

Online appendix for Using Divide-and-Conquer to Improve Tax Collection

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Abstract

Online Appendix [OA](#) reports further empirical analysis. Online Appendix [OB](#) extends the theoretical analysis to environments where taxes-due are private information. Online Appendix [OC](#) reports findings from laboratory experiments testing various divide-and-conquer mechanisms. Online Appendix [OD](#) collects templates for the original letters sent to tax-payers.

OA Further Empirical Analysis

This appendix provides further empirical analysis. We describe our predictive model of repayment odds used to rank tax-payers. We provide corner plots for the MCMC estimation of the parameters of our semi-structural model. We evaluate the robustness of findings to various specification changes. We study the possibility that notifications may have a negative

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impact on settlement, at least in some circumstances. We verify that our counterfactual simulations do not break the municipality’s capacity constraint of 200 garnishments a month for the treatment arm.

OA.1 Ranking tax-payers and progressivity

As we highlighted in the main text, the central challenge of ranking consists in predicting tax-payers’ probability of repayment.

We used repayment data from 2019 and 2020, as well as information obtained by the government from credit rating agencies to build a simple predictive model of repayment behavior following delinquency. We set as our predicted variable of interest

$$Y = \mathbf{1}_{3M \text{ repayment} > 20\%}$$

i.e. the binary variable equal to 1 whenever the tax-payer repays at least 20% of their debt within 3 months of the debt becoming due. The threshold 20% was chosen in order to maximize the variance of the outcome variable: roughly 50% of tax-payers meet that threshold.

Endogenous vs. exogenous covariates. We used covariates listed in Table [OA.1](#), all of which are normalized to take values in $[0, 1]$. We distinguish models by whether or not they use the share of taxes repaid in the last year. The difficulty here is that if the mechanism assigns a low collection rank based on past failures to pay, then it provides dynamic incentives not to make repayments: repayment behavior is endogenous. Everything else equal, we would prefer to use only exogenous covariates, but we wanted to evaluate the potential gains from using endogenous information. We refer to models using past repayment as endogenous, and to models excluding past repayments as exogenous.

We fit linear, LASSO, and Random Forest models on training data using k-fold cross-

Covariate	Exogenous covs only	Incl. Endogenous covs
Taxpayer lives in the district	0	0
Has email	0.155	0.104
Has cellular	0.091	0.077
Is employed	0.074	0.048
Has education	0.011	0
Quantile of total tax due	0.302	0.200
Quantile of property tax due	0	0
Quantile of user charges due	0.031	0.029
Quantile of tax base	0	0
Quantile of credit score rating	0.034	0
Quantile of salary	0	0
Quantile of year of most recent car	0	0
Quantile of age	0.062	0.008
Quantile of past delinquency	-0.010	0
Last year's share repaid (by 3 months)	—	0.370
Num Observations	7940	7940

Table OA.1: LASSO Coefficients with and without endogenous covariate

validation. Table [OA.1](#) reports coefficients from LASSO. As expected, past repayment behavior is a key predictor of current repayment. Having an email address, and a mobile phone are also important predictors, possibly for selection reasons, or because these make it much easier for city officials to get in touch with the tax-payer.

We then evaluate all three models on 3441 out-of-sample data points by ranking tax-payers according to their predicted probability of repaying at least 20% of tax-due within 3 months, and computing the share of tax payers who actually do repay. Figure [OA.1](#) summarizes results. There are three main takeaways. First, estimated ranks have predictive power: with 70 to 90% of highest ranked tax-payers being in partial repayment status within 3 months, and between 10 to 25% of the lowest ranked tax-payers being in partial repayment within 3 months. Second there is little difference across the linear, LASSO, and Random Forest models. Finally, while using endogenous past repayment behavior improves on the ranking of tax-payers (the curve of actual repayment shares is steeper, by construction it

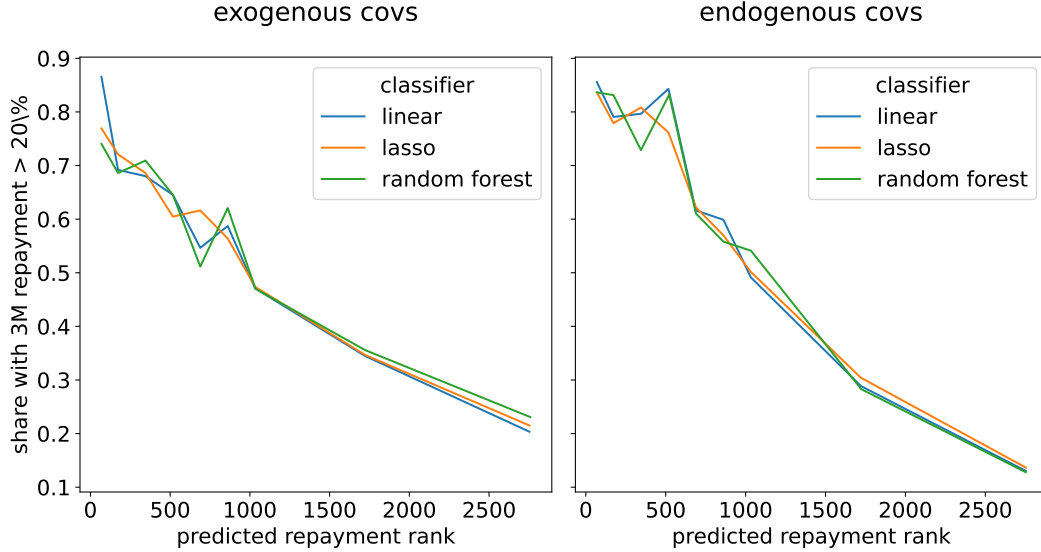


Figure OA.1: Classification performance, with exogenous and endogenous covariates.

must have the same integral), the difference is not large. This suggests that excluding endogenous variables does not come at a high efficiency cost.

Ultimately we assign each tax-payer i a subjective settlement probability $1 - q_i$ equal to the out-of-sample share of tax-payers with similar predicted repayment rate, repaying more than 20% of their taxes within 3 months. We average predictions across linear, LASSO, and random forest models. Half of treated tax-payers are assigned a subjective probability of repayment $1 - q_i$ based on models excluding endogenous covariates, half of treated tax-payers are assigned a subjective probability of repayment $1 - q_i$ based on models including exogenous covariates. The randomization is performed using the same balance objectives as in Section 4.1.

Progressivity. Under revenue maximizing score (2), PIE may be regressive. For instance, if tax-payers who owe relatively little are also very likely to repay, while tax-payers who owe

large amounts are unlikely to repay, then scoring rule

$$z_i = \frac{(1 - q_i)D_i}{q_i}$$

may rank tax-payers who owe little ahead of tax-payers who owe large amounts. Fortunately this is not the case in our application. As Table [OA.1](#) highlights, the predicted probability of non-repayment q_i is decreasing in amount of tax due: tax-payers who owe more are therefore ranked ahead of tax-payers who owe less. As a result, we expect PIE to enhance the progressivity of tax-collection.

OA.2 Corner plots

Figure [OA.2](#) provides corner plots describing the distribution of parameters from the MCMC sampler, using the python package `corner` ([Foreman-Mackey, 2016](#)). The top panel in each column is the distribution of model parameters and all other plots show pairwise joint distributions. To compute these plots, all but the final 1000 samples are discarded. We further restrict attention to samples from the chain that are above the 15th percentile of the likelihood distribution.

OA.3 Other model specifications

Findings using Q1 taxes only. The main text of the paper considers all tax payments made by tax-payers delinquent on their Q1 taxes, whether the payments correspond to Q1, or Q2-Q4 taxes.

Our findings are similar if we focus on payments relating to Q1 taxes alone, though parameter estimates from the model are mechanically smaller since there are less payment events within the same time horizon. We report both tax collection by experimental group, and parameter estimates for the model of Section [6](#).

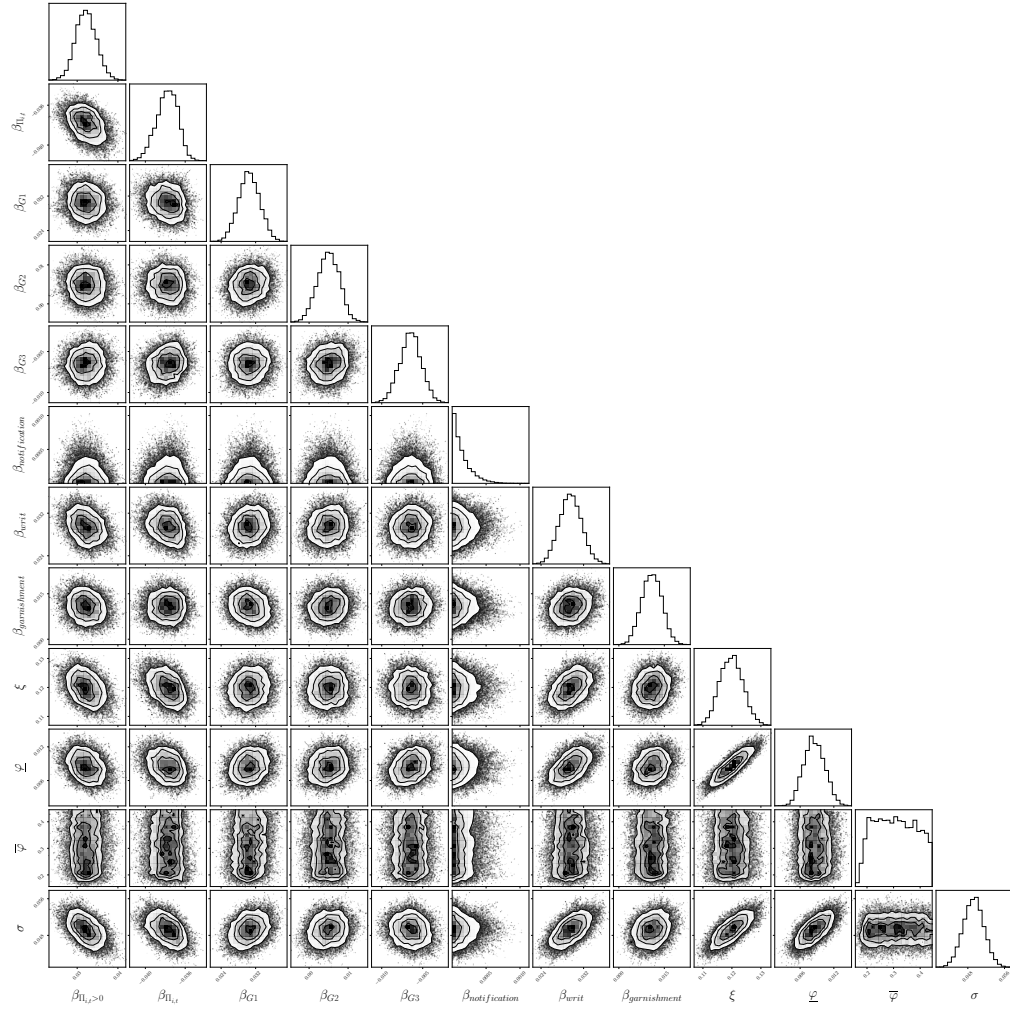


Figure OA.2: Corner plot of MCMC estimation.

Cumulative 2021 tax collection of Q1 debt by experimental group during the five months following the first-quarter 2021 tax deadline is shown in Figure OA.3. The pattern is very similar to total tax collection for unrestricted payments presented in Figure 6.

Table OA.2 reports posterior means and standard deviations for parameters of interest in the estimation restricted to payments of Q1 debt only. Estimates are qualitatively similar to those for unrestricted payments reported in Table 5, though settlement intensities are mechanically smaller. The coefficient on $G1$ is smaller by a factor of roughly two, while the

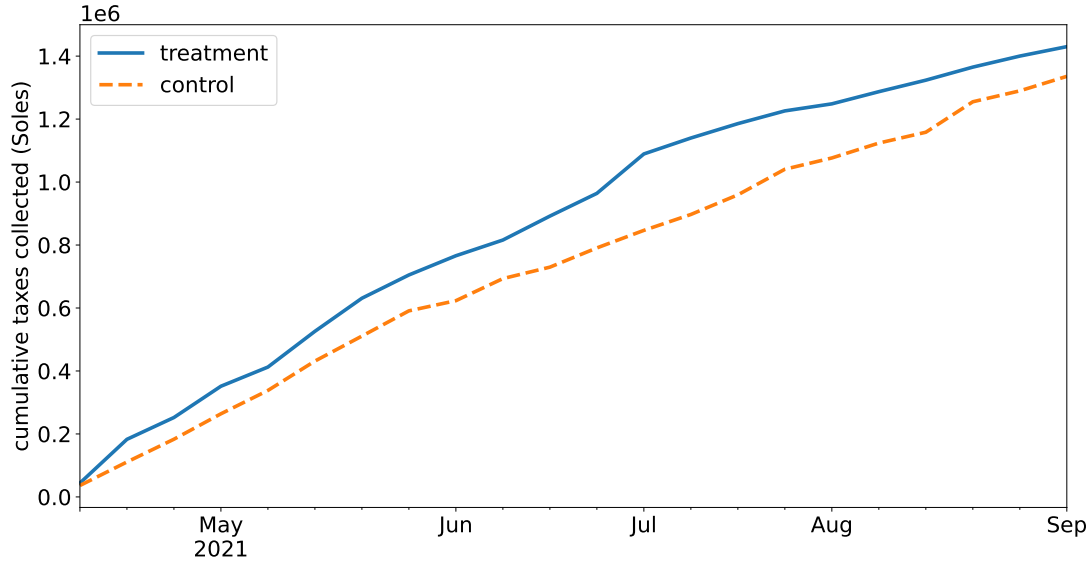


Figure OA.3: Cumulative Tax Collected April - September 2021, Q1 Debt Only

	Mean	(std. dev.)
$\beta_{\Pi_{i,t}>0}$	$4.75 \cdot 10^{-1}$	$(0.20 \cdot 10^{-1})$
$\beta_{\Pi_{i,t}}$	$-5.65 \cdot 10^{-1}$	$(0.22 \cdot 10^{-1})$
β_{G1}	$1.48 \cdot 10^{-2}$	$(0.22 \cdot 10^{-2})$
β_{G2}	$0.15 \cdot 10^{-2}$	$(0.24 \cdot 10^{-2})$
β_{G3}	$-0.19 \cdot 10^{-2}$	$(0.07 \cdot 10^{-2})$
$\beta_{\text{garnishment}}$	$0.23 \cdot 10^{-2}$	$(0.20 \cdot 10^{-2})$
β_{writ}	$1.17 \cdot 10^{-2}$	$(0.15 \cdot 10^{-2})$
$\beta_{\text{notification}}$	$0.90 \cdot 10^{-4}$	$(0.92 \cdot 10^{-4})$
β_{ξ}	$8.85 \cdot 10^{-2}$	$(0.22 \cdot 10^{-2})$
$\underline{\varphi}$	$0.40 \cdot 10^{-5}$	$(0.69 \cdot 10^{-3})$
$\overline{\varphi}$	$7.23 \cdot 10^{-2}$	$(0.16 \cdot 10^{-2})$
σ	$3.54 \cdot 10^{-3}$	$(0.24 \cdot 10^{-2})$

Table OA.2: Estimating the settlement behavior of tax-payers for Q1 debt.

coefficient on writs is smaller by a factor of roughly two and a half.

Time trend. In Table OA.3, we report posterior means and standard deviations from an estimation in which we allow for a linear time trend equal to the number of weeks elapsed since the beginning of the experiment, while still imposing the lower bound of 0 on the coefficient on notifications. Estimates are similar to those reported in Table 5. The coefficient on the linear time trend, β_t , is positive, though small. A notable difference is that the coefficient on having made some payment ($\beta_{\Pi_{i,t}>0}$) has flipped sign and become negative. This is consistent with the fact that payments $\Pi_{i,t} > 0$ are mechanically increasing in time, and therefore positively correlated to t .

	Mean	(std. dev.)
$\beta_{\Pi_{i,t}>0}$	$-1.17 \cdot 10^{-2}$	$(0.40 \cdot 10^{-2})$
$\beta_{\Pi_{i,t}}$	$-5.94 \cdot 10^{-2}$	$(0.23 \cdot 10^{-2})$
β_{G1}	$5.22 \cdot 10^{-2}$	$(0.41 \cdot 10^{-2})$
β_{G2}	$0.85 \cdot 10^{-2}$	$(0.42 \cdot 10^{-2})$
β_{G3}	$-0.52 \cdot 10^{-2}$	$(0.23 \cdot 10^{-2})$
$\beta_{\text{garnishment}}$	$0.97 \cdot 10^{-2}$	$(0.48 \cdot 10^{-2})$
β_{writ}	$3.60 \cdot 10^{-2}$	$(0.28 \cdot 10^{-2})$
$\beta_{\text{notification}}$	$0.23 \cdot 10^{-3}$	$(0.24 \cdot 10^{-3})$
β_{ξ}	$2.25 \cdot 10^{-1}$	$(0.98 \cdot 10^{-2})$
β_t	$0.41 \cdot 10^{-2}$	$(0.28 \cdot 10^{-3})$
$\underline{\varphi}$	$1.00 \cdot 10^{-1}$	$(0.78 \cdot 10^{-2})$
$\overline{\varphi}$	$2.92 \cdot 10^{-1}$	$(3.66 \cdot 10^{-2})$
σ	$1.11 \cdot 10^{-1}$	$(0.53 \cdot 10^{-2})$

Table OA.3: Estimating the settlement behavior of tax-payers allowing for linear time trend.

Alternative ϕ . In Table OA.4, we report posterior means and standard deviations from an estimation in which ϕ (defined in 5) takes the form of a logistic function:

$$\phi(x) = \frac{\overline{\varphi}}{1 + e^{-(x-\underline{\varphi})}}$$

for $\underline{\varphi} \in \mathbb{R}$ and $\overline{\varphi} \in \mathbb{R}_+$.

	Mean	(std. dev.)
$\beta_{\Pi_{i,t}>0}$	1.30	(0.27)
$\beta_{\Pi_{i,t}}$	-1.37	(0.47)
β_{G1}	1.05	(0.34)
β_{G2}	0.15	(0.50)
β_{G3}	-0.21	(0.26)
$\beta_{\text{garnishment}}$	0.34	(0.32)
β_{writ}	1.15	(0.30)
$\beta_{\text{notification}}$	0.14	(0.63)
β_{ξ}	4.40	(0.40)
$\underline{\varphi}$	3.23	(0.63)
$\overline{\varphi}$	0.15	(0.16)
σ	1.78	(0.24)

Table OA.4: Estimating the settlement behavior of tax-payers using a logistic ϕ .

Findings remain qualitatively similar: both group G1 assignment and writs have a large impact on settlement intensities.

OA.4 Investigating the impact of notifications

As we discuss in Section 6, our main specification imposes the prior restriction that the coefficient on notifications is weakly positive. This restriction is at least in part challenged by aspects of our data.

Data. In Figure OA.4, we plot the average across control-group tax-payers of the relative payments they make each week, as a fraction of annualized Q1 debt. We split the population in two subgroups: (1) the group of tax-payers for whom the most recent collection-action taken is a notification, and (2) the group of tax-payers who have not yet been subjected to any action. In Figure OA.5, we plot the same statistic for the treatment group. In April

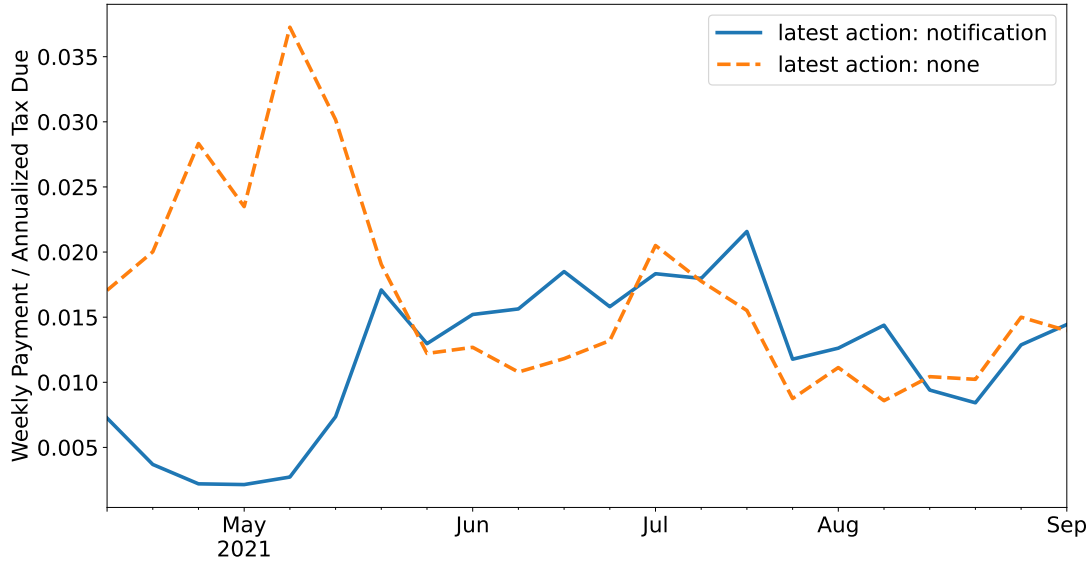


Figure OA.4: Payment given latest action (notification or none), control group.

and May 2021, control group tax-payers who had received no collection action settled their taxes at a much higher rate than tax-payers who received just a notification. This is not the case in the treatment group, and this is not the case in later periods.

We note that there is no evidence that the city engaged in significant selection when issuing notifications: tax-payers who are issued a notification by June are not predicted by our scoring model to be more likely to repay than those against whom no action had been taken by June (0.40 v.s. 0.41), but do have higher amount owed on average (440 soles v.s. 338 soles).

Unconstrained estimation. Table OA.5 reports parameters' posterior means and standard deviations using a specification in which we do not constrain the coefficient on collection notifications to be positive. The coefficient on notifications is then -0.0169, while the coeffi-

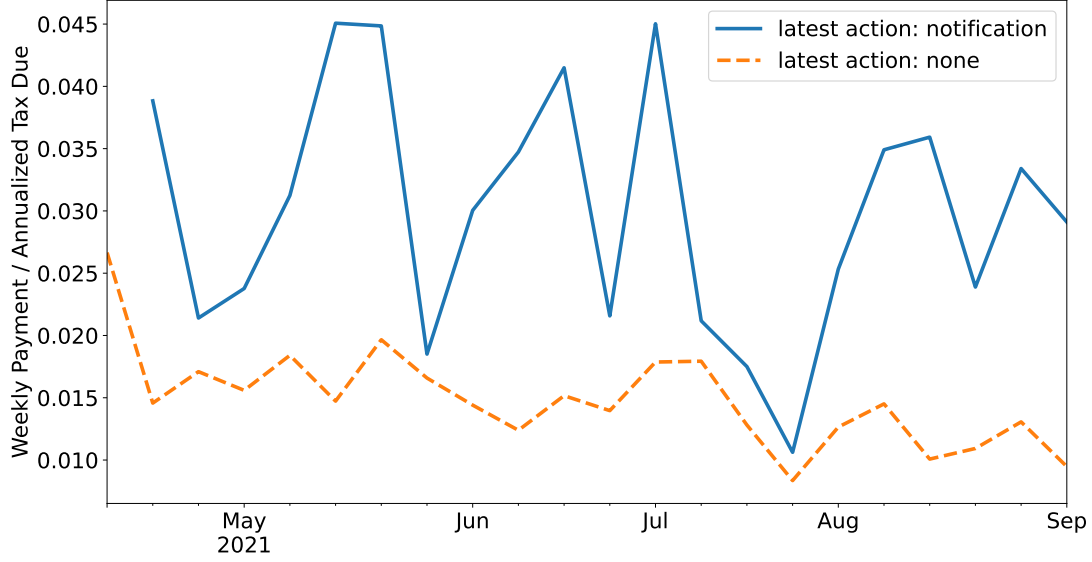


Figure OA.5: Payment given latest action (notification or none), treatment group.

	Mean	(std. dev.)
$\beta_{\Pi_{i,t}>0}$	$3.46 \cdot 10^{-2}$	$(0.25 \cdot 10^{-2})$
$\beta_{\Pi_{i,t}}$	$-3.93 \cdot 10^{-2}$	$(0.11 \cdot 10^{-2})$
β_{G1}	$3.16 \cdot 10^{-2}$	$(0.26 \cdot 10^{-2})$
β_{G2}	$-0.15 \cdot 10^{-2}$	$(0.30 \cdot 10^{-2})$
β_{G3}	$-1.29 \cdot 10^{-2}$	$(0.15 \cdot 10^{-2})$
$\beta_{\text{garnishment}}$	$0.24 \cdot 10^{-2}$	$(0.33 \cdot 10^{-2})$
β_{writ}	$2.14 \cdot 10^{-2}$	$(0.21 \cdot 10^{-2})$
$\beta_{\text{notification}}$	$-1.69 \cdot 10^{-2}$	$(0.16 \cdot 10^{-2})$
β_{ξ}	$1.20 \cdot 10^{-1}$	$(0.38 \cdot 10^{-2})$
$\underline{\varphi}$	$0.17 \cdot 10^{-2}$	$(0.18 \cdot 10^{-2})$
$\overline{\varphi}$	$3.13 \cdot 10^{-1}$	$(7.63 \cdot 10^{-1})$
σ	$4.82 \cdot 10^{-2}$	$(0.23 \cdot 10^{-2})$

Table OA.5: Estimating the settlement behavior of tax-payers allowing for negative collection notification coefficient.

cients on G1 priorities and writs are 0.0316 and 0.0214 respectively.¹

¹Recall that the collection action dummy variables are exclusive: they capture the latest collection action taken. Hence the coefficient of 0.0214 associated with writs captures the joint impact of receiving a

	Mean	(std. dev.)
$\beta_{\Pi_{i,t}>0}$	$1.57 \cdot 10^{-2}$	$(0.34 \cdot 10^{-2})$
$\beta_{\Pi_{i,t}}$	$-4.55 \cdot 10^{-2}$	$(0.15 \cdot 10^{-2})$
β_{G1}	$3.95 \cdot 10^{-2}$	$(0.32 \cdot 10^{-2})$
β_{G2}	$-0.28 \cdot 10^{-2}$	$(0.37 \cdot 10^{-2})$
β_{G3}	$-1.61 \cdot 10^{-2}$	$(0.20 \cdot 10^{-2})$
$\beta_{\text{garnishment}}$	$-0.44 \cdot 10^{-4}$	$(0.40 \cdot 10^{-2})$
β_{writ}	$2.17 \cdot 10^{-2}$	$(0.25 \cdot 10^{-2})$
$\beta_{\text{notification}}$	$-2.38 \cdot 10^{-2}$	$(0.21 \cdot 10^{-2})$
$\beta_{\text{notification after June}}$	$2.32 \cdot 10^{-2}$	$(0.20 \cdot 10^{-2})$
β_{ξ}	$1.55 \cdot 10^{-1}$	$(0.60 \cdot 10^{-2})$
$\underline{\varphi}$	$2.81 \cdot 10^{-2}$	$(0.37 \cdot 10^{-2})$
$\overline{\varphi}$	$3.13 \cdot 10^{-1}$	$(6.32 \cdot 10^{-2})$
σ	$6.99 \cdot 10^{-2}$	$(0.36 \cdot 10^{-2})$

Table OA.6: Estimating the settlement behavior of tax-payers allowing for different notification parameters before and after June.

A flexible specification. Table OA.6 reports posterior means and standard deviations for parameters of interest in an estimation with no lower bound on the coefficient on notification, but allowing the coefficient on notification to take different values before and after June 1st. The coefficient $\beta_{\text{notification}}$ is an indicator for receiving a notification any time, while $\beta_{\text{notification after June}}$ is an indicator for receiving a notification after June 1st. We find, consistent with Figure OA.4, that the coefficient on notifications is negative before June, but becomes approximately 0 (by adding up the two notification coefficients) after June. Other coefficients of the model are similar to those reported in Table 5.

Interpretation and policy impact. It is possible to attribute the pattern of early repayment in control to a meaningful mechanism rather than just noise. One possible interpretation is that this pattern reflects the temporary crowding out of intrinsic incentives: along

notification and then receiving a writ.

the lines of [Gneezy and Rustichini \(2000\)](#) tax-payers interpret the notification as a clarifying price for late payment. Alternatively, tax-payers may be surprised by the relatively mild short-term penalties associated with late payment. These considerations do not apply in the treatment group since notifications are always preceded by an information letter promising clear short-term enforcement.

While our primary interpretation is that this pattern is noise, the potential implications for design if it were in fact persistent, are clear. While the notification is a legal constraint which cannot be eliminated, the city government should ensure that the delay between notification and writs is short. Instead of first sending all notifications, and only then sending all legal writs, it may be preferable to prioritize completing (notification, writ) pairs close together in time.

OA.5 Capacity simulation

Figure [OA.6](#) provides simulations of capacity use under the *increased number of writs* counterfactual from Table [6](#), in which we increase the number of notifications and writs to match the control group. The number of new garnishments each month never exceeds 200. This figure is similar for all the other policies in Table [6](#).

OB Further Theoretical Analysis

We now outline how to extend the model of Section [2](#) to an income tax setting in which tax payers have private information about the amount of taxes $D_i \leq \bar{D}$ they would owe following a formal audit. Based on observables, the principal has a prior density f_i (with c.d.f. Q_i) over the actual tax due D_i for tax-payer i . The tax-payer knows D_i . Draws of D_i

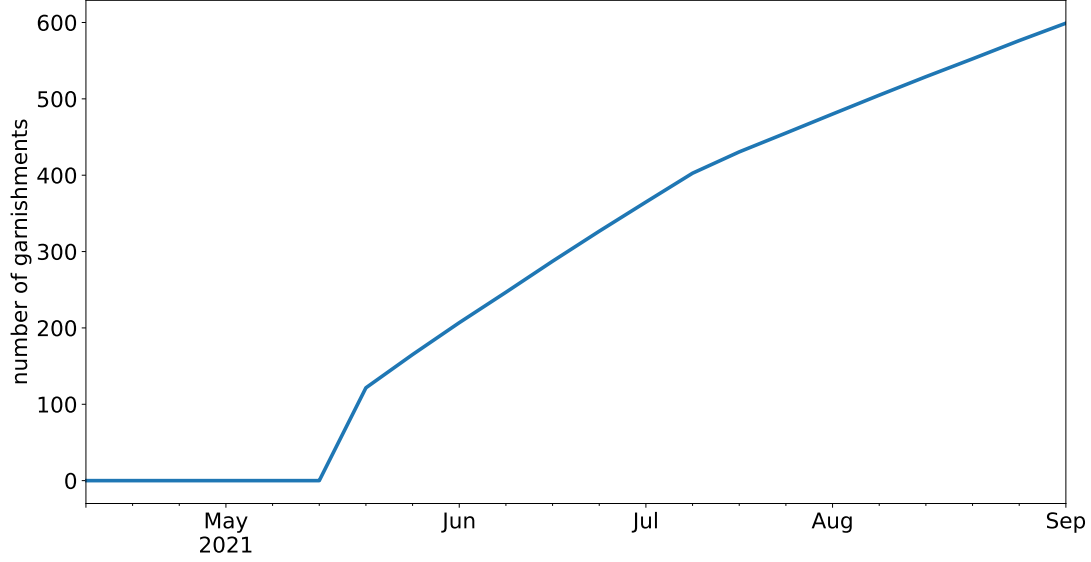


Figure OA.6: Cumulative number of garnishments in counterfactual simulation of treatment with increased number of writs.

are independent across tax-payers. For simplicity, we assume that

$$\frac{1 - Q_i(D_i)}{f_i(D_i)}$$

is decreasing in $D_i \in [0, \overline{D}]$.

In this context the collection action taken $a_i \in \{0, 1\}$ is really an audit decision. As in Section 2 the capacity constraint is that the total audit costs $\sum_{i=1}^N \lambda_i a_i$ must be less than αN . The government can commit to any direct mechanism in which:

- each tax-payer i reports an amount of tax-due $m_i \in [0, \overline{D}]$;
- the government recommends a payment \hat{P}_i to each tax-payer i ;
- each tax-payer i chooses an actual payment P_i ;
- the government implements a feasible audit profile as function of messages, recommendations and actual payments (and can force collection of at most D_i)

The principal maximizes revenue from tax-payers who settle:

$$\Pi = \sum_{i=1}^N (1 - a_i) P_i.$$

Proposition OB.1 (upper-bound on equilibrium revenue). *Under any mechanism, in Bayes Nash equilibrium, expected tax revenue is bounded above by*

$$\max \left\{ \sum_{i=1}^N \delta_i (1 - Q_i(P_i)) P_i \left| \begin{array}{l} (P_i, \delta_i)_{i \in \{1, \dots, N\}} \in ([0, \overline{D}] \times [0, 1])^N \\ \text{such that } \sum_{i=1}^N \delta_i Q_i(P_i) \lambda_i \leq \alpha N \end{array} \right. \right\}. \quad (\text{O1})$$

Bound (O1) corresponds to bound (1) with a friction rate q_i set to $Q_i(P_i)$ for optimally chosen settlement prices P_i : intuitively, tax-payers get a take-it-or-leave-it price offer P_i and endogenously refuse to pay whenever $D_i \leq P_i$.

Importantly, conditional on an optimal choice of prices $(P_i)_{i \in \{1, \dots, N\}}$, an analogue of Proposition 3 also holds: bound (O1) is asymptotically attained by setting optimal settlement prices P_i , and implementing a prioritized enforcement scheme using score

$$z_i \equiv \frac{(1 - Q_i(P_i)) P_i}{\lambda_i Q_i(P_i)}.$$

Note that while optimizing over $(\delta_i)_{i \in \{1, \dots, N\}}$ in (O1) is immediate, optimizing over $(P_i)_{i \in \{1, \dots, N\}}$ may be computationally demanding.

Proof. Consider a Bayes Nash equilibrium of a direct mechanism. A feasible auditing policy must satisfy the following constraint in expectation:

$$\mathbb{E} \left(\sum_{i=1}^N \lambda_i a_i \right) \leq \alpha N.$$

Consider a given tax-payer i with equilibrium audit probability $\mathbb{E}(a_i) = \overline{a}_i$. Because the

audit constraint in expectation is a relaxation of the ex post feasibility constraint, expected collection from i is lower than the highest expected collection from i under any individual collection mechanism such that $\mathbb{E}(a_i) \leq \bar{\alpha}_i$.

Let us denote by $\bar{a}_i(D_i)$ the audit probability of a tax-payer that discloses tax-due D_i , and asked to make a payment $P_i(D_i)$. The expected payoff of a tax-payer with true tax-due D_i , reporting tax-due D'_i , and obeying recommendation $P_i(D'_i)$ is

$$-P_i(D'_i) - \bar{a}_i(D'_i)(D_i - P_i(D'_i)).$$

Observing that the payoff of a tax-payer with tax-due 0 is 0, incentive compatibility and the usual application of the envelope theorem yields the payoff formula

$$P_i(D_i)(1 - \bar{a}_i(D_i)) = \int_0^{D_i} \bar{a}_i(D) dD - \bar{a}_i(D_i) D_i.$$

This implies that the expected collection from tax payer i is bounded above by

$$\begin{aligned} \max_{\bar{a}_i} \int_0^{\bar{D}} \left[\int_0^{D_i} \bar{a}_i(D) dD - \bar{a}_i(D_i) D_i \right] f_i(D_i) dD_i \\ \bar{a}_i \text{ s.t. } \int_0^{\bar{D}} \bar{a}_i(D_i) f_i(D_i) dD_i \leq \bar{\alpha}_i \end{aligned} \quad (\text{O2})$$

Letting $\mu \geq 0$ denote the Lagrange multiplier on the auditing constraint, and applying Fubini's theorem, this means that the audit policy \bar{a}_i solving (O2) solves

$$\max_{\bar{a}_i} \int_0^{\bar{D}} \bar{a}_i(D_i) [1 - Q_i(D_i) - (D_i + \mu) f_i(D_i)] dD_i$$

Since $\frac{1-Q_i(D_i)}{f_i(D_i)}$ is decreasing in D_i it follows that an audit policy \bar{a}_i^* solving (O2) will take a threshold form: there exists D_i^* such that for all $D_i > D_i^*$, $\bar{a}_i^*(D_i) = 0$, while for all $D_i < D_i^*$, $\bar{a}_i^*(D_i) = 1$. In turn, for all $D_i > D_i^*$, $P_i(D_i) = D_i^*$. In other terms the optimal individual taxation policy is a posted settlement price. If the tax-payer accepts, then no audit takes

place. If the tax-payer refuses, then an audit takes place with probability 1.

This implies that collection under any mechanism is bounded above by

$$\begin{aligned} & \max \left\{ \sum_{i=1}^N (1 - Q_i(P_i)) P_i \mid (P_i)_{i \in \{1, \dots, N\}} \text{ such that } \sum_{i=1}^N Q_i(P_i) \lambda_i \leq \alpha N \right\} \\ &= \max \left\{ \sum_{i=1}^N \delta_i (1 - Q_i(P_i)) P_i \mid (P_i, \delta_i)_{i \in \{1, \dots, N\}} \in ([0, \overline{D}] \times [0, 1])^N \text{ such that } \sum_{i=1}^N \delta_i Q_i(P_i) \lambda_i \leq \alpha N \right\} \end{aligned}$$

where the point of the last equality is to highlight that as in the case of Proposition (2), given prices P_i , the optimal policy offers all tax-payers with score

$$z_i \equiv \frac{(1 - Q_i(P_i)) P_i}{\lambda_i Q_i(P_i)}$$

greater than some threshold z^* a take-it-or-leave-it settlement offer at price P_i , under the threat of audit if they do not accept, while tax-payers with scores z_i less than z^* are not audited even if they do not settle. \square

OC Laboratory Evidence

Ahead of field implementation, and to refine our understanding of various implementations of divide and conquer, we ran lab experiments on Amazon Mechanical Turk (MTurk), whose main goal was to compare settlement behavior under random enforcement, prioritized static enforcement, and prioritized iterative enforcement.

Baseline game. Our main experiment was run on MTurk from August to October of 2021. Because of the difficulty of simultaneously recruiting sufficiently many reliable players, and to allow multiple treatments to be run at the same time, we set the number of agents N to 10. To ensure that the analysis of Section 2 applies although N is not large, we set friction rate q to 0.

The experimenter played the role of the principal, and recruited participants playing the role of agents. All agents received an initial endowment of 100 points and owed the same amount $D = 100$. In our three main treatment arms, the initial settlement price was set to $P_0 = 89$, and increased linearly over time up to $P_1 = 91$. In a fourth treatment arm, the initial settlement price was set to $P_0 = 80$ and increased to $P_1 = 91$. Time $t = 1$ corresponded to 45 seconds.

The principal's enforcement capacity was set to $\alpha = 10\%$, so that the principal can physically collect taxes from a single agent. To reduce sampling variation, the players were able to settle at some time randomly drawn without replacement from the set of 10 equidistant points between 5 seconds and 36 seconds.²

Treatments. We implemented three main treatments corresponding to different enforcement policies and different information structures. Under these three treatments, the initial settlement price was set to $P_0 = 89$, with a final settlement price at $P_1 = 91$.

In the **random** enforcement treatment, participants were not informed of the order in which enforcement would occur, and did not receive information about the settlement behavior of others. Players were simply made aware of when it was possible for them to settle, and at what price.

The other two main treatments implemented a prioritized enforcement rule, in which participants were informed of their enforcement priority, but received different additional information over time:

- In the **priority+no-info** treatment, players were given no information about the realized settlement of others.
- In the **priority+info** treatment, players were informed of their *real time effective rank*, i.e. their updated rank after taking into account settlement by other players.

This corresponds to PIE.

²The buffer at the beginning was to ensure that any minor latency issues in the software would not impede play, while the buffer at the end ensured that a player had time to respond to being able to settle.

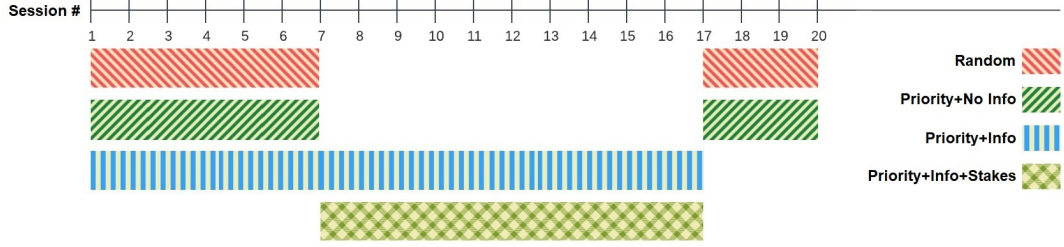


Figure OC.1: treatment overlap across sessions

Finally, a fourth **priority+info+stakes** treatment replicated the **priority+info** treatment but increased the incentives for fast settlement by setting initial settlement price to $P_0 = 80$ and final settlement price to $P_1 = 91$.

Protocol. The experiment design was filed with the AEA RCT registry under ID number AEARCTR-0004802. The experiment was programmed in oTree (Chen et al., 2016) and experimental instructions were conveyed to players through their browser. Screenshots of instructions are reproduced in Online Appendix OC.2.

Because of the difficulty of recruiting many MTurk users to play simultaneously, we did not implement all four treatments jointly at all times. Instead we implemented overlapping joint sessions along the lines described by Figure OC.1. When we compare different treatment outcomes, we focus on the subset of overlapping sessions for the relevant treatments.³ Participants played the collection game 5 times. The first collection game did not count towards participants' final payoff. Points earned in the last four collection games were averaged across games, and converted to cash at the rate of USD 8 for 100 points. Players were *not* reallocated across different treatments over time.

Participants earned a USD 3.5 fee for showing up at a pre-announced time. The experi-

³Specifically, we ran 7 sessions, each with 30 participants randomly assigned to one of three treatments: random, priority+no-info, priority+info. To understand the role of steeper incentives to settle early, we ran 10 sessions with 20 participants randomly assigned to either priority+info or priority+info+stakes. Finally, we ran 3 sessions with 20 participants randomly assigned to random or priority+no-info. Altogether, we ran 10 sessions of each treatment, except for priority+info, of which we ran 17.

ment began once the required number of participants arrived. Participants earned between USD 0 and USD 8 from their play in the collection game, with mean total earnings at approximately USD 6. Participants played for an average of 25 minutes. Participants were selected from a pool of US adults over 18 years old, with an MTurk approval rate over 98% and who had completed at least 10 tasks on MTurk.

OC.1 Findings

OC.1.1 Is prioritized enforcement effective and when?

Mean settlement by treatment. Table OC.1 displays results from regressing settlement rates and tax revenue on treatment status for the 7 overlapping sessions of treatments **random**, **priority+no-info**, and **priority+info**. Treatment **random** is the omitted category.

Table OC.1: Settlement rates and revenues across treatments.

	settlement rate	tax revenue (per person)
constant	0.443	39.86
priority+no-info	0.068 (0.271)	6.109 (0.359)
priority+info	0.318 (0.000)	28.72 (0.000)
Observations	840	840

Two-sided p-values in parentheses. Standard-errors are clustered at the (treatment, session) level.

Three observations are immediate. First, players do not play the high settlement equilibrium under random enforcement: roughly 44% of players settle, compared to a 100% theoretical bound under the high settlement equilibrium.

Second, while the **priority+no-info** treatment increases settlement rates and revenues, it fails to implement full settlement by a large margin. It improves settlement rates by 6.8pp (or 15.3%).⁴

⁴The effect is significant at the 10% level if we use the 10 overlapping sessions of the **random** and

Third, the **priority+info** treatment does a much better job of reducing the distance to full settlement. It increases settlement rates by 31.8pp (or 71.8%). Effects on revenues are similar.

Altogether, these findings show that in our context, non-obviously dominated play appears to be a much better suited solution concept than either selecting the high settlement equilibrium, or rationalizability.

Distributional effects. The distribution of group-level settlement rates is also instructive. Figure OC.2 plots the c.d.f. of group-level settlement rates, computed at the (session, treatment, round) level, by treatment.

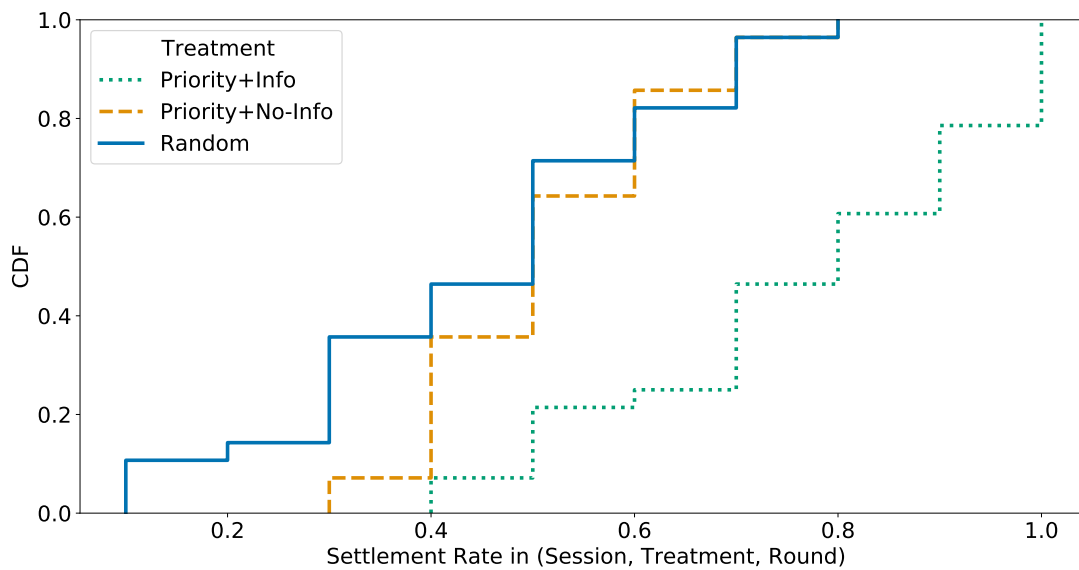


Figure OC.2: Cumulative distribution function of settlement rate by treatment.

Two facts are noteworthy. First, the **priority+info** treatment induces a first-order stochastic dominance (FOSD) increase in settlement rates. In addition, although the mean impact of **priority+no-info** over **random** is small, **priority+no-info** does seem to effectively reduce the left tail of outcomes. In data from the 10 overlapping sessions between the two treatments, **priority+info**, with a magnitude of 7pp.

it raises the 20th percentile of settlement rates from 30% to 40% (p-value 0.057). This can be viewed as an improvement in the equity of taxation across groups. Intuitively this finding makes sense since settling is dominant for at least one player under **priority+no-info**, while a settlement rate of 0 is an equilibrium under random enforcement.

OC.2 Player instructions

This section reproduces instructions given to participants in different treatments.

OC.2.1 Instructions for Priority - Info

Introduction

You are about to participate in an experiment. During this experiment you have the opportunity to earn a sum of money that will be paid to you at the end of the experiment. The amount of money you earn may be larger if

- you read the instructions carefully.
- you think carefully about the decisions you make.

In today's experiment, you will interact with other participants via your computer. Your decision as well as others' will affect your payoff, which is calculated in points. The experiment consists of a number of rounds, and at the end of the experiment we will calculate your **average payoff (in points) across rounds**. We then convert this average into US Dollars (USD) according to the following exchange rate:

$$100 \text{ points} = \text{USD } 8$$

To compute your final payment, we add to this a USD 3.5 participation fee for the experiment.

Summary of the Experiment

In this experiment, you and other participants interact with an automated *collection authority*. General details are:

- there are 10 participants in this experiment, including you
- all participants read the same set of instructions
- there are 5 rounds including 1 practice round
- each round consists of 2 stages
 - stage 1: *settlement stage*
 - stage 2: *collection stage*

Stages Overview

Stage 1: Settlement Stage

You start each round with **100** points. At the beginning of the round, you will enter the settlement stage with the other participants. The collection authority (CA) offers you and all other participants an identical settlement opportunity to keep a number of points. During the settlement stage, you will have **45** seconds to accept the offer made by the CA. Further details of the settlement stage are given in the *Settlement Stage — Details* tab.

Stage 2: Collection Stage

The CA is able to *investigate 1 participant*. If the CA investigates you, then you will certainly pay 100 points. If you accepted a settlement offer in the settlement stage, the CA will certainly not investigate you. Details of the investigation and collection procedure are given in the *Collection Stage — Details* tab.

Collection Stage — Details

The collection authority (CA) will choose to investigate according to a pre-specified line. You will be assigned an initial position in line at the start of the settlement stage, with no two participants assigned the same position. The **one** participant with the **lowest** initial position in line **among those who do not accept a settlement offer** is investigated and forced to pay 100 points, leaving that participant with a payoff of 0 points in the round. The lowest position is 1 and the highest is 10. Participants who do not accept a settlement offer and are not investigated pay 0 points, leaving each of them with a payoff of 100 points in the round. If all participants accept a settlement offer, the CA does not investigate anybody.

Settlement Stage — Details

Your Decision

You start the round with 100 points. You will be offered a settlement by the collection authority to keep a number of points — this number decreases over time. The initial settlement offer is to keep **11** points. This offer decreases by **0.045** per second, and the final settlement offer is to keep **9** points. If you accept the offer in the settlement stage, the number of points you accept is your payoff in the round. If you do not accept the offer by the deadline, your payoff in the round depends on the outcome of the collection stage described in the *Collection Stage — Details* tab.

Delayed Decision Opportunity

The button to accept a settlement offer may not be immediately available. The button will become available after a random amount of time, before the end of the settlement stage. Once the acceptance button becomes available, it will stay available until the end of the settlement stage.

Information

You will receive information about your *current position in line* to be investigated, which is a value that is updated continuously throughout the settlement stage. At the start of the round, your current position in line is equal to your initial position in line. Afterwards, any time a participant with an initial position in line lower than yours accepts a settlement offer, your current position in line decreases by 1. In general, if your current position in line to be investigated is X, you will be shown the phrase, **Your current position in line to be investigated is X.**

Other Participants

All other participants are offered the same settlement. Their buttons become available after a random amount of time, before the end of the settlement stage.

Snapshots

Below we produce example snapshots of the screens you will see in each round. Text in red is commentary describing the page — please read these comments so you understand the screen.

The snapshot below shows an example of the settlement stage screen.

The screenshot shows the 'Settlement Stage (#1)' interface. On the left is a dark sidebar with 'Instructions' and a list of menu items: Introduction, Stages Overview, Collection Stage — Details, Settlement Stage — Details, Snapshots, Payment, and Quick Facts. The main content area has a dark header with 'Time left to collection stage: 0:40'. Below this, the title 'Settlement Stage (#1)' is followed by 'Points you keep if you accept offer now : 10.77' and 'Your current position in line to be investigated is 1'. At the bottom, it says 'Settlement cannot be accepted yet'. Red arrows point to various elements with explanatory text: 'Round number' points to the stage number; 'Time until you are sent to the collection stage' points to the timer; 'Amount you keep if you immediately accept settlement' points to the points value; 'This number indicates your current position in the investigation line' points to the position value; and 'Indicates that you cannot yet accept the settlement offer' points to the 'Settlement cannot be accepted yet' message.

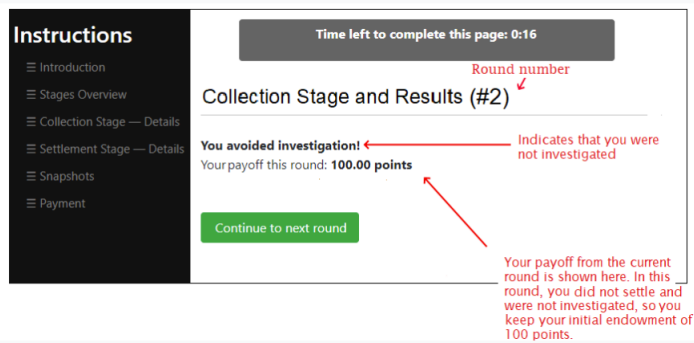
The instructions remain available to you. There is also a *Quick Facts* tab that lists some of the numbers found in the instructions.

Indicates that you cannot yet accept the settlement offer

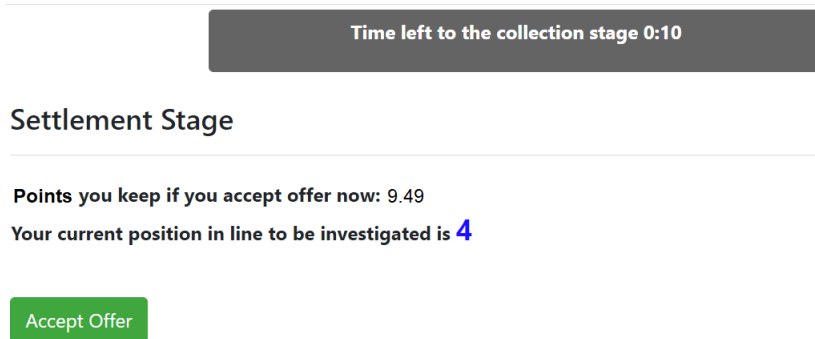
Next we produced a snapshot of an example of the settlement stage once the "accept offer" button becomes available.

This screenshot is similar to the previous one, showing the 'Settlement Stage (#1)' interface. The sidebar and header are identical. However, the message 'Settlement cannot be accepted yet' has been replaced by a green button labeled 'Accept Offer'. The 'Points you keep if you accept offer now : 10.77' and 'Your current position in line to be investigated is 1' remain the same.

At the end of the round, you will see a results page. Below is an example of the results page for a case in which the participant did not accept a settlement offer and was not investigated.



During the game, players were shown the following screen. Whenever a player was unable to settle, the “Accept Offer” button was deactivated.



OC.2.2 Instructions for Priority - No Info Treatment

The instructions are identical to the priority - info treatment, except for the description of the collection stage (and the snapshots page).

Settlement Stage — Details

Your Decision

You start the round with 100 points. You will be offered a settlement by the collection authority to keep a number of points — this number decreases over time. The initial settlement offer is to keep **11** points. This offer decreases by **0.045** per second, and the final settlement offer is to keep **9** points. If you accept the offer in the settlement stage, the number of points you accept is your payoff in the round. If you do not accept the offer by the deadline, your payoff in the round depends on the outcome of the collection stage described in the *Collection Stage — Details* tab.

Delayed Decision Opportunity

The button to accept a settlement offer may not be immediately available. The button will become available after a random amount of time, before the end of the settlement stage. Once the acceptance button becomes available, it will stay available until the end of the settlement stage.

Other Participants

All other participants are offered the same settlement. Their buttons become available after a random amount of time, before the end of the settlement stage.

During the game, players were shown the following screen with their *initial rank*.

Time left to the collection stage 0:20

Settlement Stage

Points you keep if you accept offer now: 9.86

Your initial position in line to be investigated is **7**

Accept Offer

OC.2.3 Instructions for Random Treatment

The instructions are identical to the priority-no info treatment, except for the description of collection (and the snapshots page).

Collection Stage — Details

The collection authority (CA) will RANDOMLY choose **one participant among those who do not accept a settlement offer** to investigate and force to pay 100 points, leaving that participant with a payoff of 0 points in the round. Participants who do not accept a settlement offer and are not investigated pay 0 points, leaving each of them with a payoff of 100 points in the round. If all participants accept a settlement offer, the CA does not investigate anybody.

During the game, players were shown the following screen.

Time left to the collection stage 0:09

Settlement Stage

Points you keep if you accept offer now: 9.36

Accept Offer

OD Spanish originals

Figures [OD.1](#), [OD.2](#) and [OD.3](#) report the original information letters sent to tax-payers in treatment groups G1, G2, and G3. Figure [OD.4](#) provides the template for information letters sent to the control group. The treatment and control groups were sent identical notifications (*Valor*, Figure [OD.5](#)) and legal writs (*REC1*, Figure [OD.6](#)).

Aviso de Deuda Pendiente y Cobranza Inminente

Estimado contribuyente **Nombre**

Dirección **DIRECCION**







Le recordamos que tiene la siguiente deuda pendiente con el municipio*:		Monto Deuda: S/ Monto_Deuda
*Por concepto de:	1era cuota predial 1era cuota predial + Arbitrios 2021	
El proceso de cobranza coactiva se iniciará a más tardar el día:		Fecha límite: Fecha_limite
Y la cobranza puede ser iniciada en cualquier momento y sin previo aviso.		
Si se inicia el proceso de cobranza coactivo, su deuda incluirá las gastos y costas procesales reguladas por Ley y ascenderá al monto de **::		Monto Deuda con Gastos Adicionales: S/Monto_Deuda_Coactivo
**Incluye gastos administrativos de 10% y otros derechos de emisión		
Además de acumular un interés semanal de:	Interés semanal S/ Interes_semanal	
Le recordamos que le conviene pagar inmediatamente para evitar costos mayores. Use nuestros siguientes canales de pago:		
<div> <div> <p>1 Gestión de cobranza domiciliaria El pago móvil al alcance de todos. Desde la comodidad de su casa, comunicándose a nuestros Teléfonos o WhatsApp.</p> <p>940 396 206 940 385 948</p> <p>962 727 311 (WhatsApp Rentas)</p> <p>Nuestros gestores de cobranza se apersonarán a su domicilio para que pueda realizar el pago de sus tributos mediante tarjetas de débito o crédito VISA o MASTERCARD. O brindar información sobre depósitos en cuenta corriente bancaria del banco Scotiabank o BBVA Continental.</p> </div> <div> <p>2 APP Paga Fácil Asimismo, contamos con nuestra APP Paga fácil, donde podrá consultar su deuda pendiente y efectuar el pago de sus tributos de manera rápida y segura.</p> <p></p> <p><small>TV Disponible en Android.</small></p> </div> </div> <div> <p>3 Pagos en Línea Desde su casa puede efectuar el pago de sus tributos con tarjetas de débito o crédito VISA, MASTERCARD, AMERICA EXPRESS o DINERS CLUB, ingresando a: Pag y consultas en línea desde el link: https://pagosonline.munijesusmaria.gob.pe</p> <p></p> </div> <div> <p>4 Bancos autorizados Con el estado de cuenta para pago en bancos obtenido en los locales Municipales, podrá efectuar el pago de sus tributos en los siguientes bancos.</p> <p></p> </div> <div> <p>5 Centro de pago Debido al estado de emergencia y a las medidas de distanciamiento social, la atención se realiza en:</p> <p></p> </div>		
Si quiere pagar y no puede, llámenos o escribanos para evaluar las opciones de pago:		
<p> Whats App 962 727 311 / 940 396 206 / 940 385 948</p> <p> servicios_rentas@munijesusmaria.gob.pe</p>		

Figure OD.1: Information letter template, priority group G1

Estimado contribuyente **Nombre**










Le recordamos que tiene la siguiente deuda pendiente con el municipio*:		Monto Deuda: S/ Monto_Deuda
*Por concepto de:	1era cuota predial 1era cuota predial y Arbitrios Ene-Feb 2021	
El proceso de cobranza coactiva se iniciará a más tardar el día:		Fecha límite: Fecha_limite
Y su deuda puede pasar en cualquier momento y sin previo aviso al grupo de máxima prioridad (lo que implicará el inicio del proceso de cobranza coactivo en máximo 4 semanas).		
Si se inicia el proceso de cobranza coactivo, su deuda incluirá los gastos y costas procesales reguladas por Ley y ascenderá al monto de **:		Monto Deuda con Gastos Adicionales: S/Monto_Deuda_Coactivo
**Incluye gastos administrativos de 10% y otros derechos de emisión		
Además de acumular un interés semanal de:	Interés semanal S/ Interes_semanal	
Le recordamos que le conviene pagar inmediatamente para evitar costos mayores. Use nuestros siguientes canales de pago:		
<div> <div> <p>1. Gestión de cobranza domiciliaria</p> <p>El pago móvil al alcance de todos. Desde la comodidad de su casa, comunicándose a nuestros Teléfonos o WhatsApp.</p> <div>  <div> <p>940 396 206</p> <p>940 385 948</p> </div> </div> <p>962 727 311 (WhatsApp Rentas)</p> <p>Nuestros gestores de cobranza se apersonarán a su domicilio para que pueda realizar el pago de sus tributos mediante tarjetas de débito o crédito VISA o MASTERCARD. O brindar información sobre depósitos en cuenta corriente bancaria del banco Scotiabank o BBVA Continental.</p> </div> <div> <p>2. APP Paga Fácil</p> <p>Asimismo, contamos con nuestra APP Paga fácil, donde podrá consultar su deuda pendiente y efectuar el pago de sus tributos de manera rápida y segura.</p> <div>   </div> <p><small>© 2020 Disponible en Android</small></p> </div> </div> <div> <p>3. Pagos en Línea</p> <p>Desde su casa puede efectuar el pago de sus tributos con tarjetas de débito o crédito VISA, MASTERCARD, AMERICA EXPRESS o DINERS CLUB, ingresando a: https://pagosonline.munijesusmaria.gob.pe y consultas en línea desde el link: https://pagosonline.munijesusmaria.gob.pe</p>  </div> <div> <p>4. Bancos autorizados</p> <p>Con el estado de cuenta para pago en bancos obtenido en los locales Municipales, podrá efectuar el pago de sus tributos en los siguientes bancos.</p> <div>    </div> </div> <div> <p>5. Centro de pago</p> <p>Debido al estado de emergencia y a las medidas de distanciamiento social, la atención se realiza en:</p> <div> <p>Sede central Palacio Municipal Av. Mariátegui N° 850</p> <p>Lunes a Viernes de 8:00 a.m. a 5:00 p.m. Sábados de 9:00 a.m. a 1:00 p.m.</p> </div> </div>		
Si quiere pagar y no puede, llámenos o escribanos para evaluar las opciones de pago:		
<div> <div>  <p>Whats App 962 727 311 / 940 396 206 / 940 385 948</p> </div> <div>  <p>servicios_rentas@munijesusmaria.gob.pe</p> </div> </div>		

Figure OD.2: Information letter template, priority group G2

Aviso de Deuda Pendiente

Estimado contribuyente **Nombre**






Le recordamos que tiene la siguiente deuda pendiente con el municipio*:		Monto Deuda: S/ <u>Monto_Deuda</u>
*Por concepto de:	1era cuota predial 1era cuota predial + Arbitrios Ene-Feb-Mar 2021	
Y que su deuda puede pasar en cualquier momento y sin previo aviso al grupo de cobranza prioritaria (lo que implicará el inicio del proceso de cobranza coactivo en máximo 8 semanas).		
Si se inicia el proceso de cobranza coactivo, su deuda incluirá las gastos y costas procesales reguladas por Ley y ascenderá al monto de **:		Monto Deuda con Gastos Adicionales: S/ <u>Monto_Deuda_Coactivo</u>
**Incluye gastos administrativos de 10% y otros derechos de emisión		
Además de acumular un interés semanal de:	Interés semanal S/ <u>Interes_semanal</u>	
Le recordamos que le conviene pagar inmediatamente para evitar costos mayores. Use nuestros siguientes canales de pago:		
<div> <div> <p>1. Gestión de cobranza domiciliaria</p> <p>El pago móvil al alcance de todos. Desde la comodidad de su casa, comunicándose a nuestros Teléfonos o WhatsApp.</p> <p>940 396 206 940 385 948 962 727 311 (WhatsApp Rentas)</p> <p>Nuestros gestores de cobranza se apersonarán a su domicilio para que pueda realizar el pago de sus tributos mediante tarjetas de débito o crédito VISA o MASTERCARD. O brindar información sobre depósitos en cuenta corriente bancaria del banco Scotiabank o BBVA Continental.</p> </div> <div> <p>2. APP Paga Fácil</p> <p>Asimismo, contamos con nuestra APP Paga fácil, donde podrá consultar su deuda pendiente y efectuar el pago de sus tributos de manera rápida y segura.</p>  <p>(*) Disponible en Android.</p> </div> </div> <div> <p>3. Pagos en Línea</p> <p>Desde su casa puede efectuar el pago de sus tributos con tarjetas de débito o crédito VISA, MASTERCARD, AMERICA EXPRESS o DINERS CLUB, ingresando a: Pagos y consultas en línea desde el link: http://pagosonline.munijesusmaria.gob.pe</p>  </div> <div> <p>4. Bancos autorizados</p> <p>Con el estado de cuenta para pago en bancos obtenido en los locales Municipales, podrá efectuar el pago de sus tributos en los siguientes bancos.</p>  </div> <div> <p>5. Centro de pago</p> <p>Debido al estado de emergencia y a las medidas de distanciamiento social, la atención se realiza en:</p> <p>Sede central Palacio Municipal Av. Mariátegui N° 850 Lunes a Viernes de 8:00 a.m. a 5:00 p.m. Sábados de 9:00 a.m. a 1:00 p.m.</p> </div>		
Si quiere pagar y no puede, llámenos o escribanos para evaluar las opciones de pago:		
 Whats App 962 727 311 / 940 396 206 / 940 385 948  servicios_rentas@munijesusmaria.gob.pe		

Figure OD.3: Information letter template, priority group G3



Requerimiento de pago

Estimado contribuyente **var1**

Por medio del presente, me dirijo a Usted para saludarlo cordialmente y a la vez comunicarle que mantiene deuda vencida por la suma ascendente a:

CUENTA 2021	DEUDA DE AÑOS ANTERIORES	TOTAL DEUDA *
S/ var2	S/ var3	S/ var4

Asimismo, comunicarle que se ha dispuesto la emisión de valores tributarios conteniendo su deuda pendiente, que de no cancelarse oportunamente se remitirá a la vía coactiva, motivo por el cual se le invoca a **REGULARIZAR EL PAGO DE SU DEUDA VENCIDA Y PENDIENTE DE PAGO DENTRO DE LA 8 48 HORA 8 DE RECEPCIONADO EL PRESENTE.**

CON EL PAGO DE SUS OBLIGACIONES TRIBUTARIAS PERMITE MANTENER UNA ADECUADA PRESTACIÓN DE LOS SERVICIOS PÚBLICOS LOCALES (SERENAZGO, PARQUES Y JARDINES Y LIMPIEZA PÚBLICA), ASÍ COMO EL DESARROLLO INTEGRAL, SOSTENIBLE Y ARMÓNICO EN EL DISTRITO DE JESÚS MARÍA.

Recuerde que si efectúa el pago en línea contribuye con las medidas de distanciamiento social.

(Verifique su estado de cuenta ya)

Ingrese al link Pagos y Consulta en Línea <https://pagosentinea.munijesusmaria.gob.pe/> con su DNI o RUC y clave web **vars**.

Estamos al servicio de ustedes.

Equipo de Rentas.

*Deuda verificada el 06/04/2021 y actualizada al 30/04/2021.

**Hacer caso omiso al presente en caso de haber cancelado o realizado un compromiso de pago.

Si identificas indicios de algún acto de corrupción, irregularidades o prohibiciones éticas, informarnos completando el "Formulario para presentar una denuncia" que podrás descargar desde nuestra web: www.munijesusmaria.gob.pe y enviarlo a nuestro correo: equipodeintegridad@munijesusmaria.gob.pe llámanos al número 614-1212 Anexo 2401 o de manera presencial, con el funcionario que hace de presidente del Equipo de Trabajo Permanente de Integridad Institucional.

Le recordamos que **le conviene pagar inmediatamente** para evitar costos mayores. Use nuestros siguientes canales de pago:

1. Gestión de cobranza domiciliaria
El pago móvil al alcance de todos.
Desde la comodidad de su casa, comuníquese a nuestros Telefonos o WhatsApp.

940 398 205 / 940 385 948 / 962 727 311 (WhatsApp: Rentas)

Nuestros gestores de cobranza se acercarán a su domicilio para que pueda realizar el pago de sus tributos mediante tarjetas de débito o crédito VISA o MASTERCARD. O recibir información sobre depósitos en cuenta corriente bancaria del banco Interbank o BANCARDO.

2. APP Paga Fácil
Además, contamos con nuestra APP Paga Fácil, desde aquí podrá realizar su deuda pendiente y efectuar el pago de sus tributos de manera rápida y segura.

(Disponible en Android)

3. Pagos en Línea
Desde su casa puede efectuar el pago de sus tributos con tarjetas de débito o crédito VISA, MASTERCARD, AMERICA EXPRESS o DINERS CLUB, ingresando a Pagos y Consultas en línea desde el link: <https://pagosentinea.munijesusmaria.gob.pe>

4. Bancos autorizados
Cada vez que realice un pago en los bancos autorizados en los locales Scotiabank, podrá efectuar el pago de sus tributos en los siguientes bancos:

Scotiabank BBVA Continental BanBif

5. Centro de pago
Debido al estado de emergencia y a las medidas de distanciamiento social, la atención se realiza en:

Embarcadero Pampa Incaural
Av. Maranga 1745
Lunes a viernes de 8:30 am a 5:00 pm
Sábados de 9:30 am a 1:00 pm

Si quiere pagar y no puede, llámenos o escribanos para evaluar las opciones de pago:



WhatsApp
962 727 311 / 940 398 205 / 940 385 948



servicios_rentas@munijesusmaria.gob.pe

Figure OD.4: Information letter template, control group

IDENTIFICACION DEL DEUDOR TRIBUTARIO:

Nombre o Razón social: 265951 HERRERA GILVONIO ERNESTO ERICK
Documento de Identidad: DNI: 40674714
Domicilio Fiscal: AV. BRASIL NUM. 1055 BLOCK. A DPTO. 1201 LIMA(LIMA)JESUS MARIA
Tributo: IMPUESTO PREDIAL

Se le requiere la cancelación de la deuda contenida en el presente documento, bajo apercibimiento de iniciar el procedimiento de ejecución coactiva.

La presente se emite por los tributos y periodos que se indican, cuyo monto se ha actualizado al 30/12/2020, luego de esta fecha se actualizará a una tasa diaria de 0.04%, conforme a la tasa de interés moratorio fijada.

Motivo Determinante: Se ha verificado la existencia de una deuda tributaria no cancelada dentro de los plazos establecidos

Declaración Jurada: Actualización 2016 de DJ NP0016040239 de fecha 2020-08-29
Actualización 2017 de DJ NP0017041683 de fecha 2020-08-29
Actualización 2018 de DJ NP0018044121 de fecha 2020-08-29
Actualización 2019 de DJ NP0019046083 de fecha 2020-08-29

Año	Base Imponible	Tramos	Alicuota	Insolutos	Imp. Anual	Trin. acordados	Insoluto	Reajuste(1)	Interes(2)	Total
2016	81,602.17	Hasta 15 UIT Mas de 15 UIT a 60UIT Mas de 60 UIT	0.20% 0.60% 1.00%	118.50 134.11 0.00	252.61	01 02 03 04	319.42	0.00	192.86	512.28
2017	107,773.84	Hasta 15 UIT Mas de 15 UIT a 60UIT Mas de 60 UIT	0.20% 0.60% 1.00%	121.50 282.14 0.00	403.64	01 02 03 04	379.34	0.00	182.33	561.67
2018	111,013.48	Hasta 15 UIT Mas de 15 UIT a 60UIT Mas de 60 UIT	0.20% 0.60% 1.00%	124.50 292.58 0.00	417.08	01 02 03 04	392.18	0.00	139.25	531.43
2019	114,524.73	Hasta 15 UIT Mas de 15 UIT a 60UIT Mas de 60 UIT	0.20% 0.60% 1.00%	126.00 309.15 0.00	435.15	01 02 03 04	435.15	0.00	114.16	549.31
Gastos de Emisión de la Cuponera:										25.38
Total Deuda General:										2,180.07

UIT: AÑO 2016 = S/3950.00, AÑO 2017 = S/4050.00, AÑO 2018 = S/4150.00, AÑO 2019 = S/4200.00

(1) Factores de Reajuste: 2016-01=0.0000, 2016-02=0.0000, 2016-03=0.0000, 2016-04=0.0000, 2017-01=0.0000, 2017-02=0.0000, 2017-03=0.0000, 2017-04=0.0000, 2018-01=0.0000, 2018-02=0.0000, 2018-03=0.0000, 2018-04=0.0000, 2019-01=0.0000, 2019-02=0.0000, 2019-03=0.0000, 2019-04=0.0000

(2) TIM Aplicada: 2016-01=64.96%, 2016-02=61.91%, 2016-03=58.84%, 2016-04=55.80%, 2017-01=52.23%, 2017-02=49.73%, 2017-03=46.67%, 2017-04=43.63%, 2018-01=39.95%, 2018-02=37.56%, 2018-03=34.07%, 2018-04=30.45%, 2019-01=26.23%, 2019-02=26.23%, 2019-03=26.23%, 2019-04=26.24%

BASE LEGAL:

Art. 33°, 78° inc. 1 y 104° del TUO del Código Tributario aprobado por D.S. N° 133-2013-EF y sus modificatorias
Art. 8° y siguientes del TUO de la Ley de Tributación Municipal aprobado por D.S. 156-04-EF y sus modificatorias
Redondeo: Novena Disposición Final del TUO del Código Tributario D.S. 133-2013
Ordenanza N° 551 -MDJM, que aprueban la TIM para el distrito de Jesús María.

Ordenanza No. 476-MDJM, que regula el monto de la tasa por concepto de la emisión mecanizada del Impuesto Predial y los Arbitrios Municipales para el ejercicio 2016., Ordenanza No. 510-MDJM, que regula el monto del derecho de emisión mecanizada de actualización de Valores, determinación del tributo y distribución domiciliar del Impuesto Predial y Arbitrios Municipales del ejercicio 2017., Ordenanza N°538-MDJM, que prórroga para el ejercicio 2018, la vigencia de la ordenanza N° 510 que establece el monto de derecho de emisión mecanizada de actualización de valores, determinación y distribución del Impuesto Predial y Arbitrios Municipales, Ordenanza N°554-MDJM, que prórroga para el ejercicio 2019, la vigencia de la ordenanza N° 510 que establece el monto de derecho de emisión mecanizada de actualización de valores, determinación y distribución del Impuesto Predial y Arbitrios Municipales

NOTA:

- Si a la recepción de esta, usted ya realizó el pago de tales conceptos, le rogamos no prestar atención a la presente.
- De no estar conforme, podrá interponer recurso de reclamación debidamente sustentado, para la cual deberá acreditar la cancelación de la totalidad de la deuda, salvo sea evidente la improcedencia de la cobranza.
- Cualquier consulta, los esperamos en la SubGerencia de Recaudación Tributaria y Ejecutoria Coactiva en el Palacio Municipal. Tlf. 940396206 , 940385948 o al WhatsApp Tributario 982-727311

 **MUNICIPALIDAD DISTRITAL DE JESÚS MARÍA**
GERENCIA DE RECAUDACIÓN TRIBUTARIA Y EJECUTORIA COACTIVA
Abog. SILVIA PATRICIA GORRALES RUIZ
SUBGERENTE

Figure OD.5: Notification (Valor), treatment and control groups



Municipalidad de
Jesús María

Expediente : 2020-01 6517
Auxiliar coactivo : ROSARIO PEREZ CAMARA
Código : [0000070283]

RESOLUCIÓN COACTIVA NÚMERO :UNO JESÚS MARÍA.

JESUS MARIA, JUEVES, 17 DE DICIEMBRE DE 2020
En mérito a la RESOLUCION DE DETERMINACION cuyo detalle es:

Nro. RESOLUCION DE DETERMINACION	Fecha Emisión	Fecha Notific.	Monto Insoluto	Gasto Emisión	Intereses 30/12/2020	Total S/
050869 2019 2018.FEB,MAR,ABR,MAY,JUN,JUL,AGO,SET,OCT./	11/12/2019	17/12/2019	424.82		149.11	573.93

Gastos Administrativos S/	57.39
Costas Procesales S/	15.05
Total General S/	646.37

De conformidad con lo dispuesto en los artículos 15°,25°,29° Y 30° del TUO de la Ley N° 26979 Ley del Procedimiento de Ejecución Coactiva, aprobado por D. S. N° 018 - 2008 - JS

Notifíquese a : **CHAMBI VELASCO MARIA ANGELA Y TACO VELASQUEZ MIGUEL**

Con Domicilio en : **JR. HUAMACHUCO NUM. 1741 DPTO/INT. 0101 LIMA\LIMA\JESUS MARIA**

Para que dentro del plazo de **SIETE (7) DÍAS HÁBILES**, cumpla con cancelar a la Municipalidad de Jesús María la suma de **S/646.37(SEISCIENTOS CUARENTA Y SEIS Y 37/100 SOLES)** mas los intereses generados hasta la cancelación de la deuda, así como las costas y gastos procesales, que ocasione el presente procedimiento, bajo apercibimiento de trabarse las medidas cautelares contempladas en los artículos 32° y 33° del Texto Único Ordenado de la Ley 26979 - Ley del Procedimiento de Ejecución Coactiva, aprobado mediante Decreto Supremo N° 018-2008-IUS.

Base Legal Texto Único Ordenado de la Ley 26979 Ley del Procedimiento de Ejecución Coactiva, aprobado mediante Decreto Supremo N° 018-2008-IUS.

Ley N° 27972, Ley Orgánica de Municipalidades.

Decreto Supremo N° 133-13-EF. Texto Único Ordenado del código tributario

Decreto Supremo N° 069-2003-EF, Reglamento de la Ley de Ejecución Coactiva.

Ley N° 27444, Ley de Procedimiento Administrativo General y Decreto Legislativo N° 1029.

Ordenado N° 07-MJM, Modificado por Ordenanza N° 110-MJM.

Firmado Ejecutor Coactivo
HUAMAN FARFAN FARITA MERCEDES

Auxiliar Coactivo.
ROSARIO PEREZ CAMARA

MUNICIPALIDAD DISTRITAL DE JESUS MARIA
SUBGERENCIA DE RECAUDACION TRIBUTARIA Y EJECUTORA COACTIVA

Abog. FARITA HUAMAN FARFAN
EJECUTORA COACTIVA

MUNICIPALIDAD DISTRITAL DE JESUS MARIA
SUBGERENCIA DE RECAUDACION TRIBUTARIA Y EJECUTORA COACTIVA

Bach. ROSARIO PEREZ CAMARA
AUXILIAR COACTIVO

Figure OD.6: Writ (REC1), treatment and control groups

We note that although similar, the notification letters across treatment and control groups are not identical, and it is possible that small differences across letters contribute to the measured effect of treatment. This concern is alleviated by the fact that all subsequent communication (.e.g. the legal writ) was identical across treatment and control groups. In addition, the effect of receiving a G3 notification, instead of being in the control group is small and negative.

References

- CHEN, D. L., M. SCHONGER, AND C. WICKENS (2016): “oTree—An open-source platform for laboratory, online, and field experiments,” *Journal of Behavioral and Experimental Finance*, 9, 88–97.
- FOREMAN-MACKEY, D. (2016): “corner.py: Scatterplot matrices in Python,” *Journal of Open Source Software*, 1, 24.
- GNEEZY, U. AND A. RUSTICHINI (2000): “A fine is a price,” *The journal of legal studies*, 29, 1–17.
- KAPON, S. (2022): “Interactive Experiments on Amazon Mechanical Turk,” Tech. rep., Princeton University Working Paper.