	(1) Corporation	(2) HQ in San José	(3) Filed in 2013	(4) Paid in 2013	(5) Declared sales tax	(6) Corporation	(7) HQ in San José	(8) Filed in 2013	(9) Paid in 2013	(10) Declared sales tax
A: Firms with Third-Party Information										
Any message	0.230*** (0.007)	0.222*** (0.010)	0.205*** (0.008)	0.216*** (0.007)	0.224*** (0.007)	0.030*** (0.003)	0.035*** (0.004)	0.028*** (0.003)	0.027*** (0.003)	0.032*** (0.003)
Characteristic	0.036* (0.020)	0.012 (0.010)	0.073*** (0.013)	0.047 (0.038)	0.039 (0.026)	-0.014 (0.010)	0.005 (0.004)	-0.010* (0.006)	0.052*** (0.023)	-0.038*** (0.009)
Any message × characteristic	-0.066*** (0.023)	-0.004 (0.014)	0.045*** (0.016)	0.091** (0.038)	-0.060* (0.033)	0.031** (0.012)	-0.002 (0.006)	0.019*** (0.007)	0.126*** (0.029)	0.030*** (0.014)
Characteristic avg.	0.140 12,515	0.489 12,515	0.330 12,515	0.0527 12,515	0.0637 12,515	0.140 12,515	0.489 12,515	0.330 12,515	0.0527 12,515	0.0637 12,515
Observations										
B: Firms without Third-Party Information										
Any message	0.147*** (0.004)	0.143*** (0.004)	0.129*** (0.003)	0.148*** (0.003)	0.148*** (0.003)	0.004*** (0.001)	0.005*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Characteristic	-0.020*** (0.004)	-0.011*** (0.004)	0.050*** (0.007)	-0.062 (0.039)	0.000 (0.017)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.002)	0.030 (0.018)	0.001 (0.003)
Any message × characteristic	0.010 (0.007)	0.015** (0.006)	0.124*** (0.010)	0.156*** (0.040)	0.070*** (0.026)	0.003* (0.001)	-0.000 (0.001)	0.003 (0.002)	0.067*** (0.025)	0.007 (0.006)
Characteristic avg.	0.265 37,242	0.491 37,242	0.168 37,242	0.0107 37,242	0.0251 37,242	0.265 37,242	0.491 37,242	0.168 37,242	0.0107 37,242	0.0251 37,242
Observations										

Note: This table displays OLS estimates of the treatment effect on income tax filing and payment (measured 15 weeks after the experiment start), with an interaction between the treatment indicator and different characteristics, as indicated by the column titles. The rows display the coefficients on the treatment indicator (pooling the two treatment groups), the coefficient on the characteristic, and the interaction between the treatment and the characteristic. Robust standard errors clustered by email address are in parentheses. The regressions use the same controls as in Table A8.

Table A24: Heterogeneity of Treatment Effects by Third-Party Information

	Outcome: Filed Income Tax for 2014				Outcome: Paid Income Tax for 2014			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Above median TPI	TPI > 2.5 million CRC	TPI > 6 million CRC	No. of D151 reports by clients	Above median TPI	TPI > 2.5 million CRC	TPI > 6 million CRC	No. of D151 reports by clients
Any message	0.247*** (0.009)	0.247*** (0.008)	0.241*** (0.007)	0.146*** (0.016)	0.025*** (0.003)	0.024*** (0.003)	0.031*** (0.003)	0.018*** (0.006)
Characteristic	0.047*** (0.012)	0.111*** (0.014)	0.083*** (0.020)	-0.020 (0.013)	-0.011** (0.005)	0.009 (0.006)	0.010 (0.010)	-0.002 (0.005)
Any message × characteristic	-0.053*** (0.014)	-0.079*** (0.016)	-0.112*** (0.022)	0.096*** (0.018)	0.018*** (0.006)	0.029*** (0.008)	0.018 (0.012)	0.016** (0.007)
Characteristic avg.	0.500	0.338	0.183	1.443	0.500	0.338	0.183	1.443
Observations	12,515	12,515	12,515	12,515	12,515	12,515	12,515	12,515

Note: This table displays OLS estimates of the treatment effect on income tax filing and payment (measured 15 weeks after the experiment start), with an interaction between the treatment indicator and different characteristics, as indicated by the column titles. The rows display the coefficients on the treatment indicator (pooling the two treatment groups), the coefficient on the characteristic, and the interaction between the treatment and the characteristic. Robust standard errors clustered by email address are in parentheses. The regressions use the same controls as in Table A8, and use only the sample of firms with third-party information. TPI stands for third-party information (third-party reported sales), meaning the sum of sales reported by clients (D151), state institutions (D150), and credit/debit card companies (D153). The cutoffs of 2.5 million and 6 million CRC correspond to the priority group designations used by the tax authority.

Table A25: Response to Income Tax Intervention, April 2016

	Outcome: Filed Income Tax After April 2016 Intervention					
	(1)	(2)	(3)	(4)	(5)	(6)
Any message	-0.0360*** (0.00515)	-0.0567*** (0.00506)	-0.0607*** (0.00504)	-0.0358*** (0.00515)	-0.0366*** (0.00517)	-0.0622*** (0.00506)
Filed Income Tax for 2014		0.214*** (0.0107)	0.158*** (0.0276)			0.167*** (0.0307)
Any message × Filed			0.0667** (0.0297)			0.0638* (0.0328)
Follow-up				0.0756*** (0.0229)	0.0546 (0.0370)	0.0336 (0.0427)
Any message × Follow-up					0.0332 (0.0438)	0.0865* (0.0520)
Any message × Filed × Follow-up						-0.109 (0.0944)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,405	19,405	19,405	19,405	19,405	19,405

Note: Extending the discussion in section IV.B, this table presents an OLS regression analysis of taxpayers' responsiveness to repeated enforcement interventions. The regressions focus on taxpayers in our experiment that become non-filers again for the income tax in 2015 and received enforcement messages reminding them to file in April 2016. The regressions allow us to control for firm characteristics and examine the role of the follow-up activities in July 2015, which were intended to ensure the credibility of our experimental intervention. We regress an indicator for whether a taxpayer filed income tax for 2015 in response to receiving the enforcement email in April 2016 on indicators for our experimental treatment, whether the firm ultimately declared income tax for 2014, whether it was subject to a follow-up, and interactions of these indicators, controlling for firm characteristics as in our main results tables. We do not include the interaction between filing for 2014 and follow-up, because almost all firms that were subject to follow-up ultimately filed their declaration for 2014.

Interpretation of results: Given the selection of the sample, having been treated in our experiment is negatively associated with responsiveness to the new intervention (column 1). However, this is true only for firms that did not file in response to the treatment. Firms that filed for 2014, both treated and non-treated, are actually more likely to respond to the new intervention than firms previously in the control group that did not end up filing (columns 2-3). In addition, the follow-up intervention "neutralizes" any potential perverse effect of our treatment. Firms that were subject to a follow-up are generally more responsive to the new intervention (column 4). Among 2014 non-filers, those that were treated and followed-up on are not less likely to respond to the new intervention than firms that were not treated at all in the experiment; and filers that were treated and followed-up on are marginally more responsive (column 6).

Table A26: Impact on Reporting Behavior of Tax Filers

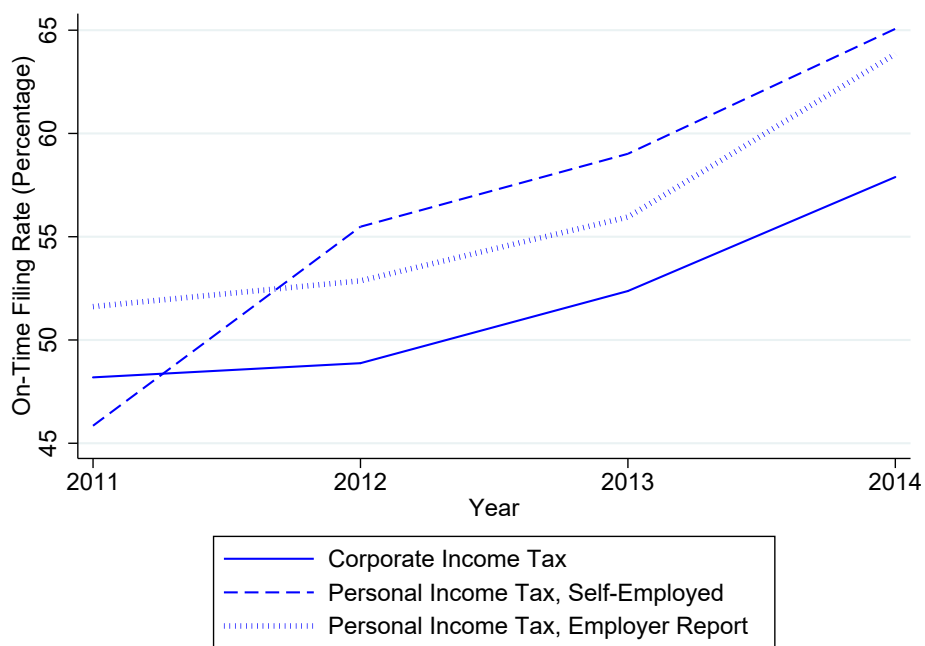
	(1) Log Sales	(2) Log costs	(3) Log profits	(4) Log tax liability	(5) Log payment	(6) Positive profits	(7) Positive tax liability	(8) Positive payment
A: Corporations								
T: Any email	0.815 (0.542)	0.321 (0.542)	0.116 (0.677)	0.141 (0.581)	0.619 (0.478)	0.0153 (0.0454)	0.0190 (0.0451)	0.0421 (0.0396)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	15.61	15.73	8.458	7.020	2.232	0.573	0.550	0.191
Observations	584	584	584	584	584	584	584	584
B: Self-Employed								
T1: Baseline email	0.256 (0.318)	-0.504 (0.386)	0.514 (0.341)	0.565 (0.255)	0.437 (0.222)	0.0359 (0.0240)	0.0512 (0.0224)	0.0391 (0.0199)
T2: Information email	0.845 (0.308)	-0.387 (0.383)	1.102 (0.336)	0.633 (0.248)	0.450 (0.221)	0.0837 (0.0236)	0.0585 (0.0219)	0.0432 (0.0199)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control group avg.	13.12	10.44	11.48	2.669	1.484	0.808	0.236	0.134
T1=T2 p-value (Wald test)	0.001	0.652	0.004	0.677	0.929	0.001	0.626	0.762
Observations	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692

Note: This table displays OLS estimates of the treatment effect on reporting behavior conditional on filing, for firms with third-party information. The outcome variables, mentioned in the column titles, correspond to line items on the 2014 income tax declarations. The table considers only firms that filed an income tax declaration, and it uses the same controls as in Table 1. For Panel A, the treatment groups are pooled into one binary treatment variable, as there is not a significant difference between the two treatment effects. Robust standard errors clustered by email address are in parentheses.



## 4 Figures

Figure A1: Filing Rates Over Time



Note: This figure displays the rate of on-time filing over time, for a balanced sample of 15 countries (the identity of which cannot be disclosed), as measured by the IMF-led RA-FIT survey (Revenue Administration Fiscal Information Tool). The filing rates are self-reported by the relevant tax authorities. The increase over time is statistically significant at the 5% level for the corporate income tax and the personal income tax for the self-employed. For details on the data, see [Cleary, Crandall and Masters \(2017\)](#) and <https://knoema.com/IMFRAFIT2017/imf-revenue-administration-fiscal-information-tool-ra-fit-round-2-aggregates>.

Figure A2: Email to Firms Covered by Third-Party Information

**SUBJECT:** Urgent: Please submit your tax return now

Attention: NAME,

**PLEASE FILE YOUR INCOME TAX RETURN IN THE NEXT 10 DAYS**

**Declare now by visiting:**  
<https://www.haciendadigital.go.cr/tribunet/loginDeclaraciones.jsp>

According to our records, you have not filed your tax return (Form D101). 8 out of 10 Costa Ricans have already filed their 2014 income tax return. You are part of a small minority of citizens who have not.

It is a serious offense to not file your taxes.

**T1:** We have third-party information confirming that you or your client performed activities in 2014 which require you to pay taxes.

**T2:** We have third-party information confirming that you or your client performed activities in 2014 which require you to pay taxes. From third-party returns (D150, D151 and D153), we know about your operations, for example:

- **Revenues of at least XXX reported by COMPANY,**
- **Revenues from credit/debit cards of at least ZZZ reported by BANK,**
- **Sales or contracts with state entities of at least WWW.**

If you do not file, you could be audited and your business may be closed. Furthermore, [your name may be published on our website](#) as someone who did not contribute.

If you have any questions, you can contact me by PHONE or E-MAIL. I'll be checking whether you respond to this message.

Sincerely,

NAME OF OFFICIAL  
POSITION

Note: This figure displays the treatment email used among firms with third-party information. Firms in the study received an email with either treatment 1 (T1, baseline email) or treatment 2 (T2, information email) shown. The mention of “your client” is added to make the message suitable for being sent directly to the firm or the firm’s legal representative.

Figure A3: Email to Firms Not Covered by Third-Party Information

**SUBJECT:** Urgent: Please submit your tax return now

Attention: NAME,

**PLEASE FILE YOUR INCOME TAX RETURN IN THE NEXT 10 DAYS**

**Declare now by visiting:**  
<https://www.haciendadigital.go.cr/tribunet/loginDeclaraciones.jsp>

According to our records, you have not filed your tax return (Form D101). 8 out of 10 Costa Ricans have already filed their 2014 income tax return. You are part of a small minority of citizens who have not.

It is a serious offense to not file your taxes.

**T1:**

**T2:**

The DGT uses information from third-party returns (D150, D151 and D153) to identify economic activity and sources of income.

If you do not file, you could be audited and your business may be closed. Furthermore, [your name may be published on our website](#) as someone who did not contribute.

If you have any questions, you can contact me by PHONE or E-MAIL. I will be checking whether you respond to this message.

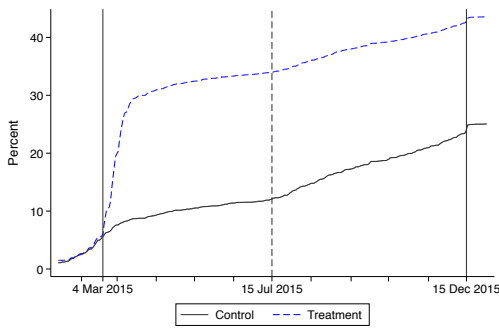
Sincerely,

NAME OF OFFICIAL  
POSITION

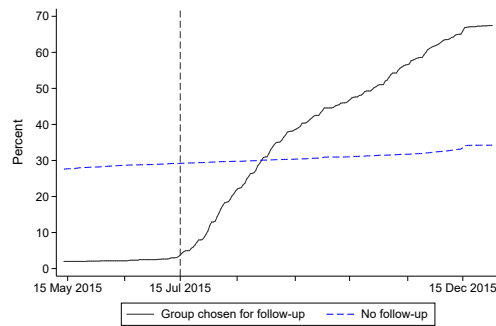
Note: This figure displays the treatment email used among firms without third-party information. Firms in the study received an email with either treatment 1 (T1, baseline email) or treatment 2 (T2, information email) shown. The mention of “your client” is added to make the message suitable for being sent directly to the firm or the firm’s legal representative.

Figure A4: Impact of Follow-up Activities Targeted at Remaining Non-Filers for 2014

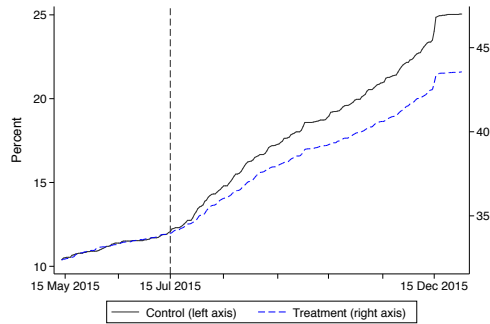
A: Income Tax Filing Behavior Over 2015



B: Impact of Follow-up on Filing Rate, by Assignment to Follow-up



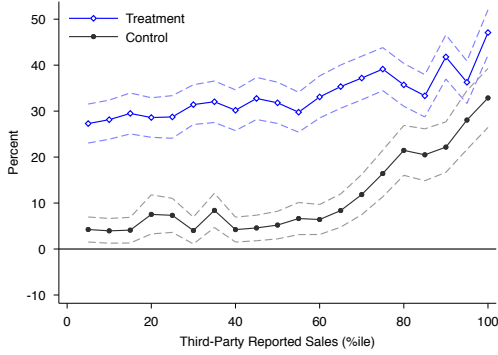
C: Impact of Follow-up on Filing Rate, by Initial Treatment Group



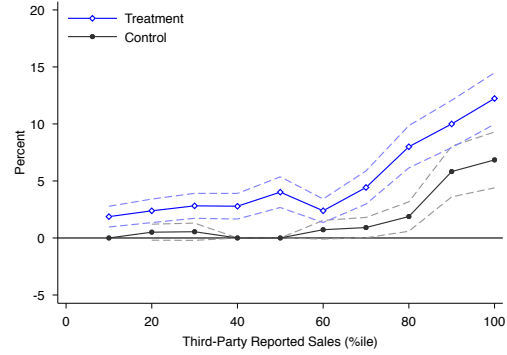
Note: This figure displays the impact of follow-up activities conducted by the tax authority after July 15, 2015, targeting remaining non-filers for the income tax in 2014. Targeted firms were mostly firms with large amounts of third-party information, and were disproportionately in the control group. Tax officers were assigned to follow up on these taxpayers according to a detailed protocol, starting with a phone call, then a written communication or a visit, with the possibility of referring a case to audit in case of continued non-compliance. The control and treatment groups referred to in the graphs are our experimental control and treatment groups.

Figure A5: Heterogeneity by Third-Party Information (Percentiles)

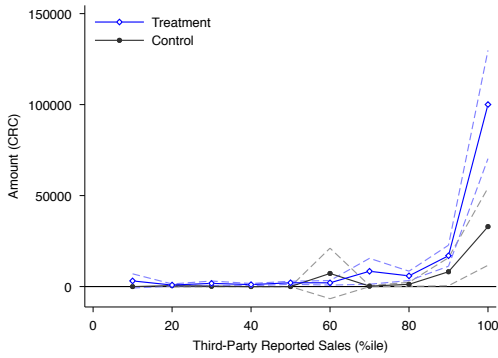
A: Filing Rate



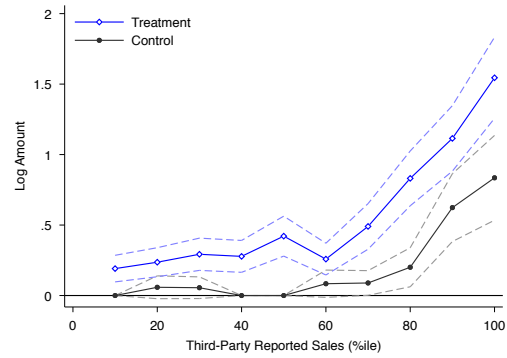
B: Payment Rate



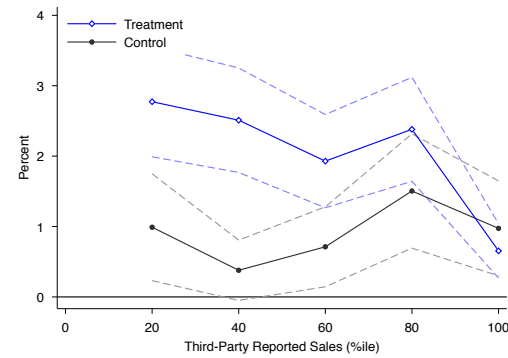
C: Payment Amount



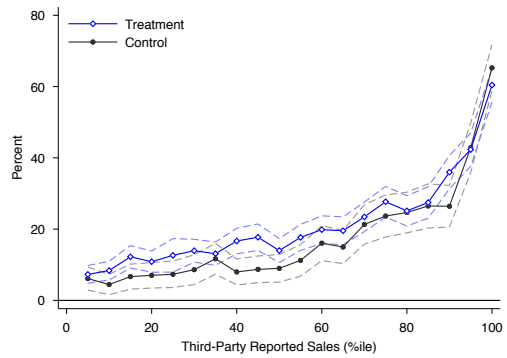
D: Log Payment Amount



E: Deregistration Rate



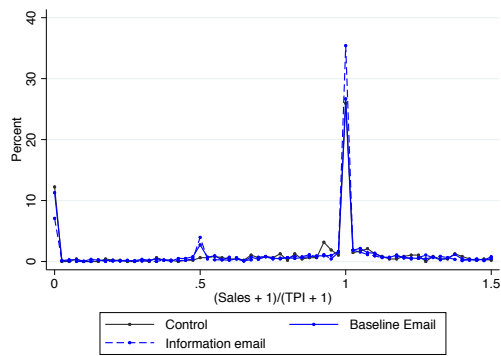
F: Third-Party Informant



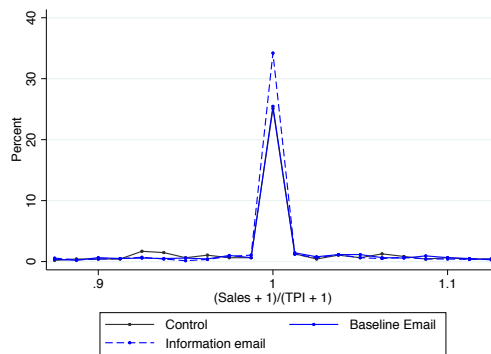
Note: This figure displays heterogeneity in the main treatment effects. It is identical to Figure 3 in the paper, except that the horizontal axis here displays the relevant percentile of third-party reported-sales rather than the level of (log) sales at the relevant percentile, and that Panels A and F use ventiles instead of deciles.

Figure A6: Self-Reported Versus Third-Party Reported Sales

A: Full Distribution



B: Zoom at 1



Note: These figures show the distribution of firms based on the ratio of self-reported sales to third-party reported sales, for firms with third-party information that filed an income tax declaration within fifteen weeks of the experiment start. Figure 5 in the paper displays the results of statistical tests for whether firms' likelihood to match self-reported sales to third-party reported sales differs significantly across treatment groups.

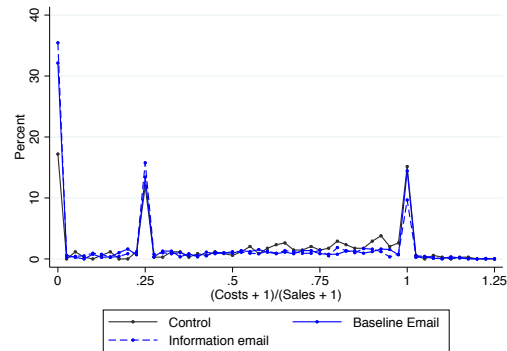
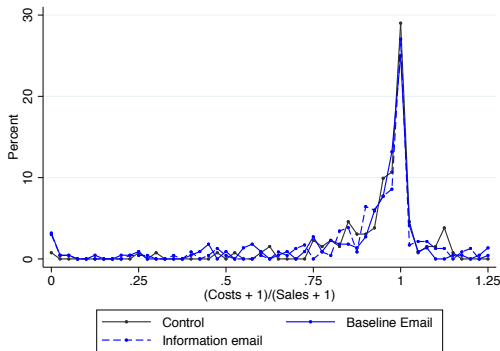
Figure A7: Self-Reported Sales Versus Self-Reported Costs

A: Corporations

B: Self-Employed

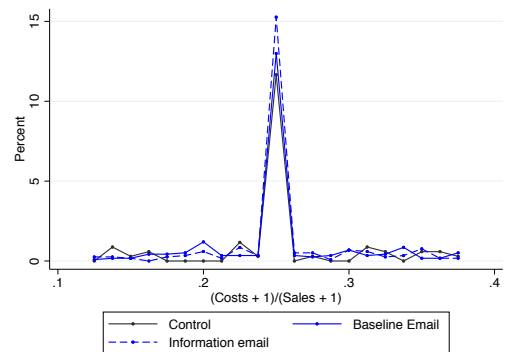
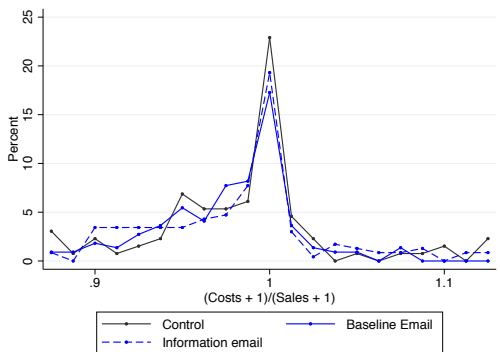
A1: Full Distribution

B1: Full Distribution

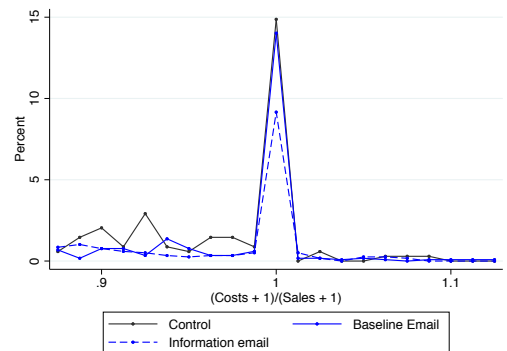


A2: Zoom at 1

B2: Zoom at 0.25



B3: Zoom at 1



Note: These figures show the distribution of firms based on the ratio of self-reported sales to self-reported costs, for firms with third-party information that filed an income tax declaration within fifteen weeks of the experiment start. Figure 5 in the paper displays the results of statistical tests for whether firms' likelihood to match self-reported sales to self-reported costs differs significantly across treatment groups.

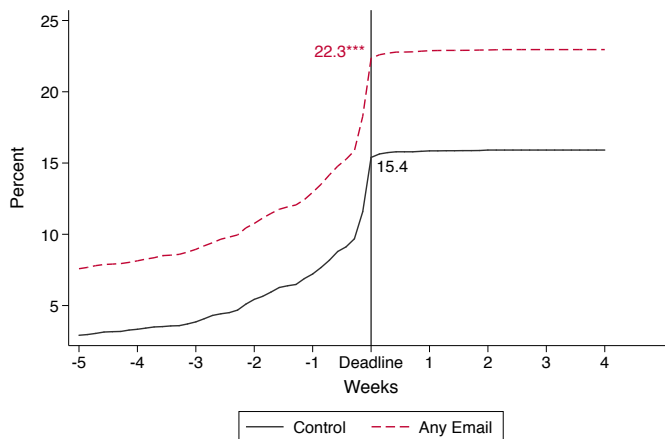
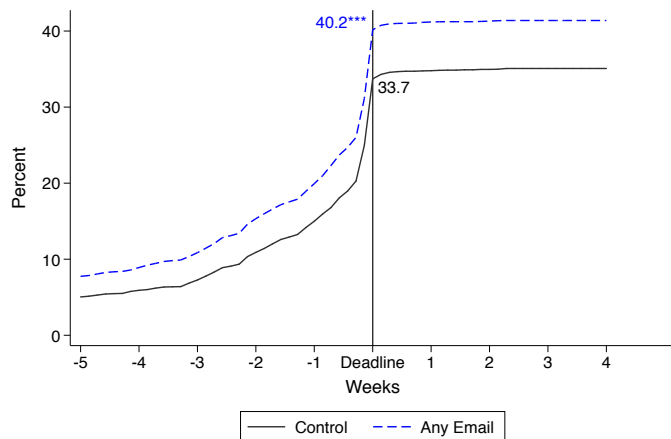
Figure A8: Compliance Over Time by Information Coverage and Treatment Group, 2015

A: Firms with Third-Party Information

B: Firms without Third-Party Information

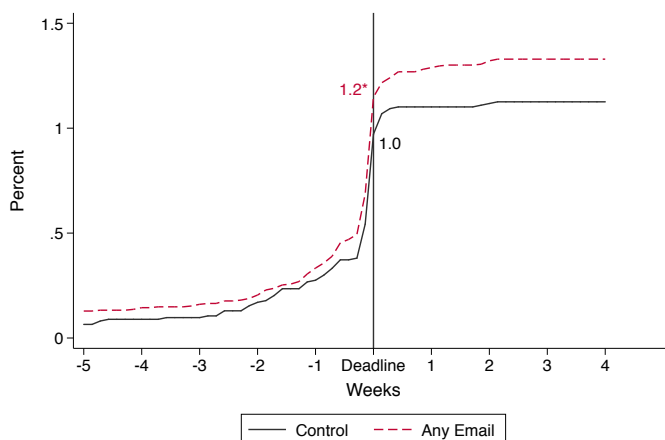
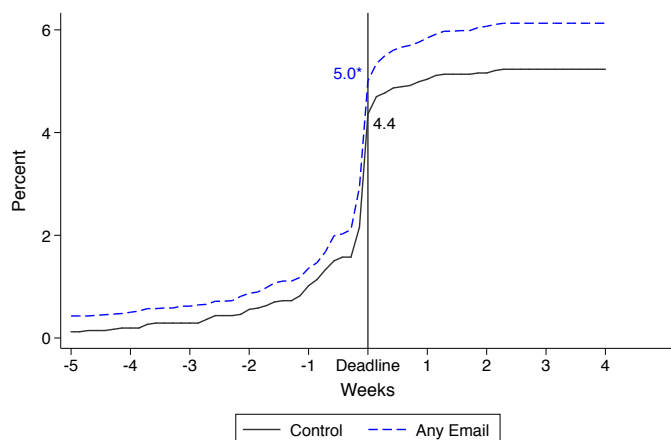
A1: Filing Rate

B1: Filing Rate



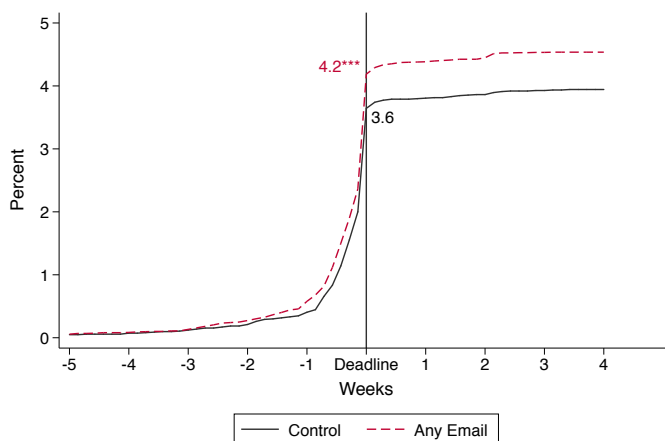
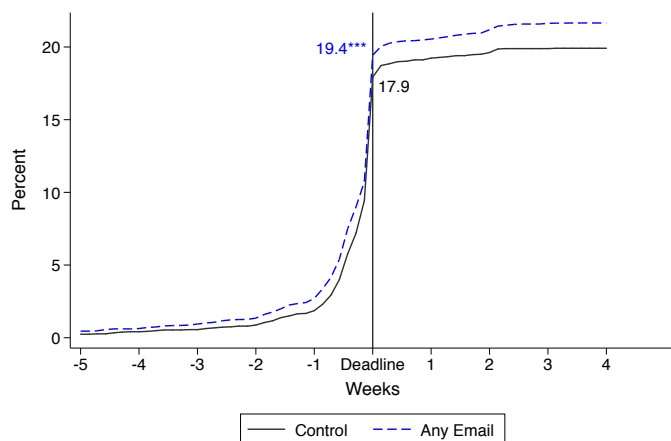
A2: Payment Rate

B2: Payment Rate



A3: Third-Party Informant

B3: Third-Party Informant



Note: These figures show the share of firms filing income tax (row 1), paying income tax (row 2), and filing a third-party informative declaration (D151) about a client or supplier (row 3), all for fiscal year 2015. Column A corresponds to firms with third-party information and column B corresponds to firms without third-party information. The vertical line in each figure indicates the filing deadline. The black solid line corresponds to the control group and the blue/red dashed lines correspond to the treatment group for the two different subsamples, as explained in Table A3. The numbers indicate the mean for each outcome and treatment group at the deadline. Stars indicate a significant difference compared to the control group and come from regressions that include controls (as in Table A8). Significance levels are noted as per convention: \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .



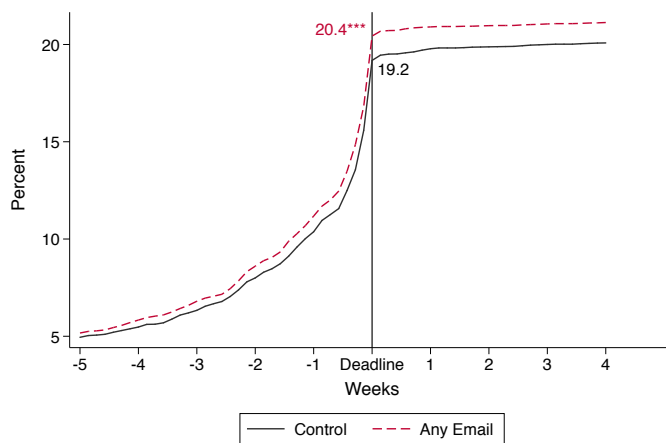
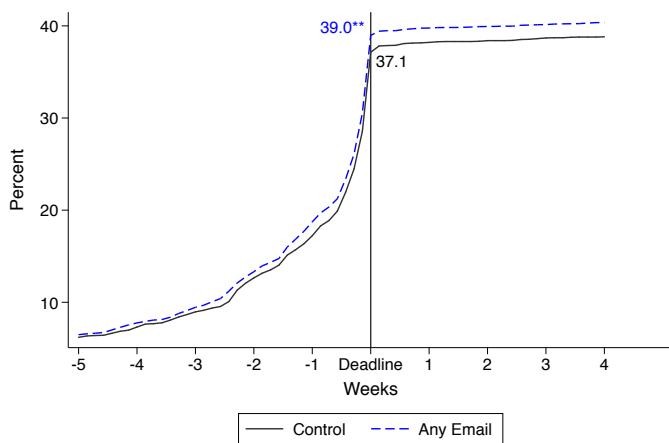
Figure A9: Compliance Over Time by Information Coverage and Treatment Group, 2016

A: Firms with Third-Party Information

B: Firms without Third-Party Information

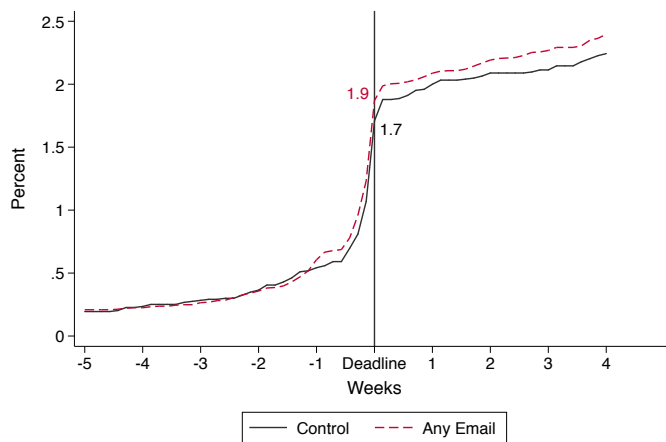
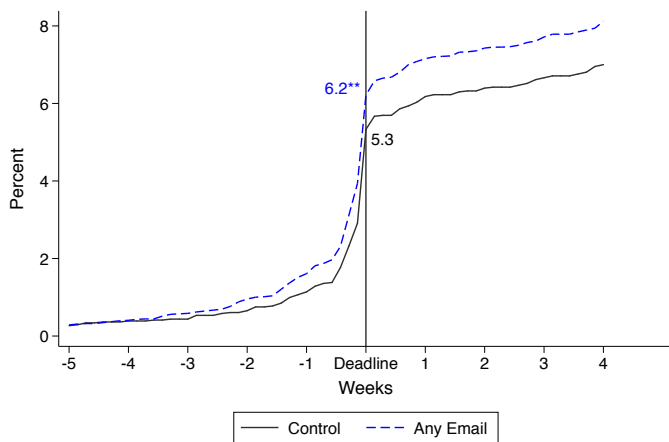
A1: Filing Rate

B1: Filing Rate



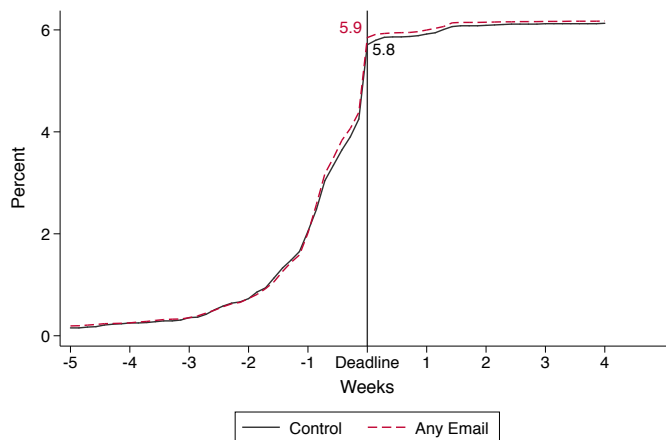
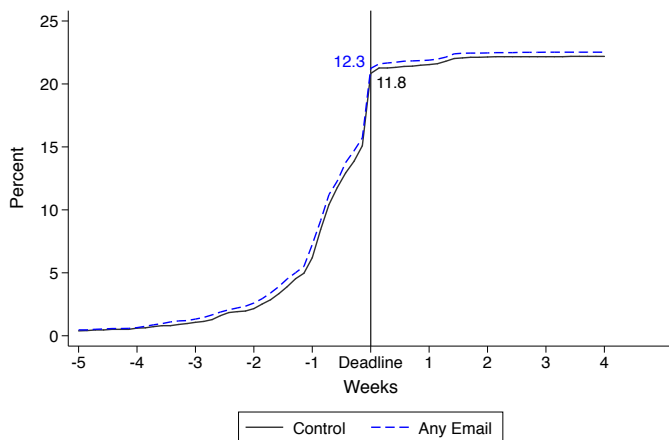
A2: Payment Rate

B2: Payment Rate



A3: Third-Party Informant

B3: Third-Party Informant



Note: This figure is identical to Figure A8, but considers compliance outcomes for fiscal year 2016.

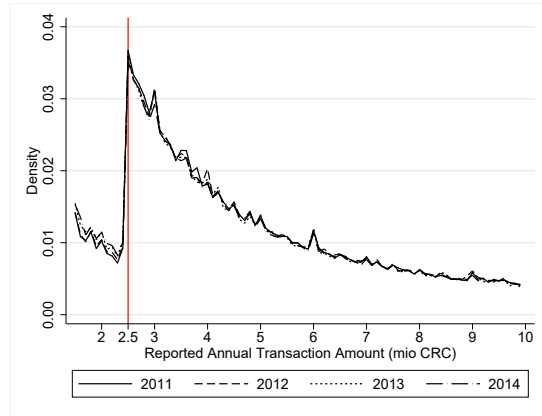
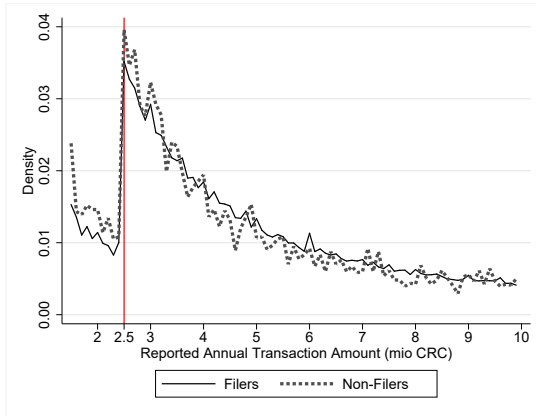
Figure A10: Distribution of Third-Party Reports around the Reporting Threshold

A: Filers vs Non-Filers, 2014

B: All Reportees, 2011-2014

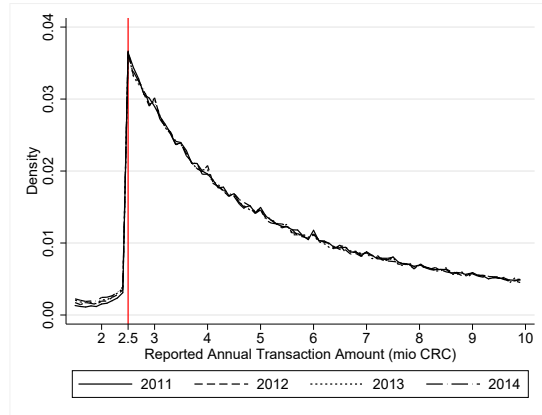
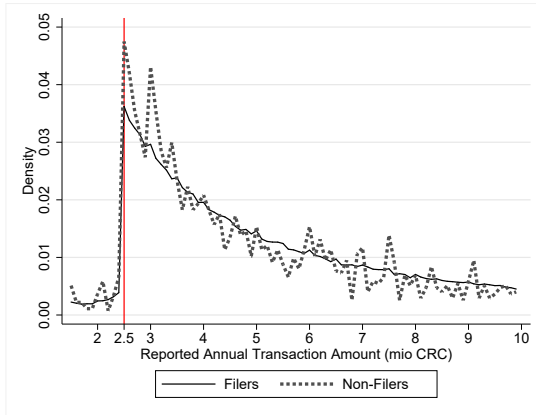
A1: Sales Reports

B1: Sales Reports



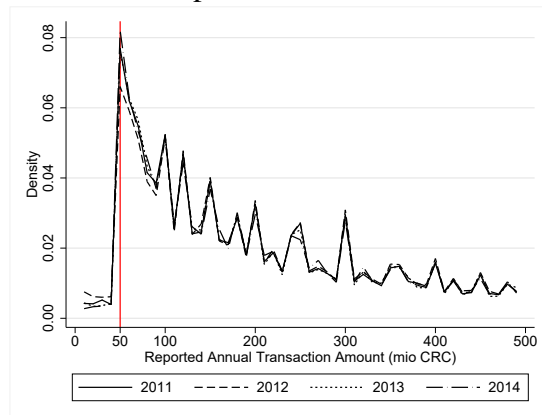
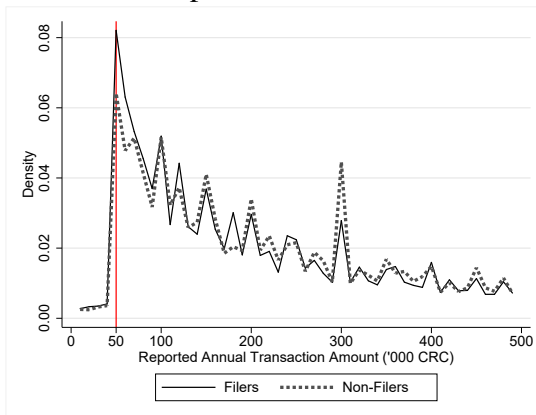
A2: Cost Reports

B2: Cost Reports



A3: Special Transactions

B3: Special Transactions



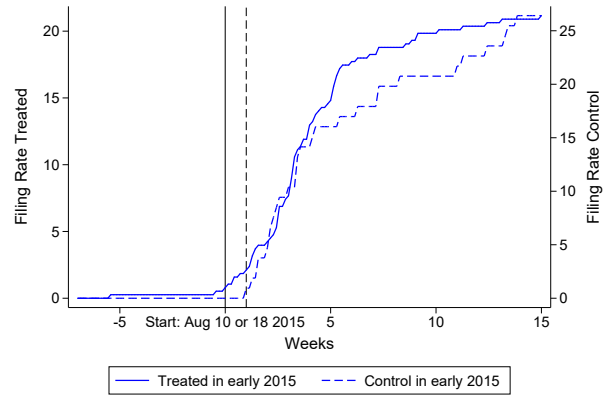
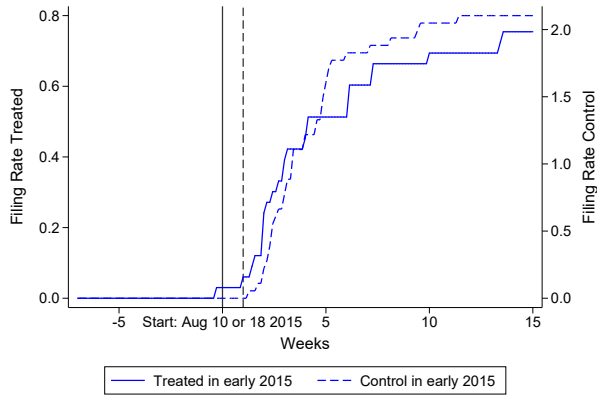
Note: These figures show the density distribution of third-party reports of sales (row 1), costs (row 2), and special transaction reports (row 3) from the D151 firm-to-firm transaction reports. An observation is a reporter-reportee-year. For sales and costs, the reporting requirement threshold is an annual transaction amount of CRC 2.5 million (US\$ 4418); for special transactions (rent, interest, commissions, and professional services), it is CRC 50,000 (US\$ 88). The panels in column A compare filers to non-filers for the year 2014 (experiment sample), and the panels in column B compare the years 2011-2014. The reporting requirement threshold is marked by a red horizontal line.

Figure A11: Filing Response to Sales Tax Intervention, August 2015

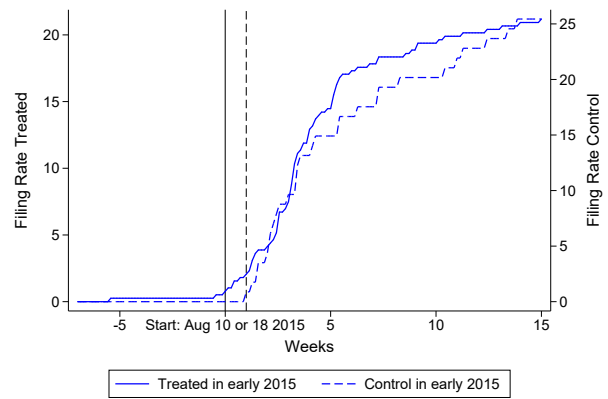
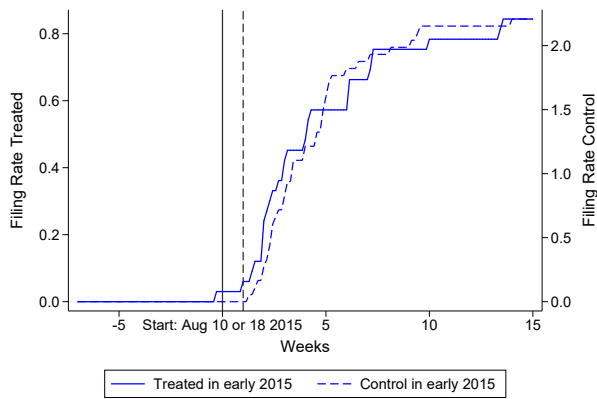
Panel 1: Taxpayers Remaining Non-filers for 2014

Panel 2: Taxpayers that Filed for 2014

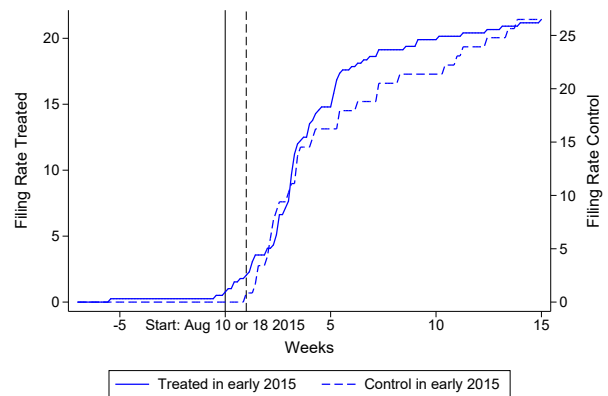
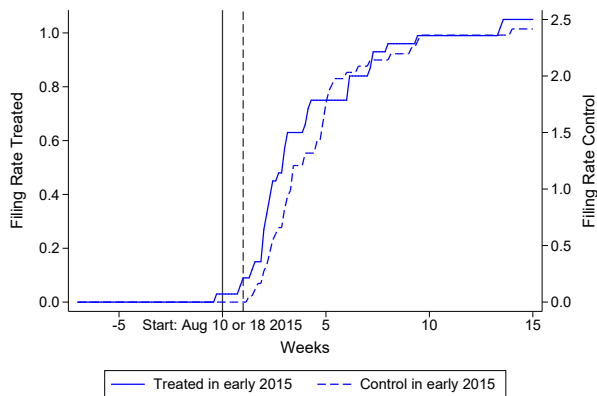
A: Filing for February 2015



B: Filing for March 2015



C: Filing for April 2015



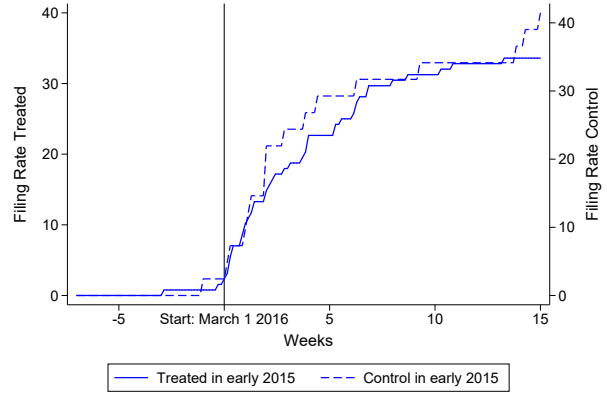
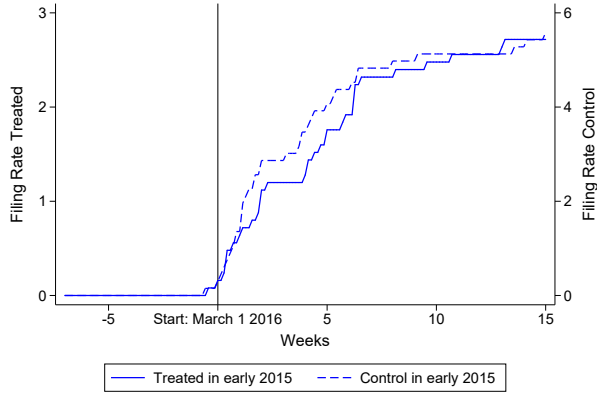
Note: These figures show the sales tax filing rate for the months of February, March, and April 2015, as measured around August 10, 2015. Non-filers for the sales tax for these months (and for the month of May, as per the results displayed in Figure 4 in the paper) received an enforcement email from the tax authority (similar to the one used in our experiment) on August 10 or August 18, 2015, as indicated by the vertical lines. The figures focus only on firms in our experimental sample, distinguishing firms that remained non-filers for the income tax in 2014 (Panels A, left side), and firms that ultimately did file income tax for 2014 (Panels B, right side).

Figure A12: Filing Response to Sales Tax Interventions, 2016

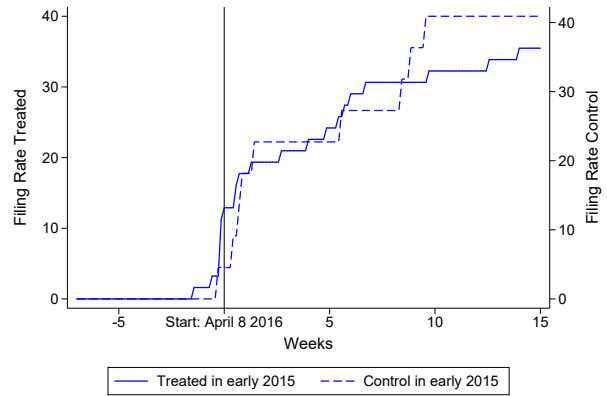
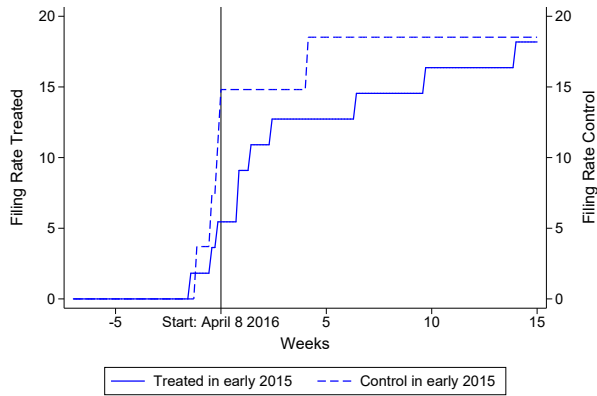
Panel 1: Taxpayers Remaining Non-filers for 2014

Panel 2: Taxpayers that Filed for 2014

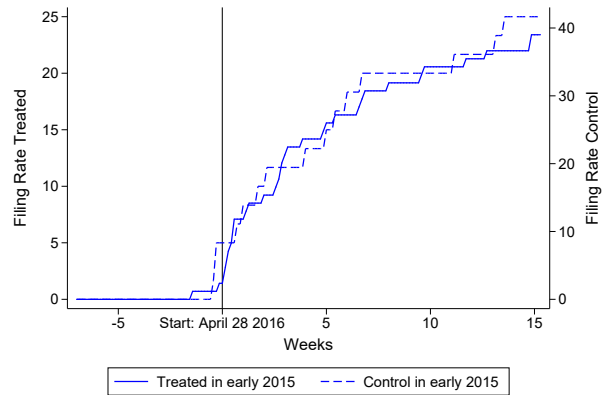
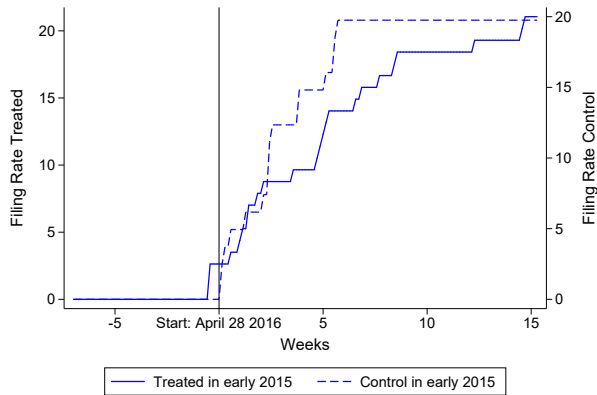
A: Response to March 1 Intervention (January Filing)



B: Response to April 8 Intervention (February Filing)



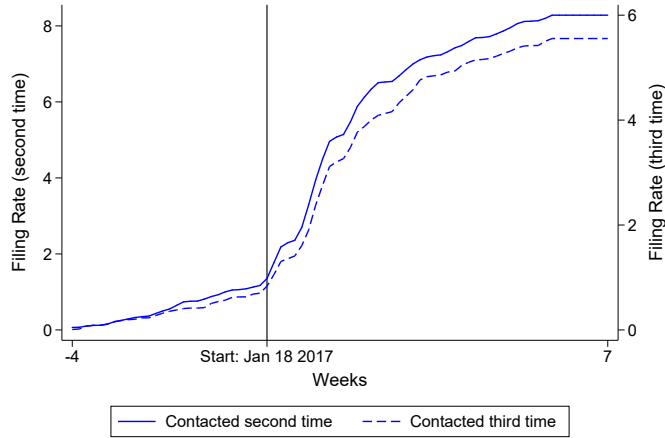
C: Response to April 28 Intervention (March Filing)



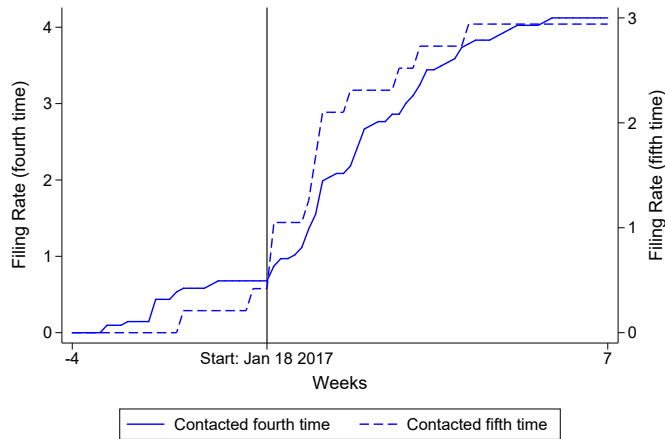
Note: These figures show the sales tax filing rate for the months of January, February, and March 2016, as measured around different dates in March and April 2016 at which non-filers for the sales tax for the respective months received an enforcement email from the tax authority (similar to the one used in our experiment). The figure is otherwise constructed in the same way as Figure A11.

Figure A13: Filing Response to Multiple Repeated Interventions, 2017

A: Taxpayers Contacted Two or Three Times

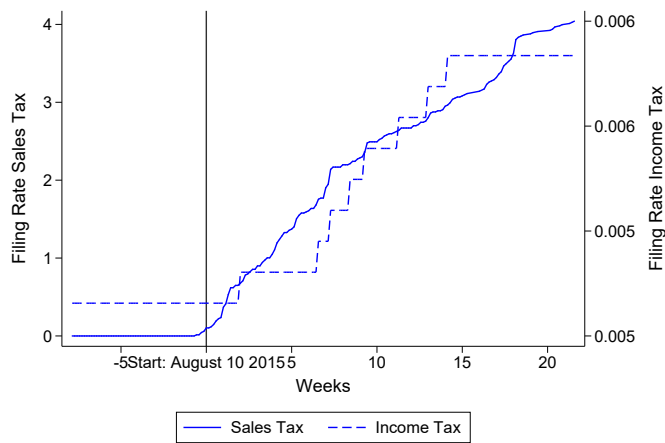


B: Taxpayers Contacted Four or Five Times



Note: These figures show the rate of income tax filing for fiscal year 2016, around January 18, 2017, when non-filers for the income tax for 2016 received an enforcement email from the tax authority (similar to the one used in our experiment). The different series distinguish taxpayers for whom this enforcement email was the second, third, fourth, or fifth time they received such an email for non-filing behavior. In constructing these groups, we take into account the 2016 and 2017 income tax non-filing campaigns, and the 2015 and 2016 sales tax non-filing campaigns, as discussed in section IV.B in the paper.

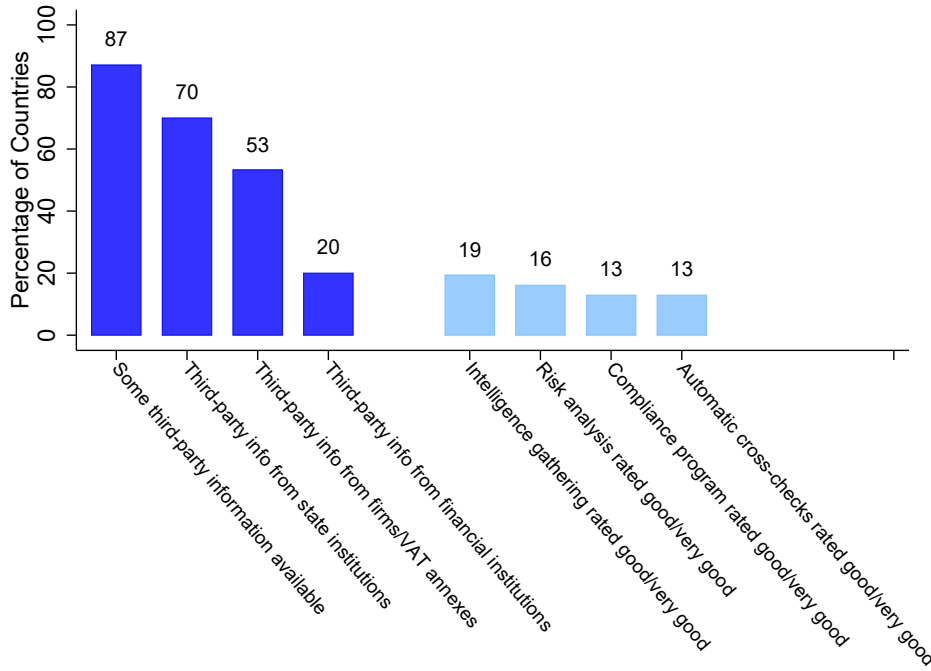
Figure A14: Impact of Online Publication of Sales Tax Non-Filers



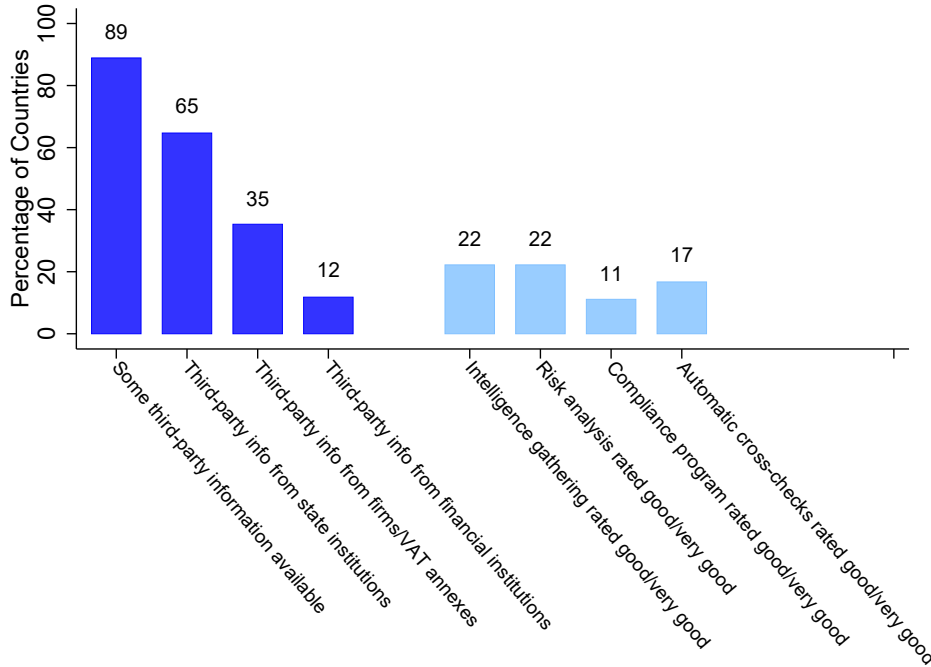
Note: This figure shows the rate of filing for the income tax for 2014 and the sales tax for May 2015, among firms whose names were published online on August 10, 2015. The majority of these firms were also sales tax non-filers for February-April 2015, and 1,366 of them were also income tax non-filers for 2014 and part of our experimental sample (265 among the firms without third-party information, one with third-party information, and 1,100 among a separate SMS experiment). Among these firms whose names were published online, 412 ultimately filed sales tax for May 2015 and 61 filed income tax for 2014.

Figure A15: Availability and Use of Third-Party Information Across Countries

A: All Countries in TADAT Database



B: Lower-Income Countries



Note: This figure displays results from an analysis of 31 country reports completed under the [Tax Administration Diagnostic Assessment Tool](#) (TADAT). TADAT is an assessment tool implemented globally by development partners and technical assistance providers including the IMF and World Bank. Bars 1-4 are coded based on a text analysis of the report, and reflect the share of countries that have access to any kind of third-party information (bar 1), and to specific types of third-party information (bars 2-4). Third-party information from state institutions includes customs and procurement information. Bars 5-8 display the share of countries receiving a grade of A or B (instead of C or D) for TADAT performance indicators P2-3-1, P2-3-2, P2-4, and P6-14, respectively. Grades are given by an external assessment team after a visit to the country and are backed by evidence. Panel B focuses on the subsample of low and lower-middle income countries according to the current World Bank classification. The results are similar when focusing on low-income countries only. The remaining countries are almost exclusively upper middle-income countries, not high-income countries.

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