## Pre-Analysis Plan:

# Making People Pay their Debts: The role of salience, information, and computational costs in a tax amnesty

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#### Abstract

This document describes the pre-analysis plan of a set of interventions that will take place in the city of Santa Fe, Argentina. In these interventions we will evaluate the role that messages play on the probability that taxpayers will cancel their debt with the Tax Administration by subscribing to a payment plan in the context of a tax amnesty. The interventions are the following. First, a group of recent debtors -debt less than five years old- will be divided into 3 groups. The control group will receive the old notification. Treatment one will receive a new notification that is more colorful and presents easy to follow descriptions of the payment plans. Treatment 2 will receive the new notification but including the computation of interests saved under each one of the payment plans also. The second intervention has been designed for those who have older debt that is close to prescribing. These taxpayers will be divided into two groups, one receiving the old notification and one receiving the new notification, including the analysis of savings. With these interventions we plan to evaluate the role of messages, salience, and information on debt payment, on the selection of a payment plan, and on compliance with current tax obligations (spillover). While there are several recent field experiments looking at the role of messages on tax payment, there is no evidence for this in the context of a tax amnesty. Moreover, even though it has long been considered that reducing transaction and informational costs should be a relevant policy instrument, there is little to no evidence about the role that reducing the costs of understanding the specifics of a payment plan could have on tax payment and compliance behavior.

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## **1** Introduction and Background

Tax compliance is low in Latin America. This is even the case in the context of property taxes, where there is little uncertainty about what each taxpayer owes. Once taxpayers have accumulated debt it becomes less likely that they will keep up with payments to the tax administration. The large stock of debt some taxpayers accumulate affects government the effectiveness of government deterrence policies including the use of moral messages (Castro and Scartascini, 2015). Even people who would otherwise be willing to pay their current taxes may decide not to as their marginal decision would not affect much their current account -paying a tax bill when the taxpayer owes 60 of them makes little sense.

Consequently, tax amnesties could be a good tool for increasing tax collection (current and future) by creating incentives for people to reduce their debt. Formally, a tax amnesty is a limited-time opportunity for a specified group of taxpayers to pay a defined amount, in exchange for forgiveness of a tax liability (which may include interest and penalties) relating to a previous tax period or periods and without fear of criminal prosecution. Amnesties are a policy instrument regularly used by governments around the world, and a successful tool to collect taxes from non-compliant taxpayers in the short-run particularly as a complement of new enforcement actions. In the long run, they may backfire if used too often, as they create a moral hazard problem. Despite being a standard policy tool, there is little research on tax amnesties in the empirical literature.

The aim of the interventions described in this pre-analysis is not to evaluate the effectiveness of tax amnesties overall but to understand the role that salience and information have on taxpayers behavior in the context of a tax amnesty. The interventions provide a more salient notice to taxpayers about the existence of the tax amnesty -use of color and other visual techniques-, and they provide an easier to understand explanation of the different payment plans they can select to cancel their debt, including a detailed computation of the reduction in interests that each payment plan entails.

The intervention will take place in the City of Santa Fe, Argentina, where we are randomiz-

ing more than 54.000 taxpayers who failed to comply with their property tax payments. While there are several recent field experiments looking at the role of messages on tax payment, there is no evidence of this in the context of a tax amnesty. Moreover, even though it has long been considered that reducing transaction and informational costs should be a relevant policy instrument, there is little to no evidence about the role that reducing the costs of understanding the specifics of a payment plan could have on tax payment and compliance behavior.

#### **1.1 Property Taxes in Santa Fe**

The Municipality of Santa Fé is the eight largest city in Argentina (about 391 thousand residents). It is the capital city of the Province of Santa Fé (third province in terms of population in the country). The Municipality collects real estate property taxes (which are locally called "Tasa General de Inmuebles" or TGI). Almost all real estate properties are taxed, including homes, vacant lots, and business premises. Taxes are proportional to the properties assessed values. Before 2012, the public assessor office (Servicio de Catastro e Información Territorial) assessed the value of all real estate properties in the Province, including those in the city of Santa Fe. After a major overhaul in 2012 properties are assessed by the City itself using a set of indexes, which vary by property, district, and citywide, that includes the provision of public goods each property receives -determined at the property level-, the value of the land -determined at the district level-, and the value of the construction -fixed at the city level. The Municipality of Santa Fe then applies a fixed tax rate to the properties' assessment. The Municipality established a floor to tax liabilities by imposing a minimum property tax (between 15% and 20% of taxpayers are billed the minimum).

Taxpayers are billed monthly but the bills are delivered to the owners address every three months (every quarter each taxpayer receives at the same time the bills necessary to pay the following three months). From the moment they receive the bills they have approximately ten days to pay before the first due date. Late payments are charged a monthly interest rate of 3%. Late fees cannot be larger than three times the original tax liability. About 60% of taxpayers pay their tax bill on time. Payment and non-payment tend to present high persistence. 64% of

those who paid on time any given month do also pay it on time the following month. On the contrary, those who don't pay any given month are highly unlikely to pay the following month (91%). Therefore, it is relatively common for taxpayers to accumulate debt once they miss a payment.

#### **1.2 Tax Amnesties in Santa Fe**

The Government of the City of Santa Fe has implemented amnesties approximately every two years, which may hinder their success and affect regular tax payments. The past two amnesties took place in September 2013 and June 2015. The 2013 amnesty included reductions of one percentage point in the monthly late payment interest rate, while the 2015 amnesty included a more generous 1.5 percentage points reduction. Amnesties usually have different payment plans that differ on their financing conditions (number of payments and interests charged on those payments).

Normally, taxpayers who have accumulated three or more unpaid tax bills receive a formal notification called Overdue Tax Collection (or "Cancelacion de Deuda Atrasada" in Spanish; from now on referred as CDA) together with the tax bills for the quarter -regardless of whether a tax amnesty is open or not. This notification lists the unpaid bills, the total amount due including interests, and describes how and where to pay it. During a tax amnesty, the city sends the same CDA, but this time it also mentions the existence of the amnesty, describes the payment plans available and provides the taxpayer the possibility of canceling the debt in one payment by computing the new amount given the discounts of the amnesty and providing a payment coupon. Figure 1 shows an example of a CDA during for the 2015 tax amnesty.

As it can be observed in the example, there are several potential shortcomings of this instruments. First, because the municipality uses the same instrument to address the taxpayer whether a tax amnesty in in place or not, the tax amnesty would be hardly salient for most taxpayers. In the case of the example in Figure 1, this taxpayer would have received this instrument about 20 times already - every quarter for the previous 5 years- without changing her or his behavior. Second, while it would be relatively easy for the taxpayer to understand the benefit of paying in one installment (in the case of the example, having debt reduced from about AR\$11,000 to AR\$7000, a reduction of about 1/3) it would be difficult for most people to compute the benefits that each one of the other plans entail, not only because it uses a complex language, but because it also lacks crucial information such as the accumulated amount of interests. While the benefits in terms of interest reductions are lower in the payment plans, most people would face significant cash constraints to pay their debt in one installment (in the case of the example, the taxpayer had not canceled 23 tax bills); therefore, being able to evaluate the benefits of each plan vis-a-vis their cash constraints could be relevant for decision making. Consequently, there are potential gains to be made from modifying the instrument used for communicating the existence and benefits of the plan.

In May 2017, the City of Santa Fe implemented a tax amnesty for taxpayers who accumulated three months or more of unpaid tax bills. Those who subscribe to the amnesty have access to five alternative payment plans, as described below:

- Plan "one-payment": one payment plan. No financing costs. Reduction of the interest rate on late payment from 3% to 0.75%, a discount of 2.25 percentage points (75% reduction).
- Plan A: up to six payments. No financing costs. No reductions in the accumulated interest.
- Plan B: 20% down-payment and up to 12 monthly payments. Financing cost of 1% monthly. Reduction of the late payment interest rate of 2 percentage points (66.66% reduction).
- Plan C: up to 18 monthly payments. Financing cost of 1.5% monthly interest. Reduction of 1.5 percentage point (50% reduction) in the late payment interest rate.
- Plan D: up to 24 monthly payments. Financing cost of 2% monthly. Reduction of one percentage point (33.33% reduction) in the late payment interest rate.

As described above, each plans comes with different financial incentives and different number of payments (from one payment up to 24). Each taxpayer would rationally choose the plan that is more convenient to her given her financial constraints. There is an additional restriction in place, which is that for every plan, the minimum payment is of AR\$300. Therefore, while each taxpayer could still choose any of the payment plans, the efficient set of choices is determined by how much they owe. For instance, for a taxpayer with accumulated debt lower than AR\$600 -for whom the only option is making one payment- the only rational choice would be selecting the one payment plan.

Table 1 presents the proportion of taxpayers by tax debt size. There are about 16% of taxpayers with less than \$600 debt. As mentioned above, they can only choose the one payment option. Half of the sample owe less than five times the minimum monthly payment. And about a quarter owe more than 18 times the minimum payment. Table 2 presents the summary statistics for the monthly tax amount and compares it to the minimum monthly payment. The results show that the minimum is a lot bigger than the monthly tax liability. For instance, for the group that owes between AR\$3,600 to AR\$5,400 the minimum payment for the amnesty represents in average more than eight times the monthly tax amount. This could represent a serious constraint on the effectiveness of the amnesty.

## 2 Literature Review

Governments of all kinds frequently use tax amnesties as part of their fiscal programs. An amnesty typically allows individuals or firms to pay liabilities without being subject to some or all of the penalties that tax evasion normally brings. Amnesties are highly controversial policy tools. The governments that use them usually argue that amnesties increase short-run revenues, and future payments if the amnesty is accompanied by stronger enforcement, better taxpayers services, and education on taxpayers responsibilities. Amnesties usually allow to 'reboot' the system and start anew. On the other hand, particularly when amnesties become too common, an amnesty might discourage payment of honest taxpayers by eroding the financial and moral incentives; as such, they become an ineffective tool to increase tax collection. Most of the empirical work on amnesties has focused on amnesties at the state level in US (Fisher et al., 1989; Alm et al., 1990a,b; Dubin et al., 1992; Luitel and Sobel, 2007). Evidence on amnesties in other countries is rare (Alm et al., 2009). With this experiment we have a unique opportunity to study the case of an amnesty in a medium size city in Argentina. Compliance rates in developing countries are generally low and the use of amnesties as a revenue-raising

tool is far too frequent. There are no studies on the impacts of amnesties on tax revenues in Latin America. In this intervention we will be able to evaluate whether joining the amnesty generates incentives for compliance or not -if taxpayers who join the amnesty do not pay their current bill would suggest a moral hazard mechanism in place. Additionally, we would be able to evaluate if there is any negative spillover of the amnesty on the compliant taxpayers.

Do amnesties work? The evidence on amnesties' impact is mixed. While most of the literature find little or no impact on revenues, there is some evidence that finds positive impacts on revenues. Alm et al. (2009) evaluated the impact of subsequent tax amnesties in the Russian Federation and found no evidence of positive (or negative) impacts on tax collection. Using a time series approach, this paper finds no structural change in payments at the moments the amnesties were announced. Similar results have been found for the US (Fisher et al., 1989,?; Luitel and Sobel, 2007) and Spain (López-Laborda and Rodrigo, 2005). Particulary, Luitel and Sobel (2007) stresses the idea that while a one-time tax amnesty seems to have positive impacts, repeated tax amnesties tend to magnify revenue losses associated with disincentives for long-run tax compliance. On the other hand, Langenmayr (2017) proposes a model where the amnesties increase revenues in presence of high administrative costs and shows evidence of a significant positive impact of the 2009 offshore voluntary disclosure program in the US.

The use of messages to taxpayers could generate incentives for joining the amnesty for various reasons.

First, targeted messages may be more effective at reaching taxpayers than massive communication campaigns. A direct message from the tax authority is harder to ignore than a public announcement on the radio or the local newspaper. While, for instance, a radio campaign is on air for a few minutes per day a letter from the municipality or any other form of direct communication can reach the taxpayer at any time.

Second, the messages can provide individualized information making the amnesty scheme more transparent and helping individuals to make better decisions. Chetty et al. (2009) and Chetty and Saez (2013) show how salience and transparency are an important determinant of behavioral responses on taxation. Chetty et al. (2009) shows how taxpayers have difficulty to understand the tax system and often make decisions far from optimal by comparing consumers resposes to the sales tax when it is included on the price tag and when it is not included. Chetty and Saez (2013) shows how the excessive complexity of the tax system reduces taxpayers welfare and the effectiveness of tax incentives. The EITC, an income tax credit for poor households, is systematically underused by eligible taxpayers. This paper finds evidence that knowledge may play an important role on behavior. Personalized information may affect taxpayers decisions about how to respond to tax incentives. Chetty et al. (2013) shows how knowledge affect individuals in a organic and persistent fashion through peer effect. When some taxpayers are taught on how the EITC tax credit operates, the amount of EITC claims increases on their neighbors.

Third, messages could include moral and deterrence messages that serve as additional incentive for compliance. There is a recent and burgeoning literature that relies on sending messages to taxpayers to increase voluntary tax compliance. Most of studies have tested the effect of deterrence and moral appealing messages. Deterrence messages, i.e., increasing the salience of the penalties and the probability of detection, seem to work (see for example, Blumenthal et al. (2001); Hallsworth (2014); Castro and Scartascini (2015). The evidence on moral appealing messages is mixed. For example, while Torgler (2003); Hallsworth (2014); Del Carpio (2014) find confirmatory evidence, Dell'Anno (2009); Blumenthal et al. (2001); Torgler (2005, 2012); Fellner et al. (2012); Castro and Scartascini (2015) do not find significant effect across all types of taxpayers. One reason may be that different people update their beliefs differently and average effects mask valuable heterogeneous responses (Castro and Scartascini, 2015). Another reason may be that a letter may just not be enough to cause taxpayers to change their beliefs (Luttmer and Singhal, 2014), or their change in beliefs may not be sufficiently large as to cause changes in behavior (Ortega and Scartascini, 2015). To avoid the pitfall that using a letter may have, we follow a similar strategy than Castro and Scartascini (2015) and use an instrument used by the tax authority, the CDA, to deliver the information and increase the salience of this instrument.

The evidence indicates that not only sending a message matters but also the content and

framing of the message matters(Behavioural Insights Team, 2012). For better results, messages should: (i) make it easy to understand; (ii) highlight key messages; (iii) use salient images; (iv) present information better; (v) personalize the messages; (vi) prompt honest behavior. The instruments used in our interventions will allow us to evaluate the effect of these insights. In particular, we test the effect of salience and clarity of information with one treatment and then we test the relevance of reducing the computational cost of computing the benefits of each payment plan.

## 3 Methodology

#### **3.1** Data and empirical strategy

So far, we have collected data from January 2011 to March 2017. For each taxpayer, we have information on tax liabilities, tax arrears, size of taxed real state, and the public goods provided by the Municipality at the property. This information is enough to select the sample of debtors and randomize treatments. On May 29th 2017, we sent to the municipality the list of taxpayers' ID corresponding to each treatment and control groups. The municipality is now in charge of printing and sending the treatments. Taxpayers will receive the treatment during the first five days of July 2017. Table 3 presents summary statistics for the sample of tax debtors. It shows a high degree of heterogeneity as the standard deviation can be several times the average value of some of the variables.

#### **3.2 Interventions**

As we mentioned in the introduction, the aim of this field experiment is to evaluate the role that communication can have on tax amnesties. In particular, the effect of making the information more salient, and reducing the computational costs for the taxpayer. The idea is that by increasing salience and introducing moral messages it would be more probable that taxpayers would join the amnesty (more people learn the amnesty exists). By making it easier to understand

the details of each plan and the benefits each one entails, we expect that more taxpayers would join. Now, they can evaluate better the financial gains from joining, even for those who are financially constrained. Finally, by providing more information about the benefits of each plan we expect more heterogeneity in the plan selection.

The field experiment consists on two interventions. The first intervention includes those taxpayers who have accumulated debt in some or all periods between January 2013 and March 2017. This group of taxpayers was randomly split into three groups. The first group was assigned to a control or placebo. The placebo group will receive the old CDA, which includes a verbal description of each plan and the total due amount after discounting the corresponding amount of the one payment plan. As mentioned, this CDA has been in used for several years now and most taxpayers have grown accustomed to it (Figure 1). The Treatment 1 group will receive a new CDA that includes many of the improvements noted before: (i) it is more salient; it is printed in color; (ii) it includes a moral message; (iii) it explains better the different benefits and costs of each payment plan (Figure 2). The Treatment 2 group will receive a new CDA which also includes the amount of interests the individual is saving under each one of the plans. This information is personalized for each taxpayer (Figure 3)

The second intervention includes those taxpayers who also owe bills from January 2011 to December 2012. This period is relevant because absent any action from the government those debts would prescribe. Henceforth, before the debts are ready to prescribe the government sends those debts and taxpayers to **judicial enforcement**. This group of taxpayers was split into two groups. The first group, control or placebo group, receive the old CDA. The treatment group received a similar new CDA than treatment 2 above but including also a deterrence message highlighted in red. The message says (in Spanish) "If you decide not to pay your outstanding debt, your account will be assigned to judicial enforcement". Figure 4 presents an example of the treatment.

Every CDA includes a payment coupon that allows the taxpayer to make effective payment if she decides to make only one payment. Otherwise, the CDA informs the taxpayer the procedure to follow to subscribe to the plan and make the first payment.

#### **3.3** Independent variables and outcomes

We have access to administrative data at the individual level for before and after the intervention. We also have access to the data for people who didn't have debts, hence are not part of the experiment. Consequently, we will be able to measure behavior: whether people in the experiment join the amnesty, which payment plan they join, and whether they pay their current tax bills. We can also look at the behavior of those who were not part of the experiment because they had no accumulated debts.

The dependent variables of the two interventions will be: (a) enrollment: a dichotomous variable that will take value one if the taxpayer chooses to enroll in any amnesty payments plan, zero otherwise (i.e., the extensive margin); (b) enrollment<sub>j</sub> a set of dichotomous variables, one for each payment plan, that takes value one if the taxpayer chooses to enroll in the plan j and zero otherwise (i.e., the intensive margin); (c) paid, which takes value one if the monthly bill is paid, and zero otherwise.

Forthrightly, our most important independent variables will be the treatment assignment, one dichotomous variable for each treatment. Formally, we will estimate the following linear probability model.

$$Y_{it}^{v} = \alpha D_{i}^{k} + X_{i}\Delta + Z_{it}\Gamma + \lambda_{t} + \mu_{it}, \qquad (1)$$

where  $Y_{ijt}^v$  is each of the outcome variables mentioned above (v = a, b, c),  $X_i$  is a vector of time-invariant characteristics of property *i*,  $Z_{it}$  is a vector of time variant characteristics of the property, which is basically the tax liability of property *i* in month *t*,  $D_i^k$  is an indicator that takes the value of one if the property was assigned to treatment *k* and zero otherwise,  $\lambda_t$  are time fixed effects, and  $\mu$  is an unobserved random term. The coefficient  $\alpha$  measures the 'intent-to-treat'' (ITT) effect of the program.

We will able to evaluate potential heterogeneous effects on several dimensions. We have the cadastral data, so we know the size of the properties, as a proxy for wealth, location and the amount and quality of public services each property receives. We also know the history of payment and debt accumulation for each taxpayer. Additionally we will look for potential spillovers on the neighbors of treated taxpayers. To evaluate the spillover effect of message we will use the same specification as Carrillo et al. (2017) using a combined sample of experiment participants (debtors) and non-participants (compliant taxpayers) and a simple linear model.

$$Y_{ijt} = \alpha B_j + E_j \Theta + X_{ij} \Delta + Z_{ijt} \Gamma + \lambda_t + \mu_{ijt}.$$
(2)

Here  $Y_{ijt}$  is tax compliance, *paid*, in period t of property i located in block j. The treatment  $B_j$  equals to one if there is at least one taxpayer who received a new CDA (with more detailed information) within block j. The randomization was done at the property and not the block level. Hence, taxpayers in blocks with more experiment participants are more likely to be treated. Because the probability of treatment depends on the number of participants in the block, we include in all specifications the number of households eligible to participate of the experiment in block j and the total number of taxpayers in each block j (both are included in the vector of block level characteristics  $E_j$ ).  $X_{ij}$  is a vector of time-invariant property characteristics, and  $Z_{ijt}$  a vector of time-variant property characteristics.  $\lambda_t$  are time fixed effects.

#### 3.4 Randomization

From the universe of taxpayers, we removed those who had no debt and were not part of the interventions, and those who only owed some or all of 2017 bills (6,340 taxpayers). The reason to eliminate this group was that the status of these taxpayers is likely to change within the period of randomization and the intervention -they could have paid their debt. The total number of taxpayers in the experiment is 54,700.

Because we are working with a sample with a high degree of heterogeneity, we divided the sample into strata to facilitate the balance between treatment and control groups. The strata are made upon the taxpayer's average compliance for the period of interest (2011-2017), and whether they have or not outstanding debt originated in 2012 or before. The latter is a stratum by itself (Category 1). For the rest of taxpayers, we distributed them in strata according to tax

compliance: Category 2 are those who paid less than 10% of the bills; Category 3 are those who paid between 10% and 90% of the bills, and Category 4 are those who paid 90% of the bills or more. In total we have four strata and Table 4 presents the number of taxpayers in each stratum.

To select treatment and control groups, we run 1,000 iterations to select a random raw that show the best balance for all the pre-experimental variables using two criteria: (i) the minimum difference in the average of treatment and control groups, and (ii) the maximum standard error for this difference. The combination of both criteria leads to the highest t-statistic of the difference between treatment and control group. The set of pre-experimental variables comprises lot area in  $m^2$ , building area in  $m^2$ , monthly tax amount in March 2017, and the average monthly compliance rate between 2011 and 2017.

Table 5 present the number of taxpayers assigned to treatment and control groups.

#### 3.5 Power

To determine the statistical power required to guarantee the validity of the field experiments, we conducted power calculations for each experiment separately. For each group of taxpayers, we obtained the statistical power and required a number of observations (N) described in the Table 6.

#### 3.6 Timeline

Data collection was done in May, the treatments are being distributed at the beginning of July, and data collection for the intervention will take place between July and October 2017. Specifics are reported in Table 7.

## **4** Relevance, Contribution, and Value of Research

In terms of academic relevance, the paper would be the first to evaluate the role of informational treatment on joining a tax amnesty, and it would be the first paper about the effectiveness of tax

amnesties in Latin America. The paper would also evaluate specifically the value of information, clarity of information, and providing taxpayers with personalized information about the benefits in terms of interests savings for each payment plan included in the amnesty. As such, it would allow to understand the value of information on the extensive -joining the amnestyand the intensive margin -the choice of plan. Additionally, we may be able to evaluate the role of amnesties on creating moral hazard (people who enroll in the amnesty but do not pay their current bills), and the effect that reducing the stock of debt may have on current payment.

Chetty and Saez (2013) says "investigating the process through which knowledge about government policy diffuses and understanding how it can be shaped by policy would be a very valuable direction for future work". In this paper, we approach to this question by evaluating potential spillover impacts as we did on Carrillo et al. (2017). We will know if our enhanced written informational treatments are strong enough to affect the behavior of untreated taxpayers. Following most of the theoretical and empirical literature on tax amnesties we expect this effect, if any, to be negative.

In terms of policy relevance, the results in the paper should be able to inform policymakers about the revenue effects of an amnesty, the relevance of offering different payment plans, the role of salience in the messages, and the effect of making it more accessible to taxpayers to understand better the benefits of the options presented to them.

## **5** Risks and Ethical Considerations

There are several factors that may reduce the effectiveness of the intervention and/or make difficult to find significant results. First, having a sizable minimum payment may reduce the ability of motivated but financially constrained individuals to join any of the plans, which would drive the estimates downward. Additionally, that restriction reduces the number of plans available to each individual and our ability to evaluate the rationality behind some of the choices. Second, because every CDA provides the option of canceling the debt in one payment but makes the taxpayer to incur in transaction costs to join other plans, it may reduce the number of people who join and reduce the variance in the selection of plans, both driving the estimates downward. Third, there is some risk of contamination from the treatment to the placebo groups either because of direct communication between taxpayers or because the media catch ups to the story and publicizes the information broadly. This would reduce the size of the estimates. Fourth, the intervention is taking place at the beginning of the electoral season. As such, taxpayers may have an overload of information which may reduce the salience of the messages. Moreover, some people may relate the amnesty to a political strategy and decide not to enroll. Of course, there is no a priori reason why this effect would affect the different treatment groups differently. Finally, because we don't have a pure control group -everybody is being informed about the amnesty- we can't evaluate the pure effect of messages but the difference across messages

We don't have ethical concerns. The project is being run by the government under the advice of the municipality legal team, and complying with all local regulations. The amnesty and the use of the CDA as the method of information has been common practice by the municipality and performed in the past. The main change is the format of the informational instrument. Nobody is being made worse off than it had been absent our intervention and everybody receives the full information set available on the regulations.

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Freq.	Percent	Cum.
0.012	16.04	16.04
9,913	10.24	10.24
21,872	22.85 22.27	52.07 22.27
14,207	25.27	23.27 47.03
61 040	100.00	100.00
	9,913 21,872 14,207 15,048 61,040	Preq.         Percent           9,913         16.24           21,872         35.83           14,207         23.27           15,048         24.65           61,040         100.00

Table 1: Tax debt distribution in March 2017

Debt size	Ν	mean	p10	p25	p50	p75	p90
Y. Monthly ta	x amount						
1. Wonding ta	x amount						
[0, 600)	9,913	83.8	24.3	40	61.2	99.2	165.2
[600, 3600)	21,872	92.1	23.6	40	60	102.4	184.7
[3600, 5400)	14,207	66.8	15.3	30	42.7	75.6	123.7
[5400, .)	15,048	370.8	34.8	58.1	98.4	191.8	389.3
Total	61,040	153.6	21.7	40	62.1	110.9	214.2
Z: Minimum 1	nonthly p	ayment	(\$300)	/Month	ly tax	amount	
[0, 600)	0.870	6 25	1 0 1	2 02	1 99	7 50	11 0
[0, 000]	9,079	6.46	1.01	3.02	4.00	7.50	11.0
[000, 3000)	21,810	0.40	1.02	2.95	3	1.50	12.7
[3600, 5400)	14,182	8.88	2.42	3.97	/.00	10	19.6
[5400, .)	15,005	4.02	0.77	1.56	3.04	5.12	8.57
Total	60,882	6.41	1.40	2.70	4.83	7.50	13.4

Table 2:Summary Statistics - Tax amount in March 2017

*Notes:* Table shows the average and distribution of monthly tax amount and its ratio to the minimum monthly payment in March 2017.

Variable	Mean	Std. Dev.
	0.5.000	
Property valuation (in \$)	265,398	4,585,519
Lot area (in $m^2$ )	2,029	126,389
Building area (in $m^2$ )	91.05	340.61
Average tax compliance rate	.412	.389
Monthly tax amount in 2017	153.617	4852.951
Number of Obs. 61,040		

Table 3: Summary statistics

*Notes:* Table presents summary statistics for the entire sample of debtors between January 2011 and March 2017.

Strata	Freq.	Percent	Cum.
Out of experiment	6,340	10.4	10.4
1	5,248	8.60	19.0
2	16,487	27.0	46.0
3	12,913	21.2	67.6
4	20,053	32.9	100
Total	61,041	100	-

Table 4: Count per stratum

*Notes:* Table shows the proportion of taxpayers per each stratum. Stratum zero are taxpayers who only owe 2017 bills; taxpayers that don't participate of the experiment.

Sample	Treatment	Ν	Percent	Cum.
	~ .		• • •	
	Control	12,737	23.3	23.3
Normal debtors	Treatment 1	12,738	23.3	46.6
	Treatment 2	12,740	23.3	69.9
To be individually enforced	Control	8,243	15.1	84.9
To be judicially enforced	Treatment	8,242	15.1	100
Total		54,700	100	

### Table 5: Count per treatment assignment

*Notes:* Table shows the proportion of taxpayers per each treatment assignment group. Taxpayers who only owe 2017 bills don't participate of the experiment.

	Normal debtors	To be judicially enforced
Mean	0.2215	0.1058
Variance	0.415	0.307
MDE	0.0146	0.0218
$N_{control}$	12,737	8,243
$N_{t1}$	12,738	8,242
$N_{t2}$	12,740	-
Power	0.8	0.8

Table 6: Power calculations

*Notes:* the power calculations were carried out using the outcome variable "paid" which takes the value of one if the taxpayer paid the bill for March 2017 and zero otherwise. We could not compute the power using previous tax amnesties.

Table 7: Time line

Date	Activity
May 21th - 30th	Data collection and Randomization
June 5th - 23th	Piloting and logistical arrangements
June 24th - July 7th	Distribution of the treatments
July 1st - October 31th	Data collection

Old CDA - Control Example CANCELACIÓN DE TGI MUNICIPALIDAD DE LA CIUDAD DEUDA ATRASADA DE SANTA FE DE LA VERA CRUZ www.santafeciudad.gov.ar AUDIA ni moratorias) www.santafeciudad.gov.ar (No incluye deudas en gestión judicial, ni conv PADRÓN Nº CONTRIBUYENTE LIQUIDACIÓN Nº 63 **BOLETA N°** Conforme a nuestros registros su cuenta posee un saldo deudor al 31/03/2015 de \$ 11366,63 Hasta el 21/08/2015, tendrán vigencia los siguientes beneficios: Total a Cancelar por Pago Contado \$ 7178,67 Pago en cuotas: Interés por financiación del 2% mensual Plan A: Hasta 6 cuotas mensuales, iguales y consecutivas, reducción interés por mora del 3% al 1%. Plan B: Anticipo del 10% plazo máximo en 12 cuotas mensuales, iguales y consecutivas, reducción interés por mora del 3% al 1%. Plan D: Anticipo del 10% plazo máximo en 24 cuotas mensuales, iguales y consecutivas, reducción interés por mora del 3% al 2%. Plan D: Anticipo del 10% plazo máximo en 24 cuotas mensuales, iguales y consecutivas, reducción interés por mora del 3% al 2%. La presente liquidación es válida para la cancelación por pago contado. Podrá realizar planes de pago ingresando a: http://www.santafeciudad.gov.ar/servicios/contribuyentes/tasa\_general\_inmuebles.html o concurriendo al Centro de Distrito más cercano a su domicílio. También podrá abonar con tarjeta de crédito Mastercard y Visa del Banco Santa Fe y Credifiar hasta 6 cuotas sin interés en las cajas ubicadas en el Palacio Municipal. De no regularizar la deuda, su cuenta será asignada a gestión judicial para iniciar las acciones necesarias para el cobro. De haber efectuado pagos por los períodos detallados, deberá acreditar los correspondientes comprobantes durante los meses de julio y agosto de 2015. Los reclamos podrán hacerse vía web o en ventanilla de contribuyentes del Palacio Municipal. Evite mayores inconvenientes regularizando su situación a la brevedad. Atentamente, Dirección de Rentas MAYOR INFORMACIÓN: Palacio Municipal Ventanilla de Contribuyente de 7.30 a 14.00 hs. LOTE: 1102 DEUDA EXIGIBLE AL 31/03/2015 AÑO CUOTAS IMPORTE 1520,93 1696,89 2265,64 2502,99 2695,27 684,93 MUNICIPALIDAD 11366,63 TOTAL "DONAR ÓRGANOS, TEJIDOS Y SANGRE ES AYUDAR A VIVIR" IMPORTE CUOTA VENCIMIENTO PLAN

Figure 1:

17

01

CONTADO

000039411310081003548298000202108201500007178674

02/10/8201

7178,67

#### Figure 2: Treatment 1 Example

WUNICIPALIDAD DE LA CIUDAD DE SANTA FE DE LA VERA CRUZ www.santafeciudad.gov.ar	CANCELA DEUDA A	ACIÓN DE TRASADA	TGI
NOMBRE Y APELLIDO	РА	DRÓN Nº	9999999
Domicilio envío	LIC	QUIDACIÓN Nº	999999999
Ciudad	BC	LETA Nº	9999
DEUDA EXIGIBLE AL//2017		LOTE	

La Municipalidad de la Ciudad de Santa Fe comunica que se han detectado IMPAGOS los periodos que se detallan en la presente liquidación. Su padrón posee un saldo deudor actualizado --/--/2017 de \$--.---

AÑO	CUOTAS	CAPITAL	INTERÉS	TOTAL
EEEE	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX,XX	X.XXX,XX	X.XXX,XX
FFFF	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX,XX	X.XXX,XX	X.XXX,XX
нннн	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX,XX	X.XXX,XX	X.XXX,XX
TOTAL (No in	ncluye deudas en gestión judicial, ni convenios de pago).	\$8.888.888,88	\$8.888.888,88	\$8.888.888,88
Puede regular de <b>pago conta</b> intereses por	izar su situación fiscal abonando la presente liquidación <b>do</b> antes del vencimiento, obteniendo un ahorro de mora.	Ahorro de intereses	\$XXX.>	xx,xx

La cancelación se podrá realizar por los medios de pago habituales o con tarjeta de crédito **Mastercard o Visa del Nuevo** Banco de Santa Fe y Credifiar hasta en 6 cuotas sin interés, exclusivamente en las cajas ubicadas en el Palacio Municipal. De no optar por la opción contado, podrá elegir alguno de los planes de pago con beneficios en el interés por mora o financiación detallados a continuación, los que estarán vigentes hasta el 31/08/2017. (\*) Cuota mínima de \$300.

Plan	Cant. Máx. de Cuotas(*)	Anticipo	Interés por financiación	Interés por mora
А	6	-	0%	3%
В	12	20%	2%	1%
С	18	-	2%	1,5%
D	24	-	2%	2%

Podrá formalizar el plan seleccionado, concurriendo a Ventanilla de Contribuyentes del Palacio Municipal o a los Centros de Distrito o ingresando a: http://www.santafeciudad.gov.ar/servicios/contribuyentes/tasa\_general\_inmuebles.html. De haber efectuado pagos por los períodos detallados, usted deberá presentar los correspondientes comprobantes vía web o en ventanilla de contribuyentes del Palacio Municipal.

PAGUE SUS TRIBUTOS. UN MEJOR BARRIO LO HACEMOS ENTRE TODOS.					
Pago CONTADO Vencimiento XX/XX/XXXX Importe \$XXX.XXX,XX					

### Figure 3: Treatment 2 Example

MUNICIPALIDAD DE LA CIUDAD DE SANTA FE DE LA VERA CRUZ www.santafeciudad.gov.ar			cancelación de <b>TGI</b>					
NOMBR Domicilio en Ciudad DEUDA EXIGIE	<b>E Y APELLIDO</b> Vío BLE AL//2017		PADRÓN N°         9999999           LIQUIDACIÓN N°         999999999           BOLETA N°         9999           LOTE         1000000000000000000000000000000000000					
La Municipalidad de la Ciudad de Santa Fe comunica que se han detectado IMPAGOS los periodos que se detallan en la presente liquidación. Su padrón posee un saldo deudor actualizado//2017 de \$								
AÑO	CUOTAS	CAPIT	AL	INTER	ÉS	TOTAL		
EEEE	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	XX	X.XXX,XX		
FFFF	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	XX	X.XXX,XX		
НННН	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	XX	X.XXX,XX		
YYYY	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	XX	X.XXX,XX		
ZZZZ	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	ХХ	X.XXX,XX		
ZZZZ	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic	X.XXX	,XX	X.XXX,	ХХ	X.XXX,XX		
TOTAL (No in	ncluye deudas en gestión judicial, ni convenios de pago).	\$8.888.8	88,88	\$8.888.8	88,88	\$8.888.888,88		
Puede regularizar su situación fiscal abonando la presente liquidación de <b>pago contado</b> antes del vencimiento, obteniendo un ahorro de intereses por mora			tereses \$XXX.XXX,XX					

La cancelación se podrá realizar por los medios de pago habituales o con tarjeta de crédito **Mastercard o Visa del Nuevo** Banco de Santa Fe y Credifiar hasta en 6 cuotas sin interés, exclusivamente en las cajas ubicadas en el Palacio Municipal. De no optar por la opción contado, podrá elegir alguno de los planes de pago con beneficios en el interés por mora o financiación detallados a continuación, los que estarán vigentes hasta el 31/08/2017. (\*) Cuota mínima de \$300.

Plan	Cant. Máx. de Cuotas(*)	Anticipo	Interés por financiación	Interés por mora	Ahorro interés por mora		
А	6	-	0%	3%	-		
В	12	20%	2%	1%	xxx,xx		
С	18	-	2%	1,5%	xxx,xx		
D	24	-	2%	2%	XXX,XX		

Podrá formalizar el plan seleccionado, concurriendo a Ventanilla de Contribuyentes del Palacio Municipal o a los Centros de Distrito o ingresando a: http://www.santafeciudad.gov.ar/servicios/contribuyentes/tasa\_general\_inmuebles.html. De haber efectuado pagos por los períodos detallados, usted deberá presentar los correspondientes comprobantes vía web o en ventanilla de contribuyentes del Palacio Municipal.

PAGUE SUS TRIBUTOS. UN MEJOR BARRIO LO HACEMOS ENTRE TODOS.							
Pago CONTADO	Vencimiento XX/XX/XXXX	Importe <b>\$XXX.XXX,XX</b>					
(01)9501234							

## Figure 4: Second Intervention Treatment Example

MUNICIPALIDAD DE LA CIUDAD DE SANTA FE DE LA VERA CRUZ www.santafeciudad.gov.ar							<b>GI</b>		
NOMDE						4			
NOMBRE Y APELLIDO					PADRÓN Nº		9999999		
Domicilio envío Ciudad					BOLETA Nº 9999		)		
DEUDA EXIGI	BLE AL//2017				LOTE				
La Municipalidad de la Ciudad de Santa Fe comunica que se han detectado IMPAGOS los periodos que se detallan en la presente liquidación. Su padrón posee un saldo deudor actualizado//2017 de \$									
AÑO		CU	DTAS	CAPITAL		INTERÉS		TOTAL	
EEEE	Ene Feb Mar A	Abr May Jun	Jul Ago Sep Oct Nov Dic	X.XXX	X.XXX,XX		,XX	X.XXX,XX	
FFFF	Ene Feb Mar A	Abr May Jun	Jul Ago Sep Oct Nov Dic	X.XXX,XX		X.XXX,XX		X.XXX,XX	
нннн	Ene Feb Mar A	Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic		X.XXX	,XX	X.XXX,XX		X.XXX,XX	
YYYY	Ene Feb Mar A	Ene Feb Mar Abr May Jun Jul Ag		X.XXX	,XX	X.XXX	,XX	X.XXX,XX	
ZZZZ	Ene Feb Mar A	Abr May Jun	Jul Ago Sep Oct Nov Dic	X.XXX	X.XXX,XX		,XX	X.XXX,XX	
ZZZZ	ZZZZ Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic				,xx	X.XXX	,XX	X.XXX,XX	
TOTAL (No i	ncluye deudas en gest	ión judicial, n	i convenios de pago).	\$8.888.8	88,88	\$8.888.8	888,88	\$8.888.888,88	
Puede regularizar su situación fiscal abonando la presente liquidación de pago contado antes del vencimiento, obteniendo un ahorro de intereses por mora.  La cancelación se podrá realizar por los medios de pago habituales o con tarieta de crédito Mastercard o Visa del Nuevo									
Banco de Santa Fe y Credifiar hasta en 6 cuotas sin interés, exclusivamente en las cajas ubicadas en el Palacio Municipal. De no optar por la opción contado, podrá elegir alguno de los planes de pago con beneficios en el interés por mora o financiación detallados a continuación, los que estarán vigentes hasta el 31/08/2017. (*) Cuota mínima de \$300.									
Plan Cant.	Máx. de Cuotas(*)	Anticipo	Interés por financiación	Interés	erés por mora		a Ahorro interés por moi		
А	6	-	0%	3	3%		-		
В	12	20%	2%	1	1%		XXX,XX		
С	18	-	2%	1,	5%		xxx,xx		
D	24	-	2%	2	2%		XXX,XX		
Podrá formalizar el plan seleccionado, concurriendo a Ventanilla de Contribuyentes del Palacio Municipal o a los Centros de Distrito o ingresando a: http://www.santafeciudad.gov.ar/servicios/contribuyentes/tasa_general_inmuebles.html. De haber efectuado pagos por los períodos detallados, usted deberá presentar los correspondientes comprobantes vía web o en ventanilla de contribuyentes del Palacio Municipal.									
PAGUE SUS TRIBUTOS. UN MEJOR BARRIO LO HACEMOS ENTRE TODOS. Pago CONTADO Vencimiento XX/XX/XXXX Importe \$XXX.XXX.XX									