

Tax Debt Enforcement:

Theory and Evidence from a Field Experiment in the United States*

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Abstract

We present theory and supportive evidence on the enforcement of tax delinquencies, which are tax debts incurred with the government. In our model, the tax agency relies on both a financial penalty as well as a shaming penalty that involves publishing the names of tax delinquents online. The latter penalty is becoming increasingly common. We show that when the tax agency focuses on private welfare as well as revenues, the optimal policy involves a mix of financial and shaming penalties. To flesh out the interplay between financial and shaming penalties, we conducted a field experiment with 35,000 tax delinquents in three U.S. states who owed half a billion dollars. We find that increasing the salience of both financial and shaming penalties reduces tax delinquencies. We also provide suggestive evidence that the effectiveness of shaming and financial penalties depends on the garnishability of the debtor's income.

JEL Classification: C93, H26, K34, K42, Z13.

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1 Introduction

An efficient system of tax collection is one of the key determinants of state capacity (Besley and Persson (2013)). The existing literature has focused on understanding tax evasion and tax avoidance (Slemrod (2007); Slemrod and Gillitzer (2014)). However, a less-explored topic that is equally important for tax compliance is the reduction of tax delinquencies; that is, the debts incurred by the citizen with the tax administration. These potential tax revenues are arguably the most readily available for the tax agencies, and tax enforcement agencies consequently invest substantial resources in designing and implementing policies to reduce tax delinquency. Tax delinquency is a significant problem in the developed world. For example, according to the U.S. Department of Treasury (2012), delinquent taxes composed more than 20 percent of the total U.S. gross tax gap in 2006.³ Tax delinquency plays an even more important role in the developing world (Gordon and Li (2009)). This paper develops a theoretical framework for this understudied aspect of tax compliance and provides empirical evidence from a field experiment in three U.S. states.

In practice, tax debts are enforced through financial penalties (e.g., an above-market interest rate on the debt amount) and nonfinancial penalties. When these penalties do not impel payment, tax agencies may use other collection tools as a last resort, such as garnishing wages (i.e., require the employer to withhold a portion of the debtor's paycheck and send it to the tax agency). We focus on one particular type of nonfinancial penalty, which consists of a website publishing the names, addresses, and other information of individuals and businesses delinquent on their taxes. This shaming penalty is becoming widespread in the United States and the rest of the world. For example, as shown by Table 1, as of December 31, 2014, twenty-three U.S. states maintained online lists of individuals and businesses with delinquent taxes. In spite of the widespread use of shaming penalties and the enthusiasm evinced by tax agencies in their press releases, little is known about whether they are effective in reducing delinquency or whether they may be desirable from a social welfare perspective.⁴ Our research tackles these knowledge gaps. First, we present a model that shows that shaming penalties can indeed be useful for increasing revenues and social welfare. Second, we present evidence from a field experiment with 35,000 tax delinquents in three U.S.

³The treasury reported \$46 billion in underpayment of declared taxes and \$65 billion in enforced and other late payments as of 2006. In addition to the previous items, the tax gap includes nonfiling and underreporting, estimated to be near \$450 billion dollars. There are official estimates for other developed countries: e.g., the French Public Finances Directorate reported €18.1 billion in total unpaid net taxes and penalties in 2012 (about \$24 billion 2014 U.S. dollars).

⁴Some examples of the practical effectiveness of the online list of delinquents are: Wisconsin (Department of Revenue press release, December 26, 2007), Illinois (Department of Revenue press release, November 3, 2009), California (Hines, Alice "Amex, Cantor Fitzgerald And Pamela Anderson Land On Cyber-Shame Lists Of Tax Delinquents," Huffington Post, April 17, 2012), Georgia, Wisconsin and Colorado (Jones, Ben "Latest tax tool: 'Internet shaming'" USA TODAY, December 22, 2005), Delaware ("State releases list of top 100 delinquent taxpayers in Delaware," Dover Post, November 28, 2011), Massachusetts (Mohl, Bruce "Mass. lists 1,481 as delinquent on taxes" Boston Globe, May 6, 2004). Not all the press releases were positive, though. For example, the spokesman for the Georgia Department of Revenue had doubts during the early implementation of this policy (Chu "Shame apparently not motivating delinquent Georgia taxpayers to pay up," Associated Press News, 2004).

states who owed about half a billion dollars. We show that increasing the salience of both financial and shaming penalties reduces tax delinquencies, and that the effectiveness these penalties seems to depend on the debtor's income garnishability as in the model.

In our model, a tax agency maximizes a weighted average of tax revenues and private welfare. The agency can use imperfect collection tools to enforce tax debts from debtors who refuse to pay, such as wage garnishment. Depending on the debtor's source of income, the collection tool may be more or less effective; for example, it is arguably easier to garnish wages than to garnish business income. Indeed, this heterogeneity in income garnishability resembles the heterogeneity in the ability to hide assets in models of tax evasion (Kleven et al (2011)).⁵

The tax agency can set a financial penalty (i.e., an above-market interest rate) as well as a shaming penalty (i.e., advertise the identities of the tax delinquents). To model how the shaming penalty affects delinquency, we take a signaling approach to social interactions (Cole, Mailath, and Postlewaite (1992); Bénabou and Tirole (2003)). Each individual has social interactions with peers, and her utility from these interactions depends on how financially (or morally) trustworthy her peers perceive her to be.⁶ By publishing a list of delinquents, the tax agency heightens the visibility of the decision to pay back tax debts. A higher visibility makes not paying taxes less attractive because it can signal untrustworthiness, which can impair social interactions.

We show that when individuals are homogeneous with regard to income garnishability, the shaming penalty is clearly inferior to the financial penalty. Intuitively, even though both penalties increase the proportion of individuals who pay earlier, the financial penalty generates additional revenues from the individuals who do not pay sooner but have to pay above-market interest later. As a result, if the tax agency cares mostly about revenues, using the shaming penalty would never be optimal.⁷ However, when garnishability of income differs between individuals, shaming penalties have an advantage over financial penalties. For a given financial penalty, some individuals do not pay even though they can afford to, because they expect to escape the collection tool with a higher probability. However, the effect of the shaming penalty does not vary with income garnishability. We show that, if the collector cares about private welfare in addition to revenues, it is optimal to use a combination of a shaming penalty and a financial penalty. Intuitively, the shaming penalty has the advantage of being more lenient towards individuals who are going through financial hardship.⁸

⁵Indeed, there is an overlap in the institutional factors that drive both heterogeneities: e.g., third-party reporting makes it more difficult to hide assets and easier to garnish them.

⁶This value of reputation may be instrumental (e.g. a job/business opportunity, a romantic/friendly proposal) or purely affective (social esteem as an hedonic good).

⁷The U.S. regulations on collection of credit card debt explicitly prohibit credit card companies from using shaming penalties (Hunt (2007)). At first sight, this prohibition may seem at odd with the finding that a revenue-maximizing collector would not find it optimal to use shaming penalties. However, in practice, since usury laws limit the interest rates that they can charge, these revenue-maximizing collectors can still find optimal to use shaming penalties.

⁸Another rationalization for the existence of shaming penalties would be that the debt collector cannot increase the financial penalty and thus imposes a shaming penalty instead. In other words, the shaming penalty could act as a mere substitute of the financial penalty. However, this is not a compelling explanation, because the tax agencies

In the second part of the paper, we provide evidence from a field experiment on the effectiveness of financial and shaming penalties and, additionally, on whether it varies with income garnishability as in our model. Several plausible conjectures may explain why shaming penalties could be ineffective in reducing delinquency or even backfire.⁹ For example, shaming penalties may conflict with the intrinsic desire to honor tax debts, as suggested by the literature on extrinsic motivation being able to crowd-out intrinsic motivation (Bénabou and Tirole (2003); Kleven et al. (2011)). The effect of shaming penalties on debtors' social interactions could alienate them from new sources of income generation and thus make them less likely to pay.¹⁰

Our field experiment was based on a sample of 34,344 individuals from the online lists of tax delinquents published by three U.S. states: Kansas, Kentucky, and Wisconsin. Our sample is notable in that tax delinquents were vastly heterogeneous in their debt amounts, ranging from \$250 to \$150,000. The median amount owed by these subjects was \$5,500, and the total amount was about half a billion dollars. These subjects had been delinquents for years, despite numerous attempts and solicitations from the tax agency and high financial penalties. For example, subjects in Kentucky had been delinquent for an average of 2.7 years (median of 2 years) and faced an annual interest rate of up to 30 percent.¹¹ We sent letters to all 34,344 delinquents. All of these letters were identical except for a few key pieces of information that were randomly assigned to affect the salience of financial and shaming penalties. We then estimated the effect of those pieces of information on the probability of paying the tax debt by using publicly available data on whether the subjects were still listed as delinquent after they received our letters.

The first treatment arm was designed to alter the visibility of recipients' delinquency status in the eyes of their neighbors. We randomized whether a recipient was the only individual in the area randomly chosen to receive information about the online list of delinquents or whether other individuals from her area were also randomly chosen to receive this information.¹² The difference between these two treatment groups is that, in the second one, other individuals in the area were also provided with the information about the website, thus making the recipient of the letter feel more monitored by neighbors. The second treatment arm was intended to create exogenous variation in the knowledge and/or salience of information about financial penalties. The letter contained either no message about financial penalties or a message summarizing the financial penalties incurred by the debt. Providing these reminders should provide an estimate of the financial penalties if, as documented in a variety of settings, subjects systematically underestimate

face little to no restrictions to set financial penalties.

⁹Indeed, some states, such as Louisiana and Illinois, chose to discontinue the publication of the list of tax delinquents (Hines, Alice "Amex, Cantor Fitzgerald And Pamela Anderson Land On Cyber-Shame Lists Of Tax Delinquents," Huffington Post, April 17, 2012).

¹⁰For instance, Prescott and Rockoff (2011) shows that disclosing the identities of sex offenders may actually have increased recidivism among existing sex offenders.

¹¹Kentucky is the only one of the three states in our sample for which we observe the exact date when the lien was originated. The annual interest rates in Kansas and Wisconsin were 12% and 18%.

¹²The methodology of increasing the salience of the policy is based on Perez-Truglia and Cruces (2013), who study political campaign contributions.

the financial penalties (Stango and Zinman (2011); Frank (2011); Ausubel (1991)) and/or are inattentive about financial penalties (Karlan et al. (2014)). Indeed, in an extension of our model in the Appendix, we show that correcting biases about financial penalties can be desirable for the tax agency if it cares enough about private welfare relative to revenues.

We find that increasing the salience of financial and shaming penalties has a statistically and economically significant effect on the speed of repayment. We find that the effect of the financial penalty does not change with the debt amount, but the effect of the shaming penalty declines significantly with the debt amount. This finding is informative about the underlying value of social interactions, and it also suggests that social incentives may sometimes be difficult to scale up. We also find that the effect of the financial penalty is stronger where more of the reported income comes from wages, which we use as a proxy for income garnishability. Instead, the effect of shaming penalty does not vary with the fraction of reported income coming from wages. This evidence suggests that the shaming and financial penalties depend on the debtor's income garnishability as in our model and, as a result, that the use of shaming penalties may increase not only tax revenues but also social welfare.

We also consider the possibility that the online list of delinquents could affect the behavior of delinquents through a separate channel: delinquents may use the list to compare their own debt amount with the amounts owed by other delinquents. Depending on the direction of the effects, this alternative channel could make the publication of online lists more or less attractive from a social welfare perspective. To address this concern, our experimental letters also included exogenous but non-deceptive information about the delinquent behavior of others. We find that delinquents do not change their behavior in response to information about the behavior of other delinquents. This finding suggests that peer comparison may not be significant source of side effects from the publication of the list of delinquents. Also, this evidence is broadly consistent with the finding that moral appeals seem ineffective in reducing tax avoidance (Blumenthal, Christian and Slemrod (2001)).¹³

This paper relates to several strands of literature. Our study is related to recent studies focused on providing experimental and quasi-experimental evidence on the effects of tax evasion, tax enforcement, and tax avoidance (Blumenthal, Christian and Slemrod (2001); Slemrod, Blumenthal and Christian (2001); Slemrod (2006); Kleven et al. (2011); Casaburi and Troiano (2013); Castro and Scartascini (2013); Slemrod, Thoresen, and Bo (2013); Fellner et al. (2013); Hasegawa et al. (2013); Dwenger et al. (2014); Hallsworth et al. (2014)). We contribute to this literature in two different ways. First, we are among the first to study administrative tax delinquencies, which are debts actually owed by citizens to local administrative agencies that have not been collected

¹³Fellner, Sausgruber and Traxler (2013) also find that moral appeals fail to reduce tax evasion. There are, however, two notable exemptions. First, Kleven et al. (2014) find that even though moral incentives do not change average tax evasion, they do seem to have a significant effect on different groups of the population (those intrinsically and extrinsically motivated), but with opposite effects so that they can cancel each other out. And Hallsworth et al. (2014) present evidence that some moral appeals increase tax compliance.

despite numerous attempts and solicitations.¹⁴ Second, we are the first to study the disclosure of tax delinquents' identities as a shaming penalty, which is widely used in the United States and the rest of the world.

The optimality of financial and nonfinancial penalties composes a central question in law and economics (Becker (1968); Shavell (1987); Polinsky and Shavell (2000); Prescott and Rockoff (2011); Prescott (2012)), and the specific application to tax debt enforcement is novel, allowing us to contribute to this literature with new predictions. The standard legal and economic framework predicts that the first-best sanctions for crimes rely on the exclusive use of financial penalties, even when nonfinancial sanctions are available (Shavell (1987)). Consistent with the increasing trends in the United States and around the world, we show that nonfinancial penalties can be optimal in the context of tax delinquency. Given some similarities in the institutional setting, our insights may also be useful for the literature on consumer finance, debt collection, and default (Wang and White (2000); Hynes and Posner (2001); Djankov et al. (2008); Lilienfeld-Toal, Mookherjee, and Visaria (2012); Agarwal et al. (2015); Karlan et al. (2014)).

This paper is also related to the literature on social interactions and peer pressure in contexts of prosocial behavior (Bénabou and Tirole (2003); Bénabou and Tirole (2006); Gerber, Green and Larimer (2008); Andreoni and Bernheim (2009); Bénabou and Tirole (2011); DellaVigna, List, and Malmendier (2013); Ali and Lin (2013); Perez-Truglia and Cruces (2013)). We contribute to this literature in three ways. First, we show that social pressure can be effective in a context of antisocial behavior like having an outstanding tax delinquency. Second, many of the social incentives studied in the literature, such as social pressure for charitable giving and voting, have been studied in isolation, but we provide an analysis that considers shaming and financial penalties jointly. Third, and related to the previous point, we provide a theoretical and empirical analysis that not only measures the effect of social incentives on revenues but also examines the conditions under which a combination of social and financial incentives may increase social welfare.

The paper proceeds as follows. Section 2 lays out the model of tax debt enforcement and presents the main propositions. Section 3 introduces the institutional framework, the experimental design and the data sources. Section 4 presents the empirical results. The last section concludes.

¹⁴Casaburi and Troiano (2013) study the electoral response to a program in Italy that involved the identification of buildings that were not registered in the tax base register. Although the main goal of the program was to reduce property tax evasion, one additional component of the program involved enforcing the payment of previous not paid taxes on those unregistered buildings.

2 A Model of Tax Delinquency with Financial and Shaming Penalties

2.1 Financial Penalty

There is a continuum of taxpayers indexed by subscript i , who each have a tax responsibility normalized to 1.¹⁵ There are two periods. In the first period, the individual can either pay the tax due ($x_i = 1$) or not pay it ($x_i = 0$) and as a result becoming a tax delinquent. Some individuals are liquidity constrained, so that paying off their tax responsibility in the first period will not allow them to conduct their lives normally (e.g., eat, keep their businesses alive, pay expensive medical bills). Paying off the tax due has a cost of R_i , where the interest rate $R_i > 1$ is uniformly distributed between \underline{R} and \bar{R} . The government does not observe each R_i , although it knows how this variable is distributed.¹⁶ The heterogeneity in R_i represents a combination of liquidity needs and credit constraints.¹⁷ The government also prefers revenues in the first period to revenues in the second period. The government's value for receiving payment in the first period is $R_g > 1$. For individuals who did not pay in their first period, the effective debt at the second period will be F , where $F > 1$ is the size of the financial penalty.¹⁸

2.2 Collection Tool

In this second period, if the individual refuses to pay then the government will try to force the payment using some collection tool. For example, the creditor can force payments of wage earners through wage garnishment.¹⁹ However, the collection tool is imperfect: an individual expects to be immune with probability $1 - q_i \in [0, 1]$. As a result, debtor i expects to pay $F \cdot q_i$ in the second period. We allow for heterogeneity in q_i : a proportion $\theta \in (0, 1)$ of the population expects its income to be "garnishable" with probability $q_i = \underline{q}$, and the remaining $1 - \theta$ expects to be garnishable with probability $q_i = \bar{q} \geq \underline{q}$. One easy interpretation is that $1 - \theta$ is the share of future wage earners, from whom it is easier to garnish income. The government knows the distribution

¹⁵While in standard models of tax evasion (Allingham and Sandmo (1972)) the agents decide whether to report the income or not, in our model the relevant decision is whether or not to pay the tax responsibility that the government already knows.

¹⁶On the effect of financial penalties on tax compliance see also Andreoni (1992).

¹⁷This heterogeneity, of course, depends on a number of factors, such as number and type of credit lines that are still open, ability to borrow money from family and friends, credit history and possibly many other considerations.

¹⁸We implicitly assume that there is not an ex-ante limit to the size of financial penalties, which turns out to be consistent with a number of facts. For example, states typically exempt the Department of Revenues from complying with usury laws when setting up penalties for tax delinquencies (see for example Revised Code of Washington 19.52.140). Also, the financial penalties typically vary from year to year, with both increases and decreases, which is suggestive of the absence of restrictions.

¹⁹In practice, there are a number of different technologies for enforcing collection so that, for a given individual, the government may want to use the one that is most cost-effective for that particular individual. We abstract from this aspect because it is not relevant for the results that follow.

of q_i but does not observe the q_i of each individual.²⁰ For the sake of simplicity, we assume that q_i is always observable to one's peers (this assumption does not change the main results, but does make the model considerably more tractable).

2.3 Shaming Penalty

Whether the individual is a tax delinquent is observable to peers with probability p , which is a parameter under the control of the tax agency. The creation of an online list of tax delinquents can be seen as an increase from $p = 0$ to some $p > 0$. Further steps, such as including a search tool or advertising the list of delinquents, can increase p even further. We assume that increasing p has no significant costs. This simplifying assumption is for the purposes of clarity: even though adding a cost would lead to a lower use of the policy, it would not change the main qualitative results that follows.

To understand how the shaming penalty affects the decision to pay taxes, we take a signaling approach to social interactions (Cole, Mailath and Postlewaite (1992); Bernheim (1994); Bénabou and Tirole (2003)). After deciding whether to pay the tax or not, the individuals interact with peers. The individual's utility from these interactions depends on the peer's perception about how financially trustworthy the individual seems. This value of reputation may be instrumental (e.g., through a higher likelihood of obtaining an invitation, a job/business opportunity, a romantic/friendly proposal) or purely affective (e.g., social esteem as an hedonic good). To represent this, we assume that the utility of the individual is a linear function of the expectation about her financial trustworthiness: $-\eta \cdot E[R_i|I_i]$, where I_i is the observable information about i and η is a parameter that scales the value of social interactions. With probability $p \in [0, 1]$, I_i includes whether the individual paid her taxes in the first period.

The expected utility from social interaction can be expressed as:

$$-\eta \left[p \cdot E[R_i|x_i] + (1 - p) \cdot \frac{\underline{R} + \overline{R}}{2} \right]$$

By publishing the list of delinquents, the tax agency affects the visibility of the decision to pay one's tax liability. This visibility makes not paying taxes less attractive, because it can serve as a bad signal of trustworthiness and thus result in worse outcomes in social interactions.

Integrating over the population of individuals, we can obtain the average utility from social interactions: $-\eta \frac{\underline{R} + \overline{R}}{2}$. This value does not depend on p , meaning that disseminating information about delinquents redistributes utility across taxpayers (i.e., from individuals who did not pay in the first period to individuals who did pay), but does not affect the aggregate utility from social interactions. This convenient property is a direct product of the linearity assumption made about

²⁰In practice, even if q_i was perfectly observable to the collector, the results would stay the same if the financial penalty cannot be made dependent on q_i : e.g., if the tax agency cannot charge a higher interest rate to wage earners than to the self-employed.

the value of social interactions: $-\eta \cdot E[R_i|I_i]$.²¹

This model of social interactions assumes that peers care about financial trustworthiness. The results, however, are similar when peers care instead about moral trustworthiness. Appendix C.2 provides an extension of the model where individuals have an additional source of utility from paying on time, related to the pride from doing what is right. We show that instead of signaling financial trustworthiness, being a delinquent may serve as a signal of moral trustworthiness. The Appendix shows that the main results that follow are qualitatively identical under this alternative specification. In the real world, it is likely that peers care about a combination of both financial and moral trustworthiness.

2.4 The Taxpayer's Problem

Combining the financial and social incentives, the individual solves the following maximization problem:

$$\max_{x_i \in \{0,1\}} U(x_i; R_i),$$

$$U(x_i; R_i) = -R_i \cdot x_i - (1 - x_i) \cdot [q_i \cdot F + p \cdot \eta \cdot (E[R_i|x_i = 0] - E[R_i|x_i = 1])] + \eta \cdot (1 - p) \cdot \frac{R + \bar{R}}{2}$$

The term $p \cdot \eta \cdot (E[R_i|x_i = 0] - E[R_i|x_i = 1])$ is the individual's loss from signaling due to not paying the debt in the first period. Let the debtor's optimal response be denoted $x^*(q, R) = \arg \max_{x \in \{0,1\}} U(x; q, R)$. This optimal response can be characterized as a threshold decision:

$$x^*(q, R) = 1 \left[R \leq \hat{R}(q) \right]$$

Assuming all taxpayers are responding like this, we can obtain the rational inference from the perspective of peers:

$$E[R_i|x_i = 1] = \frac{R + \hat{R}}{2} \text{ and } E[R_i|x_i = 0] = \frac{\hat{R} + \bar{R}}{2}$$

Replacing that back into the objective function:

²¹A non-linear specification could make the aggregate utility from social interactions depend on p either negatively or positively. As a result, relaxing this assumption could make the shaming penalty either more or less desirable. Furthermore, we are ignoring the utility that the peers obtain from the social interactions. Including this utility into the social welfare function would make the shaming penalty more desirable. A higher p should increase the utility of the peers, because they have more information and thus should get better outcomes from their social interactions. Indeed, the peers could even increase the number of interactions that they choose to have.

$$U(x_i; R_i) = -R_i \cdot x_i - (1 - x_i) \cdot \left[q_i \cdot F + p \cdot \eta \cdot \frac{\bar{R} - R}{2} \right] + (1 - p) \cdot \eta \cdot \frac{R + \bar{R}}{2}$$

Thus, individual i chooses $x_i = 1$ iff:

$$R_i \leq q_i \cdot F + p \cdot \eta \cdot \frac{\bar{R} - R}{2}$$

Which confirms our guess that the optimal response consists of the cutoff decision $\hat{R}(q) = \max \left\{ \underline{R}, \min \left\{ q \cdot F + p \cdot \eta \cdot \frac{\bar{R} - R}{2}, \bar{R} \right\} \right\}$. As expected, the proportion of individuals paying in the first period is decreasing in the financial penalty, F , and in the shaming penalty, p .

2.5 The Government's Problem

The government chooses two policies: the financial penalty, F , and the intensity of the shaming penalty, p . Let T denote government revenues:

$$T(F, p) = \int \int [x^*(q, R) \cdot R_g + (1 - x^*(q, R)) \cdot q \cdot F] dF(R) dG(q)$$

Recall that R_g denotes the government's own discount rate. And let $PW(F, p)$ denote the private welfare of the taxpayers:

$$PW(F, p) = - \int \int [x^*(q, R) \cdot R + (1 - x^*(q, R)) \cdot q \cdot F] dF(R) dG(q)$$

Note that we used the property that the aggregate utility from social interactions does not depend on F or p . The government maximizes social welfare, which is a weighted average of the tax revenues and private welfare:

$$\max_{F \geq 1, p \in [0, 1]} SW(F, p) = \alpha \cdot T(F, p) + (1 - \alpha) \cdot PW(F, p)$$

Where $\alpha \in \left[\frac{1}{2}, 1 \right]$ measures how much the government values an additional dollar in its own pocket (in the second period) versus in the pockets of the taxpayers. In the extreme case $\alpha = \frac{1}{2}$, the government is indifferent between the two. This can be consistent with a government that maximizes social welfare and cares about both the private welfare of citizens and raising revenues to provide the efficient level of public good provision as in Samuelson (1954).²² In the extreme case $\alpha = 1$, the government only cares about maximizing revenues, no matter the cost to the taxpayers. In reality, we expect tax agencies to have preferences somewhere in the middle of these two extreme cases.

²²For the sake of tractability we don't model explicitly the process of public good provision.

2.6 Ranking Policies

The followings definitions are useful to rank sets of policies:

Definition 1. Given a set of feasible policies A and B , they are interchangeable if for every policy in B there is a policy in A such that the government attains the same utility and for every policy in A there is a policy in B such that the government attains the same utility.

Definition 2. Given a set of feasible policies A and B , A dominates B if for each policy in B there is a policy in A such that the government attains higher utility.

For ranking policies, the possibility of corner solutions can introduce an extra layer of complexity. For example, consider an extreme case where R_g is arbitrarily larger than \bar{R} : i.e., the government is infinitely impatient. In that case, the shaming penalty could not help the government do better, because the government can attain the first best by simply setting a financial penalty that is arbitrarily large so that everyone pays in the first period. However, this negative results stems entirely from the (simplifying) assumption that R is bounded. To separate these extreme cases, we introduce the following assumption:

Assumption 1. Let $F^*(\alpha)$ be the set of optimal financial penalties that maximize $SW(F, p = 0)$ given a set of parameter values $\{\underline{R}, \bar{R}, \underline{q}, \bar{q}, \theta, \eta, R_g\}$. We assume that these parameter values are such as: $\cup_{\alpha \in [\frac{1}{2}, 1]} F^*(\alpha) \in \left(\frac{\underline{R}}{\underline{q}}, \frac{\bar{R}}{\bar{q}}\right)$.

This assumption implies that, if the government had only access to the financial penalty, the optimal financial penalty would always be an interior solution, regardless of the value of α . This assumption effectively excludes the possibility of extreme cases like the infinitely-impatient government discussed above.

The next two subsections presents the main results. We want to show that heterogeneity in q_i and a low enough α are jointly necessary and sufficient conditions for the shaming penalty to be optimal. To make this clear, we present the results in two parts. First, we show that with a homogeneous q_i , there is no α such as the shaming penalty is optimal. Second, we show that under a heterogeneous q_i , the shaming penalty is optimal as long as α is low enough.

2.7 Optimal Penalties under Homogeneity in q_i

The following proposition ranks the policies under homogeneity in q_i :

Proposition 1. *If $\bar{q} = q$:*

- *If $\alpha = \frac{1}{2}$, then the sets of policies $\{(F, p) : F \geq 0, p = 0\}$ is interchangeable with the set $\{(F, p) : F \geq 0, p \in (0, 1]\}$.*

- *If $\alpha > \frac{1}{2}$, then the set of policies $\{(F, p) : F \geq 0, p = 0\}$ dominates $\{(F, p) : F \geq 0, p \in (0, 1]\}$.*

Proof. See Appendix A.1.

To see the intuition behind this result, it is easier to start with the case $\alpha = 1$, when the government wants to maximize revenues. Both the financial and the shaming penalties have the capability of increasing the proportion of individuals who pay in the first period. However, the financial penalty is superior to the shaming penalty because it generates additional revenues from the individuals who don't pay in the first period and thus have to pay more in interest later. As a result, a revenue-maximizing collector would not rely on shaming penalties if the use of financial penalties is unrestricted. In the other extreme case, when $\alpha = \frac{1}{2}$, the government simply wants the group with $R < R_g$ to pay right away and the group with $R > R_g$ to pay in the second period. For that, the government can simply choose $F \cdot q = R_g$ and let the individuals maximize the utility of the government, attaining the first best. Even though combining F with $p > 0$ would not harm the government, it could not make it better either. That is, the government is indifferent about whether using $p > 0$ or $p = 0$. As a result, even if the government has the slightest bias in favor of revenues, $\alpha \in \left(\frac{1}{2}, 1\right)$, the government is strictly better off by not using the shaming penalty.²³

2.8 Optimal Penalties under Heterogeneity in q_i

The following proposition ranks the policies under heterogeneity in q_i :

Proposition 2. *If $\bar{q} > \underline{q}$, there is a unique threshold $\alpha^* \in \left(\frac{1}{2}, 1\right)$ such as:*

- *if $\alpha \leq \alpha^*$, then the set of policies $\{(F, p) : F \geq 0, p \in (0, 1]\}$ dominates $\{(F, p) : F \geq 0, p = 0\}$.*
- *if $\alpha > \alpha^*$, then the set of policies $\{(F, p) : F \geq 0, p = 0\}$ dominates $\{(F, p) : F \geq 0, p \in (0, 1]\}$.*

Proof. See Appendix A.2.

To see the intuition behind this result, it is easier to start with the case $\alpha = \frac{1}{2}$. As before, the government simply wants the group with $R < R_g$ to pay right away and the group with $R > R_g$ to pay in the second period. However, this is not attainable any more by using just the financial penalty. Intuitively, if the government is only using a financial penalty, there will be two different thresholds, $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$, for individuals with high and low income garnishability. This is because individuals with different garnishability expect to escape the financial penalty with different probabilities and thus have different incentives to pay in the first period. In other words, some individuals don't pay because they are having a harder time but some other individuals don't pay because they expect to escape wage garnishment.

Instead, were the government using the shaming penalty alone, there would be a single threshold and the government could attain the first best solution. That is, the shaming penalty could completely eliminate the asymmetric information problem that arises with the financial penalty. In

²³It must be noted, however, that a $p > 0$ could be optimal even if $\alpha > \frac{1}{2}$ as long as the financial policy is restricted (e.g., because of political constraints or because of laws).

practice, the value of social interactions is bounded so the optimal policy involves a combination of both financial and shaming penalties. When the government only cares about maximizing revenues (i.e., $\alpha = 1$), the government prefers to rely on the financial penalty alone, for the same reasons explained for homogeneous- q_i . As a result, the use of the shaming penalty depends on the value of α : the shaming penalty will be desirable if and only if α is low enough, that is, if the government cares enough about private welfare.

The advantage of the shaming penalty is that its effectiveness does not depend on income garnishability (q_i). This property would be violated if the value of social interactions (η_i) were heterogeneous and correlated with income garnishability (q_i). We believe that it is plausible that income garnishability is more related to the ability to escape the tax burden than to the value social interaction. Even assuming that garnishability were related to social interactions, this would not necessarily weaken our result. On the one hand, if the effectiveness of the shaming penalty were increasing in income garnishability, that would diminish the comparative advantage of the shaming penalty relative to the financial penalty, possibly even to the point of making the shaming penalty no longer optimal. On the other hand, if the effectiveness of the shaming penalty were increasing in income garnishability, the shaming penalty, properly combined with the financial penalty, would instead become even advantageous. The latter case is arguably more likely than the former. For instance, many self-employed professions, with arguably lower income garnishability, such as lawyers or doctors, rely, if anything, more than wage earners on the value of social interactions.

The above discussion implies that our main result would change only if higher garnishability were to reduce the effectiveness of the shaming penalties at a higher rate than reducing the effectiveness of the financial penalties. According to our conversation with professionals in this sector, the differential effectiveness with respect to income garnishability is perceived as a key advantage of the shaming penalty over the financial penalty. For example, in a press release from November 3, 2009, the Illinois Department of Revenue declared that: “The threat of disclosure and the negative publicity of being included in this list are particularly effective with self-employed professionals and cash businesses where some routine collection tools, such as the ability to garnish wages, may not work.” This suggests that our assumptions bears out with real world evidence. In the empirical section we aim at providing further evidence about the relationship between the effectiveness of penalties and income garnishability.

3 Experimental Design, Subject Pool and Data Sources

Even though our model suggests that the shaming penalty should reduce tax delinquency, we discussed some deviations from the model (e.g., crowding-out of intrinsic motivation) that could make the shaming penalty ineffective or even counterproductive. Similarly, the optimality of shaming penalties relies on their effectiveness not depending on the debtor’s garnishability; however, that property assumes that the value of social interactions does not vary with garnishability. In this

section, we describe an experimental design aimed at measuring the effectiveness of shaming and financial penalties. This findings can shed light on whether the effects of the shaming and financial penalties are consistent with the predictions of our model.

3.1 Experimental Design

The field experiment consisted of sending a letter to a sample of individuals listed in the online lists of delinquent taxpayers published by the Departments of Revenue in three U.S. states: Kansas, Kentucky, and Wisconsin. These letters were identical except for a few key pieces of information that were randomly assigned with the goal of varying the salience of the shaming and financial penalties. We then measured how each piece of information affected the subsequent behavior of the delinquents by determining whether the recipients of the letters were still delinquent each week after the letters were sent, which we could verify by using publicly available information from the online lists.²⁴

Appendix B contains a sample letter and its envelope. Both the envelope and the letter included a logo of the Department of Economics at the University of Michigan to increase the legitimacy of the communication as perceived by the recipient. The first paragraph of the letter indicated that the letter was part of a research study about tax delinquency. The letter also contained a table with ten tax delinquents in the recipient’s area, including the recipient. The delinquents were all identified by full name and debt amount, and appeared in ascending order by debt amount; the recipient’s row was highlighted. One of the goals for having this table was to grab the recipient’s attention. The second paragraph of the letter identified the corresponding state’s Department of Revenue as the data source, with an explanation that “Names, addresses and other details about tax delinquents are freely available to see for anyone with access to the Internet. You can search for individual debtors by first and last name, or by zipcode, by visiting the following web-page (...).” The second page of the letter contained a screenshot of this online search tool for illustration purposes, the researchers’ contact information, a link to the project’s website, and a link to an online survey that was designed to increase the legitimacy of the communication.²⁵

The effects of shaming and financial penalties were measured by randomizing two key pieces of information in this letter. The first treatment was designed to alter the visibility of the recipient’s

²⁴We did not base the experiment in the comparison between individuals who received a letter and those who did not receive a letter, because it would be very difficult to disentangle the mechanisms through which receiving a letter like this may affect behavior: e.g., being reminded that one is a delinquent, being told that one is being part of an academic study, being compared to other delinquents.

²⁵This website provided basic information about the research project, and contact information to reach the research team. The main purpose of the website was to provide contextual information about our study to interested subjects, and to dissipate any doubts about its legitimacy, emphasizing its academic and non-partisan nature. Although the website provided some general information about the main research objective, to avoid the contamination of the experimental results, it did not provide any details about the precise hypotheses to be tested, nor about the existence of several different treatment types. We don’t report the survey results because of its extremely low response rate (0.2%), but these results are available upon request.

delinquency status with respect to the neighbors. We followed the design in Perez-Truglia and Cruces (2013), by randomizing the message prominently displayed in a box located right below the list of contributors between two possible cases:

Lower Visibility: “Your household was the only household randomly chosen from your area to receive a letter of this type.”

Higher Visibility: “Your household and other households in your area were randomly chosen to receive a letter of this type.”

Note that households were explicitly told that the selection process was random. Both of these messages were nondeceptive; we divided the U.S. territory in small areas (ZIP-9 level) and then, consistent with the message, we randomized whether one or more individuals in the area would get a letter.²⁶ The higher visibility group differed from the lower visibility group based on other individuals in the area also receiving the information about how to access the list of tax delinquents, a situation that would make the recipient feel monitored by neighbors.

It must be noted that the above treatment increases the visibility of an individual’s delinquency status only within a limited circle of individuals: his or her neighbors. In practice, individuals likely care about neighbors’ opinions to a limited extent, which can generate differential responses to the shaming penalty depending on the debt amount. For example, if all delinquents value their neighbor’s esteem at most \$100, being exposed to them as being a delinquent may be an effective deterrent for an individual who owes \$1,000, for which the shaming penalty could amount to 10% of the amount owed, but not at all effective for an individual who owes \$1,000,000 because the shaming penalty would amount to no more than 0.01% of the amount owed. Indeed, one reason why some researchers do not find the power of social incentives to be compelling is that they may only work when stakes are low (Levitt and List, 2007). In the context of lab experiments, for example, there is evidence that stakes matter. For instance, even though respondents in the ultimatum game often reject unfair offers, that almost never occurs when stakes are very high (Andersen et al., 2011). A remarkable advantage of our empirical setting is that the size of the debts of our experimental subjects varied extensively, from \$250 to about \$150,000, so we can plausibly measure how social incentives scale up.

To measure the effect of financial penalties, the ideal experiment would consist of randomizing the interest rate that the individuals are subject to. Because randomizing the financial penalties was not feasible for us, we opted to create exogenous variation in the knowledge and/or salience of this information. The letter could either include a message with a brief summary of the interest rates applied to the subject’s debt amounts or leave it out. To make this information more salient, the message was printed in boldface, below the snapshot of the search tool. For example, in Wisconsin the message was “This website also includes information about penalties. For instance,

²⁶Note that the probability of assignment to the message is conditional on the number of delinquents in the area, which we always include as a control variable. Also, we chose the share of areas to be assigned to each group as to generate roughly the same number of letters in each of the two treatment groups.

your tax debt is subject to, among other penalties, an annual interest rate of 18%.” For Kansas, the value of the interest rate was 12%, while it was 30% for Kentucky.²⁷

We can compare these interest rates with those attached to different sources of credit that a liquidity-constrained individual might try to use. First, the U.S. average for the annual interest rate on a credit card was 14% (Source: CreditCards.com, accessed on January 5, 2015). For individuals with a bad credit score, the rate can be substantially higher. Second, individuals using less conventional sources of credit, which presumably would be the most liquidity-constrained individuals, can pay several times this rate; for example, the average annual interest rate for payday loans is estimated to be over 100% (Stegman (2007)). If delinquents underestimated the size of the financial penalties on average and/or they ignored them, then our message about financial penalties would be expected to make the delinquents pay more rapidly. Indeed, there is evidence that people underestimate interest rates in many markets (Ausubel (1991); Stango and Zinman (2011); Frank (2011)) and also that they are inattentive about interest rates (Karlan et al. (2014)).

Last, we anticipated that publishing the list of tax delinquents might affect a delinquent’s decision to pay her tax debt through a separate channel: the information contained in the list might change the delinquent’s perception about the delinquent behavior of others. For instance, individuals have been documented to behave more prosocially when they perceive that others are also behaving pro-socially.²⁸ To test whether delinquents care about the behavior of other delinquents, we created some exogenous variation in the recipients’ perception of the delinquent amounts owed by others. To attain that goal without being deceptive, we followed the methodology from Perez-Truglia and Cruces (2013). In the table of delinquents in the area, we created some exogenous variation in the distribution of delinquent amounts by randomly selecting a group of nine neighbors in the area with higher or lower debt amounts, depending on the value of a randomly assigned weighting parameter that determined which individuals to include in the list.²⁹ The independent variable of interest will not be the actual mean amount shown in the list, but rather the difference between that amount and the amount that would have resulted from using some baseline parameter. As a result, the independent variable consisted purely of exogenous variation created by random assignment of the weighting parameter.³⁰

²⁷The messages were “This website also includes information about penalties. For instance, your tax debt is subject to, among other penalties, an annual interest rate of 12%” in Kansas and “This website also includes information about penalties. For instance, your tax debt is subject to, among other penalties, an annual interest rate of 4% and a monthly late payment fee of 2%” in Kentucky.

²⁸The evidence includes diverse behavior such as charitable contributions (Frey and Meier, 2004) political contributions (Perez-Truglia and Cruces, 2013) and energy conservation (Alcott, 2011).

²⁹For each recipient, we identified the twenty closest delinquents. The nine neighbors to be shown in the table were selected by first ordering the list of twenty closest delinquents according to a composite index, and then selecting the top nine delinquents from the ordered list. This composite index was the sum of a random term plus the debt amount of the individual, weighted by the weighting parameter. Choosing higher values of that parameter would result in a table with nine delinquents with higher debt amount. Thus, by randomly assigning the weighting parameter we can generate exogenous variation in the mean debt amount for the delinquents in the table.

³⁰For more methodological details, see Perez-Truglia and Cruces (2013).

3.2 Institutional Context and Subject Pool

Even though twenty-three U.S. states publish online lists of tax delinquents (Table 1), we focused on Kentucky, Kansas, and Wisconsin because they were the only ones to satisfy two important criteria. First, the minimum debt amount for being included on the online list had to be low enough that a significant number of individuals were listed, as opposed to other states where only the very top delinquents were included (e.g., the top 100 delinquents). Second, the delinquent lists in these three states included the addresses of the delinquents, which we needed to contact them by mail.³¹ Our sample includes individual delinquents but not business delinquents.

The publication of tax delinquents' names and addresses is regulated by state legislation. In these three states, even though the consent of tax delinquents is not legally required, the administrative agency is required by law to notify taxpayers before publishing their names online to give them time to pay the balance and avoid being listed.³² As a result, a vast majority of delinquents know that they are included in the lists. The lists are updated on a daily basis, with amounts being updated to reflect revisions to the original debt, additions of new debts, and the interest, penalties, and fees. In spite of these similarities, some differences exist in the way the program is implemented across the three states, as discussed in more detail in Appendix E. The main difference among the states is the amount of debt above which the delinquent is listed:³³ \$250 in Kentucky, \$2,500 in Kansas, and \$5,000 in Wisconsin.³⁴

The debts primarily originate from state income taxes. In Kansas only individuals who owe state income tax debts are listed. In Kentucky the type of tax generating the debt includes non-income taxes, but it is not specified in the list. Even though there are no public statistics, private communications between our research team and the Kentucky Department of Revenue suggest that most people on the list had debts originating from state income tax. In Wisconsin, the list includes delinquents for both income and a variety of other taxes (e.g., estate tax). To improve the similarity across states, we *ex ante* excluded from the subject pool delinquents with debts not

³¹For example, in Georgia every delinquent is listed online, but their addresses are not listed.

³²Once listed, the websites contain an e-mail address and a phone number that exposes tax delinquents can contact to pay off their debt and be removed from the lists.

³³The existence of these thresholds suggests that an alternative research design could have been a Regression Discontinuity one, exploiting the exogenous variation generated by those discontinuities. The main limitation of such a design would be that delinquents right above the threshold receive an additional letter from the state, that not only informs them about the shaming policy, but also reminds them about their tax debt and other information unrelated to the shaming policy. Therefore, such a design would not be ideal to study the effect of the shaming policies. An additional limitation of such a design would be that those results would not necessarily be externally valid to delinquents owing amounts that are farther away from the threshold. Our experimental results suggest that the size of the debt is an important determinant of those treatment effects, and shaming penalties seem to be more effective for small debts rather than large ones.

³⁴In Wisconsin, the public list at its inception in 2006 included delinquent taxpayers who owed more than more than \$25,000 while, on January 2008, the threshold was lowered at \$5,000. The Communications Officer of the Wisconsin Department of Revenue declared that the policy had been highly successful at increasing collected tax revenues, as one of the reasons to explain the lowering of the threshold (Communications Officer Press Release December 26, 2007, Wisconsin Department of Revenue).

originated from state income tax.

In Appendix D.1 we use the administrative data from the online lists of delinquents to study the correlates of tax delinquency at the ZIP-5 level. The results suggest that tax delinquency is correlated with several expected characteristics. For example, the delinquency rate increases with our proxy for income garnishability (i.e., the share of wage income). The tax delinquent rate is also higher in places where individuals take advantage of opportunities for tax evasion, as proxied by the bunching measure provided by Chetty et al. (2013). This measure suggests that individuals who take advantage of opportunities to evade reporting income may also take advantage of opportunities to evade tax collection. Also as expected, the tax delinquency rate decreases with social capital (Putnam (2001); Casaburi and Troiano (2014)).

We downloaded the online lists of individuals for the three states on May 26, 2014. At that point in time the online lists included 57,744 individual tax delinquents, who owed \$968,764,474 to Departments of Revenue in the three states. We ex ante excluded some individuals from the subject pool: (i) individuals with unreliable address information; (ii) records with full names corresponding to multiple addresses in the same state, due to uncertainty about whether they corresponded to the same or different individuals; (iii) individuals living in Wisconsin whose debts were not due to state income tax; (iv) individuals who moved out of state; and (v) individuals with debt amounts over \$150,000. From the resulting subject pool of 38,299 delinquents, 34,334 were chosen to receive a letter.³⁵ Of the total study population, 52.7% of the subjects were from Kentucky, 25.4% from Kansas, and the remaining 21.9% from Wisconsin.

Some of the information contained in the letter was randomly assigned. The random assignment was conducted at the household level and was stratified at the 3-digit ZIP code (ZIP-3) level.³⁶ In Table 2 we present some descriptive statistics and balance checks for the randomization. The main characteristic was the (pre-treatment) initial debt amount. The mean (median) debt amount was \$13,000 (\$5,500). We also included other variables that we did not observe directly but could impute from secondary data sources: the gender and ethnicity of the individual.³⁷ About 65% of subjects were coded as male, 71% as white, and 14% as black. Table 2 presents the p-value of a test of the null hypothesis that the average characteristics are the same across all seven treatment groups. As expected from random assignment, the individuals were balanced on pre-treatment characteristics.³⁸ As an additional robustness check, in the results section we present falsification tests by estimating the “effects” of the treatments on a key pretreatment outcome: the initial debt

³⁵About 150 letters were returned to us because undeliverable. The results are virtually unchanged if we exclude ex-post these individuals. Results are available upon request.

³⁶That is, all household members were assigned to the same treatment group.

³⁷Data for these characteristics is imputed using data on the joint distribution of first names and gender (several sources, including data from the U.S. Census Bureau), and the joint distribution of last names and ethnicities (data from U.S. Census Bureau).

³⁸The null hypothesis of equality is rejected statistically for one of the seven individual characteristics, the percentage of African-Americans, albeit the size of the difference is small and one rejection may be due to chance given the the large number of combinations between treatment groups and individual characteristics.

amount.

3.3 Outcome of Interest and Econometric Specification

Once an individual is listed, the main way to get off the list is to pay upfront the entire amount or enter a payment plan for the full amount and pay the first installment. According to the instructions for the delinquents shown on the websites of tax delinquents, and consistent with the statutory evidence discussed in Appendix E, paying the difference between the debt and the threshold to get off the list is not possible.³⁹

Our main dependent variable is a dummy variable for whether a delinquent is off the list at a given point in time.⁴⁰ We interpret changes in this variable as a indication of either paying back the debt in full or agreeing to a repayment plan for the full amount, although we do not have data on the relative composition of these two.⁴¹ Figure 1 shows the evolution of this outcome variable for each week from the beginning of the sample (Monday, May 26, 2014). Figure 1.a shows the evolution over the entire sample, while Figures 1.b-1.d show the evolution in each of the three states separately. These figures show that the probability that a given delinquent is off the list increases quite smoothly over time, although in Kentucky and Wisconsin there are some specific points in time when a larger-than-usual fraction of individuals leave the list (e.g., fifth week in Wisconsin and eleventh week in Kentucky). According to our conversations with the tax agencies, those discontinuities reflect time points when, for administrative reasons, the tax authority makes a higher number of updates to the list.

The baseline econometric specification is given by:

$$Y_i^t = \alpha + \sum_{j=1}^4 \beta_j Q_i^j M_i + \sum_{j=1}^4 \gamma_j Q_i^j F_i + \sum_{j=1}^4 \phi_j Q_i^j + \delta X_i + \epsilon_i \quad (1)$$

The outcome variable (Y_i^t) is a dummy variable that takes the value 100 if the individual has left the list t weeks after the letters were sent. The dummy for shaming penalty (M_i) takes the value 0 if the recipient was the only one in the area chosen to receive a letter and 1 if others in the area were chosen to receive a letter too. The dummy for financial penalty (F_i) takes the value 1 if the letter included information about the financial penalties and 0 if not. Note that, to accommodate

³⁹In conversations with them, the tax agencies confirmed this claim. Furthermore, Appendix D.2 provides some related empirical evidence. It should also be noted that, even if there was a way of paying to be taken below the threshold, that would only result in being taken off the list for a short time period, because the financial penalties would accumulate and take the total amount back above the threshold. It is possible, however, to pay new debts on time in order to avoid them from being accumulated with the amount listed from previous debts.

⁴⁰We must note that it is not uncommon for delinquents to leave the list to then re-enter a few months later, after contracting new tax debt with the government. For example, 9.3% of our subjects leave the list temporarily during the 37 weeks after the sample began (May 26).

⁴¹There are some alternative ways to get off the list, such as due to death, bankruptcy or surpassing the 10-year limit of the lien. Even though we do not have direct data on the share of individuals leaving the list due to these reasons, conversations with officials of the tax agency indicate that a very small minority leaves the list through these mechanisms. Appendix E discusses in more detail the specific laws and requirements.

the fact that the shaming penalty may be less effective for higher delinquent amounts, we allow the treatment effects to differ with each quartile of the initial debt amount ($\{Q_i^j\}_{j=1}^4$). Finally, X_i is a vector of controls, including variables such as state dummies and the initial debt amount.

4 Results

4.1 Effects of Financial and Shaming Penalties

Figure 2 presents the effects of the shaming and financial penalties on the probability of leaving the list ten weeks after the letters were sent, broken down by quartiles of the initial debt amount.⁴² Both financial and shaming penalties increased the probability of leaving the list, although they differed in how their effects varied with the debt amounts. As a falsification test, in Figure 3 we plot the same average treatment effects of the previous figure, but on the logarithm of the initial debt amount, three weeks before the experimental letters were delivered. As expected, none of the “fake” treatments effects were statistically significant for any quartile of the debt distribution. For reference, all these estimates are included as regression estimates in Table 3, along with the corresponding baseline rates.

We first considered the effects of the shaming penalty, shown in Figure 2.a. For the lowest quartile (\$250–\$2,273), the shaming penalty was associated with a 2.1 percentage point increase in the share of individuals leaving the list. This effect is statistically significant at the 1% level, and compared to the baseline rate of 10 percentage points, suggests an economically significant effect of nearly 21% of the baseline rate. The effect of the shaming penalty, however, was estimated to be very close to zero and statistically insignificant for the other three quartiles of the initial debt amount. The finding that the effect of the shaming penalty declines with the debt amount is consistent with the possibility of an upper bound on the underlying value of social interactions with neighbors, as discussed in the previous section.⁴³ This evidence suggests that scaling up social incentives may be difficult. However, if instead of increasing visibility among a few neighbors, we had increased visibility among a larger group of individuals (including relatives, friends, etc.), the shaming penalty might have also had a significant effect on individuals owing larger amounts.

Three reasons explain why our estimates may provide a very conservative lower bound to the effectiveness of the shaming penalty. First, a significant share of the individuals may not have read the letter; indeed, the U.S. Environmental Protection Agency estimates that only half of unsolicited correspondence is opened. As a result, the average effect on those who actually read the letter could be twice the magnitude of our estimates. Second, our treatment increased the

⁴²The results choosing other time periods close to 10 weeks are qualitatively similar and available upon request.

⁴³We are aware that there may be other explanations for this finding. For instance, it’s possible that people who owe larger amounts have unobservable characteristics, such as dishonesty or selfishness, that are associated both with having big debts and being less responsive to shaming penalties. However, we find it reassuring that the effect of shaming penalties changes with the debt amount but not the effect of financial penalties.

visibility of one’s delinquency status among neighbors. For most individuals, however, the most valuable social interactions are instead with relatives, friends and coworkers, a majority of whom are not neighbors. If we had instead increased the visibility in the eyes of those peers, the shaming penalty would have arguably had a greater effect. Third, as mentioned before, the tax agencies in all three experimental states must send letters to allow individuals and businesses the opportunity to resolve their debt prior to the posting. Both press releases from the tax agencies and private communications between our research team and these agencies suggest that a sizable fraction of the response to the shaming penalty happens when the warning letter is received.⁴⁴ Our subject pool comprised only individuals who received such notification and did not react to it, which by construction is a subset of individuals who care less about social interactions and thus provide a lower bound on the average response to the shaming penalty in a more representative sample of delinquents.

Figure 2.b shows the effects of the financial penalty. Consistent with financial penalties being proportional to the amount owed, the effects of financial penalties were roughly similar on individuals who owed different amounts. For the first three income quartiles, the financial penalty increased the probability of leaving the list by about 1 percentage point (or 10% of the baseline rate). Even though each of these three coefficients is statistically insignificant individually, their average is significant: an average effect of 0.98, with a p-value of 0.034. The effect of the financial penalty seems to be close to zero and statistically insignificant for the top quartile (\$13,347–\$150,000). At first, this may suggest that the effectiveness of the financial penalty eventually declines with the debt amount. However, as shown below, this pattern arises purely from the heterogeneity of effects by state rather than by debt amount.

The finding that individuals reacted significantly to reminders about financial penalties implies that they subsequently made more informed choices. To illustrate the potential applications of our theoretical framework, in Appendix C.1 we provide an extension of our model that gives the government an extra policy, consisting of disseminating unbiased information about financial penalties. The model shows that this policy can be optimal for the government when the agency cares about private welfare rather than just tax revenues. Intuitively, a revenue-maximizer agency could actually benefit from uninformed delinquents by being able to “surprise” them with financial penalties above their expectations. Instead, a tax agency that cares about private welfare would like delinquents to be fully informed and make optimal choices.

The financial and shaming penalties differ across states: the interest rates differ markedly, and the online lists of delinquents are implemented differently.⁴⁵ As a consequence, the effects of these

⁴⁴For example, during one of those interviews, the spokeswoman for the Illinois Department of Revenue declared that “The real success of the program is before the postings are made.”

⁴⁵For instance, the Kentucky website features a search tool to search individuals by name, lien balance and/or location (e.g., street, city, state, zip code, county), while the Wisconsin website does not feature a search tool, but it provides the opportunity to sort the list of delinquents alphabetically by name or by city. The Kansas website allows for a name search, and it also provides the full list that can be sorted by name, county and amount due,

penalties may very well vary by state. Figure 4 presents the results on state-level heterogeneity. Given that the distribution of the debt amounts is so different in Kentucky compared with the other two states, we needed to separate the heterogeneity by state from the heterogeneity by debt amount. We did this by splitting the Kentucky sample in two: initial amounts between \$250 and \$2,500, and initial amounts above \$2,500. This resulted in four groups containing about one quarter of the sample each. Figure 4.a presents the results for the shaming penalty. Even though in Kentucky debtors below \$2,500 reacted to the shaming penalty, debtors above \$2,500 did not react to the shaming penalty in any of the three states. The results suggest that, even within Kentucky, the effects of the shaming penalty decline significantly with the debt amount. The results also suggest that once we control for heterogeneity by debt amount, no significant differences remain in the effects of shaming penalties across states.

Figure 4.b explores state-level heterogeneity for the financial penalty. For all debtors in Kentucky, both below and above \$2,500, the financial penalty had a significant and similar effect. In other words, the effect of the financial penalty did not appear to change with the initial debt amount within Kentucky. The effect of the financial penalty was close to zero and statistically insignificant for Kansas and Wisconsin. This evidence suggests that the effect of the reminders about financial penalties differed between Kentucky and the other states. This finding is not really surprising, given that the interest rate in Kentucky is significantly above-market, and about twice the interest rates in the other two states. As a result, individuals in Kentucky may be more likely to underestimate the true financial penalty and/or more likely to react to a reminder if they were being inattentive.⁴⁶ However, it should also be noted that because of the precision of the point estimates, even though the differences in effects between Kentucky and each of the two other states are large, they are statistically insignificant at conventional levels.

To illustrate the timing of the effects, Figure 5 shows the week-by-week estimates of the effects of social incentives (for the first quartile) and financial incentives (for the full sample). Figure 5.a shows that individuals reacting to the shaming penalty get off the list as soon as possible: the vast majority of the reaction occurs during the second to fifth week after mail delivery. After week ten, the effects of the shaming penalty start to gradually decline. Intuitively, this means that some of the individuals who paid by week 10 because of the shaming penalty were individuals who were going to pay anyway during the following weeks. But 29 weeks after the letters were delivered, the probability of leaving the list was still 1.6 percent higher, which compared to the 2.1 effect at week 10, suggesting that nearly 75% of the individuals who reacted to the shaming penalty were originally not planning to pay during the subsequent 19 weeks.⁴⁷

among others.

⁴⁶There may be other characteristics that vary between Kentucky and the other two states that may explain the difference in effects. For instance, it is possible that Kentucky disseminated less information about the financial penalties. Also, delinquents in Kentucky may be more responsive to financial penalties because this state may be better at threatening delinquents with collection tools to force payments.

⁴⁷Due to the precision of the estimates, however, we can not reject that our effects are statistically different than

Figure 5.b shows that the effects of the financial penalty seem to build during the first four months, and then start to slowly decline.⁴⁸ Individuals reacting to the financial penalty react more slowly than those reacting to the shaming penalty. This may be because they owe higher amounts on average and thus may need more time to gather the resources to pay the full amount or the first installment. Just as in the case of the shaming penalty, the slow decline implies that a majority of individuals who paid because of the reminder about the financial penalty were individuals who, in absence of this reminder, would have not paid in the following months.

4.2 Wage Garnishment and the Effectiveness of Shaming and Financial Penalties

In this section we provide evidence related to the interactions between income garnishment and the effectiveness of shaming and financial penalties. According to our model, the effect of financial penalties should increase with the income garnishability of the debtor, but the effect of the shaming penalty should not depend on the income garnishability. If feasible, we would like to interact a measure of expected income garnishability at the individual level with the variables on financial and shaming penalties. Unfortunately, we did not observe this information directly. As a proxy, we constructed the variable *Importance of Wages*, which is the share of gross income from wages in the 5-digit ZIP code as reported by the Internal Revenue Service Statistics of Income database for 2012. A higher share indicates higher income garnishability, given that wages are one of the sources of income that are easiest to garnish (as opposed, for example, to business income). This variable was normalized to have a mean of zero and a standard deviation of one within each of the three states.⁴⁹

The results in the previous section suggest that the effect of shaming penalties are inversely proportional to debt amount owed by the delinquent. To incorporate this, for the rest of the section, we normalize the shaming penalty dummy by dividing it by the initial debt amount (in \$1,000s).⁵⁰ Thus, the coefficient on *Shaming Penalty* should be interpreted as the predicted effect for a delinquent with an initial debt of \$1,000.⁵¹ Results are shown in Table 4. Column (1) presents the baseline results. The financial penalty increases the probability of leaving the list four months after the treatment by 1.15 percentage points, whereas the shaming penalty increases this probability by 1.1 percentage points (again, for an individual with a \$1,000 initial debt). Both of

zero, or that they are statistically different from the effect from earlier weeks.

⁴⁸There is a jump around the tenth week, corresponding to one of the major updates to the databases made in Kentucky, that, as discussed above, is the state for which the financial penalties reminder had the highest effect.

⁴⁹The goal of normalizing within each state is that the variable does not pick up cross-state heterogeneity in the effectiveness of the penalty. In practice, the results are similar if applying the same normalization over the entire population instead of within each state.

⁵⁰The regression also includes the inverse of the initial debt amount as a control variable.

⁵¹The results are similar if, instead, we interact the shaming penalty dummy with a dummy for the first quartile of initial amount.

these effects are about 5 percent of the baseline mean.

Column (2) adds the variable *Importance of Wages* along with its interaction with the shaming and financial penalties. As in our model, the effect of financial penalties is stronger in places characterized by a higher fraction of wage income. The coefficients imply that a one standard deviation increase in *Importance of Wages* doubles the effectiveness of the financial penalty. Also as predicted by our model, the effectiveness of shaming penalties does not vary with the share of wage income. The corresponding point estimate is very close to zero and statistically insignificant.

Of course, it should be noted that the heterogeneity with respect to *Importance of Wages* could be due to heterogeneity with respect to unobservable place characteristics correlated with the importance of wages (e.g., income, tax sophistication, tax morale). We alleviate those concerns by assessing how sensitive the results are when we control for other place characteristics, including the interactions between these characteristics and the shaming and financial penalties. First, we control for income by using a measure of mean gross income in the ZIP code, obtained from the Internal Revenue Service Statistics of Income database for 2012. Second, we control for tax sophistication using a measure known as EITC bunching provided in Chetty, Friedman, and Saez (2013), which measures the awareness of opportunities for tax evasion. Last, given that political views may lead to different tax morale (see Cullen, Turner, and Washington, 2015), we control for the share of Republican votes in the 2012 U.S. presidential election.⁵² Columns (3) through (5) control for each one of these variables individually, while column (6) controls for all these variables simultaneously. The interactions of the shaming and financial penalties with the importance of wages are very robust under all of these specifications, both in terms of magnitude and statistical significance.

4.3 Estimating Potential Side Effects from the List of Delinquents

It is possible that publishing the list of tax delinquents affects the delinquent's perception of the behavior of other delinquents, which may affect the decision to remain delinquent. For instance, individuals have been documented to behave more pro-socially when they perceive that others are behaving prosocially too.⁵³ If such externalities exist in the case of tax compliance, it could change, for better or worse, the welfare implications from publishing the lists of tax delinquents. In this subsection, we present suggestive evidence about the possibility of side effects.

Results for this test are shown in Table 5. We follow the same econometric specification used for the previous subsection. Column (1) shows the baseline specification with the effects of financial and shaming penalties. Column (2) adds a new variable, the mean tax debt amount (in \$1,000s)

⁵²On the link between politics and tax enforcement see also Casaburi and Troiano (2014) and Besley, Jensen and Persson (2014).

⁵³The dependency between one's behavior and the perceived behavior of others has been documented in a variety of contexts such as charitable giving (Frey and Meier 2004), campaign contributions (Perez-Truglia and Cruces, 2013) and energy conservation (Alcott, 2011).

in the table included in the letter. As explained in section 3, this right hand side variable only includes the variation that was exogenously generated by the random selection of nine individuals out of the twenty closest delinquents from the recipient. The coefficient is virtually zero and statistically insignificant, indicating that the mean amount shown in the list has no effect on the subsequent probability of leaving the list. This result suggests that individuals do not care about the delinquent behavior of others.

One potential concern is that the mean amount of tax debts may have effects through multiple channels, which may cancel each other out. On the one hand, if a tax debtor believes that others have even higher debts, she could potentially feel less guilty about her own tax debt and thus be less likely to pay. On the other hand, the same information could also lead an individual to perceive that tax debtors as a group have a worse reputation, making it more costly to be associated with other debtors by appearing on the list and thus making the debtor more likely to pay. Only the first channel could be considered a side effect, because the second channel would be part of the shaming penalty itself. To disentangle the effects from these two channels, we can exploit the exogenous variation in visibility used to measure the effects of the shaming penalty. Column (3) adds the mean amount in the list along with its interaction with the shaming penalty (i.e., with the higher-visibility dummy) and (for the sake of completeness) with the financial penalty. The coefficient on the mean amount corresponds to the effect of this variable in the lower-visibility treatment, which is closest to the notion of a side effect. The coefficient on the interaction between the mean amount and the shaming penalty, instead, measures the second channel.

The coefficient on mean amount has the expected negative sign. However, the magnitude of the effect is very small and statistically insignificant. Increasing the mean amount in the list by \$10,000,⁵⁴ would only decrease the probability of leaving the list by 0.02 percentage points.⁵⁵ This finding may suggest that social norm considerations do not play a significant role in state tax compliance, and there is consequently no reason to worry about the side effects from publishing lists of tax delinquents. As an additional robustness check, columns (4) and (5) replicate the results from (2) and (3) except they use the median amount shown in the table instead of the mean amount. The results are similar under this alternative specification.⁵⁶ This evidence is broadly consistent with related field experiments showing that messages of moral appeal are ineffective at reducing tax evasion (Blumenthal et al. (2004); Fellner et al. (2013)).⁵⁷

⁵⁴This is a significant increase compared to the median delinquent amount among the subjects of \$5,500.

⁵⁵Column (3) also reports the coefficient on the interaction between the shaming penalty and the mean amount in the list. This coefficient has the expected positive sign: increasing the mean delinquent amount by \$10,000 increases the effect of the shaming penalty by 0.39 percentage points, or roughly 35% of the mean effect of the shaming penalty. This might suggest that individuals may be even more averse to being recognized as a tax delinquent when tax delinquents have a worse reputation as a group. However, this coefficient is not statistically significant. Column (3) also reports the interaction between the mean amount in the list and the financial penalty. As expected, the coefficient is close to zero and statistically insignificant, indicating that the perception about the delinquent behavior of others does not affect the effectiveness of the financial penalty.

⁵⁶In other words, individuals may be less sensitive to very large amounts owed by a minority of delinquents.

⁵⁷Nevertheless, it should be noted that even though some of our subjects are regular individuals facing financial

5 Conclusion

Increasing the efficiency of tax compliance is a key issue for fostering economic development. In this paper we explored an important topic that has been arguably understudied compared with other aspects of tax compliance: tax debt collection. In the first part of the paper, we provided a simple and tractable framework for analyzing tax debt enforcement when the government can use both financial and shaming penalties. We showed that, under plausible conditions, the optimal policy involves the use of shaming penalties. In the second part of the paper, we provided evidence from a field experiment suggesting that financial and shaming penalties do indeed increase the speed of payment. Additionally, our evidence suggests that financial and shaming penalties can target different types of taxpayers. This evidence suggests that combining financial and shaming penalties can be welfare-enhancing. In sum, our research provides support for the use of shaming penalties by tax agencies in the United States and the rest of the world.

Our results raise several questions for future research. First, our framework could be used to examine, from a theoretical and empirical perspective, the optimality of disclosure policies for other aspects of tax compliance, such as tax evasion and tax avoidance. Consistent with this observation, some tax agencies outside the United States have started to publish lists of tax evaders, although this policy is much less widespread compared with the one disclosing tax delinquents.⁵⁸ Second, we focused on a specific form of nonfinancial penalty that involved online publication of lists of debtors: this form of shaming penalty is arguably the most common in the United States and around the world. In practice, tax agencies use other nonfinancial penalties, such as direct pressure through home visits and revocation of driving licenses and passports (Blank, 2014). Our theoretical and empirical framework could be extended to shed light on the effectiveness and optimality of these other nonfinancial policies.

hardship, some of the delinquents may have lower tax morale. As a result, our evidence cannot reliably rule out the possibility that, among individuals who paid their taxes on time, social comparisons may play a more significant role.

⁵⁸For example, the U.K. publishes a list of top tax evaders ([link](#)). And even though it was not part of a regular policy, Chetty, Mobarak and Singhal (2014) present results from a policy intervention consistent with a relationship between tax avoidance and social recognition when studying firms in Bangladesh.

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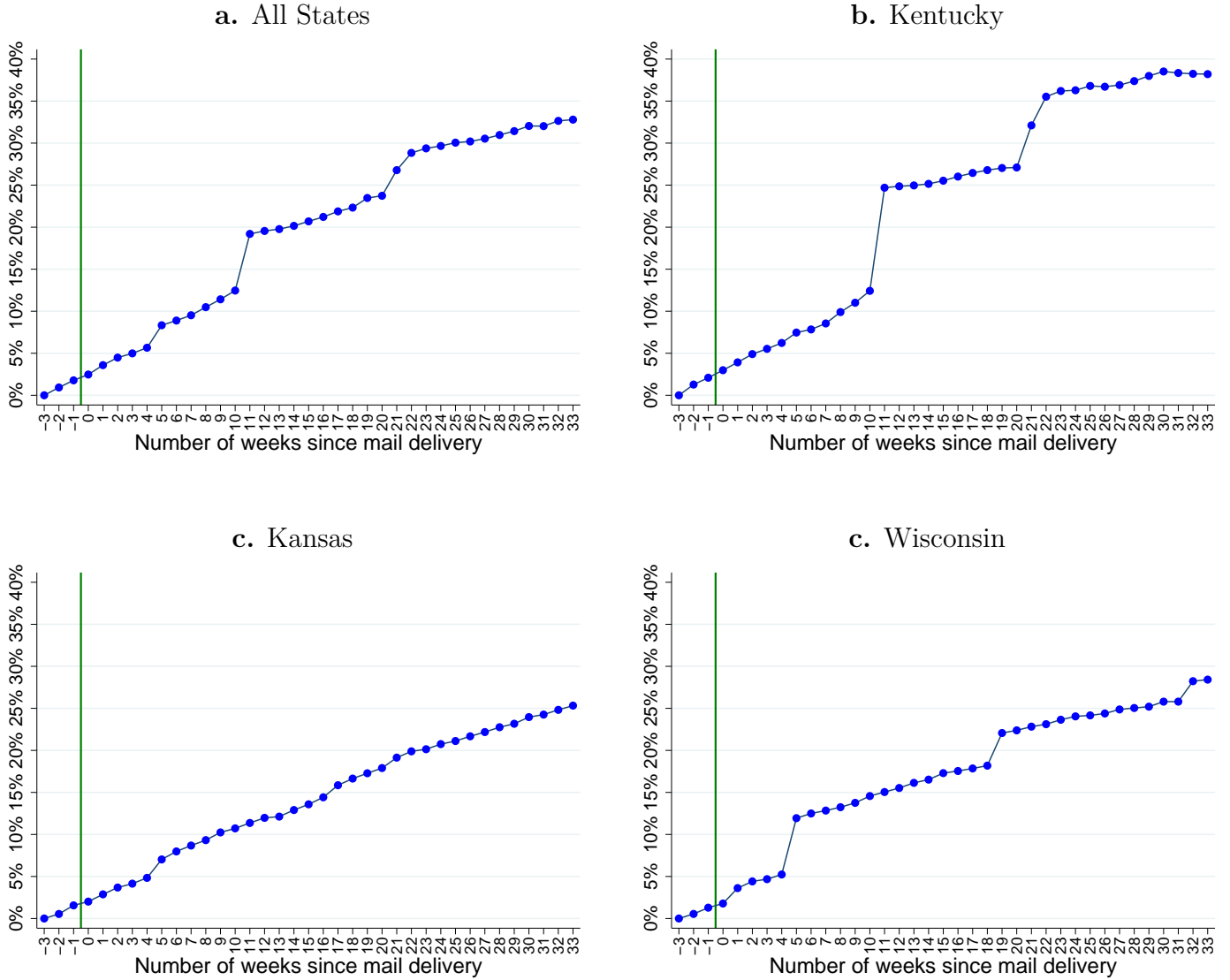
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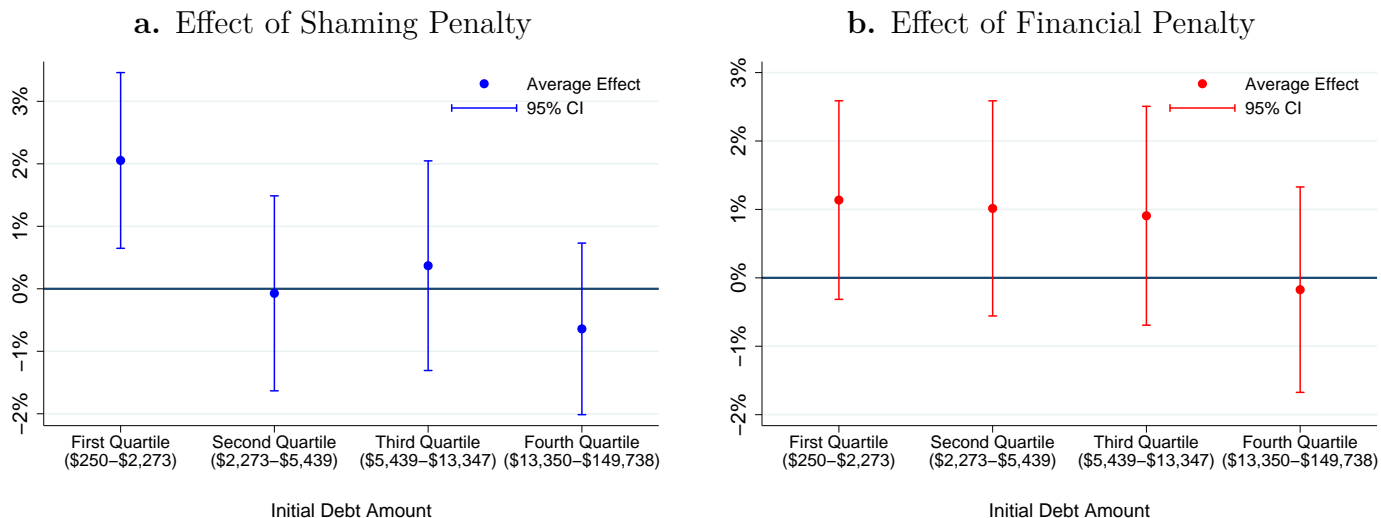
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Figure 1: The Evolution of the Probability of Leaving the List



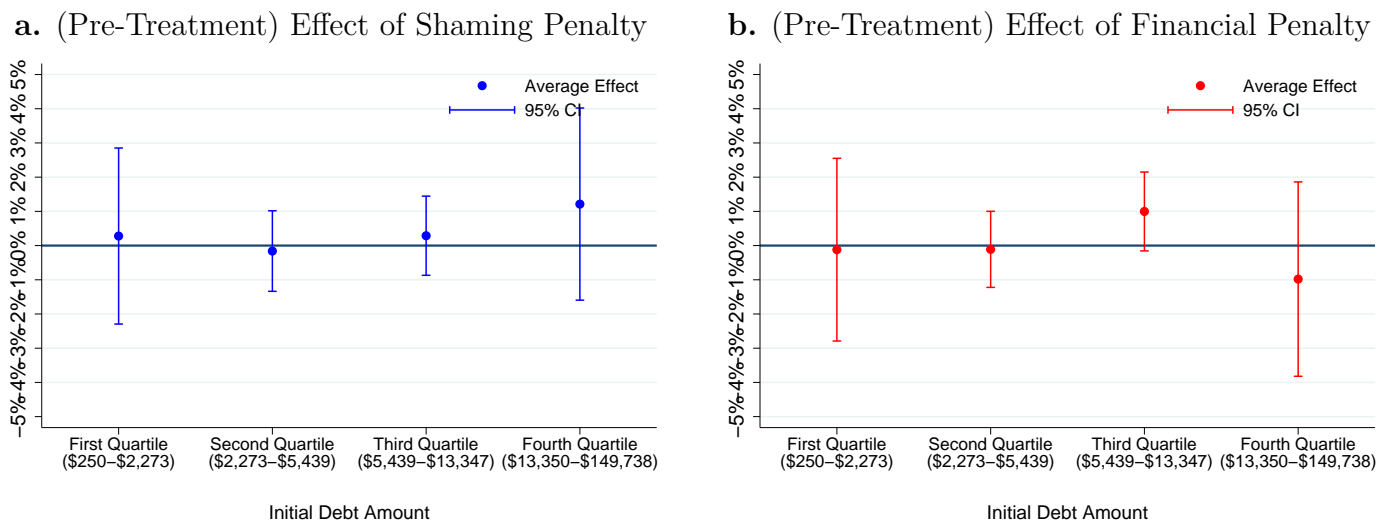
Notes: $N=34,334$ (18,101 from Kentucky, 8,710 from Kansas and 7,523 from Wisconsin). In the x-axis, week -3 corresponds to the date when the subject pool was formed (May 26, 2014). The green vertical line shows the approximate date when the letters were delivered. The y-axis corresponds to the share of the subjects who were no longer listed online.

Figure 2: Effects of Shaming and Financial Penalties 10 Weeks after Mail Delivery, by Quartile of Debt Amount



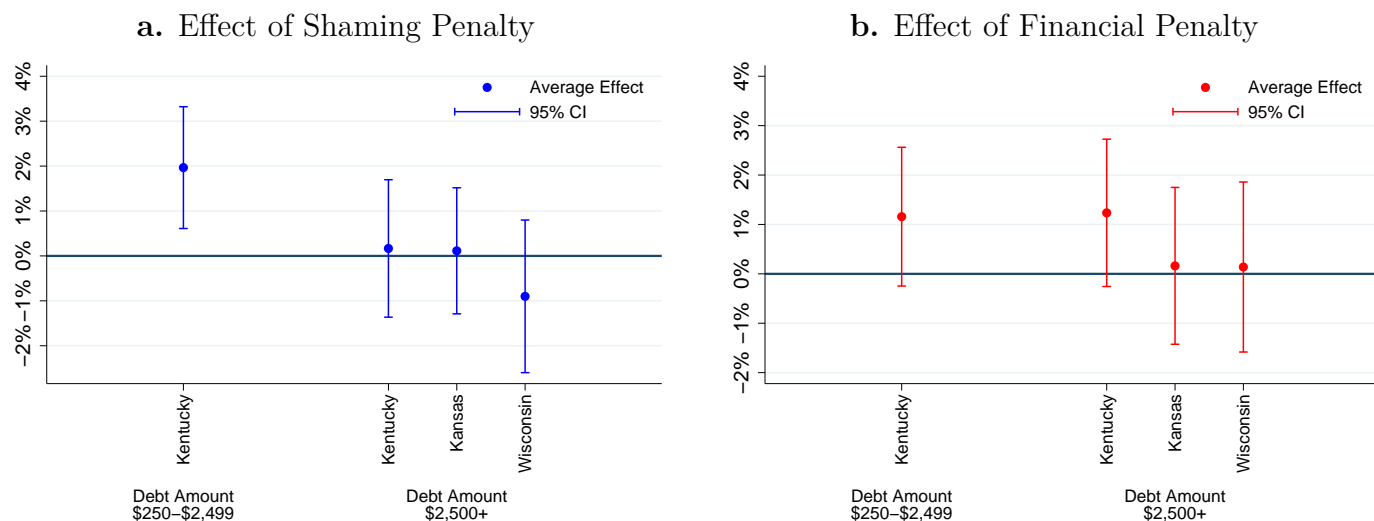
Notes: N=34,334. The debt amount in the x-axis corresponds to the amount owed when the subject pool was formed (May 26, 2014). The effects were estimated from OLS regressions (one for each quartile of initial amount) where the dependent variable is a dummy for whether the subject is listed as a delinquent 10 weeks after the letters were delivered, and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state dummies). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. Confidence intervals computed with heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level.

Figure 3: Falsification Test: Placebo Effects of Shaming and Financial Penalties on the Pre-Treatment (Log) Debt Amount



Notes: $N=34,334$. The debt amount in the x-axis corresponds to the amount owed when the subject pool was formed (May 26, 2014). The effects were estimated from OLS regressions (one for each quartile of initial amount) where the dependent variable is the logarithm of the initial debt amount, and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state dummies). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. Confidence intervals computed with heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level.

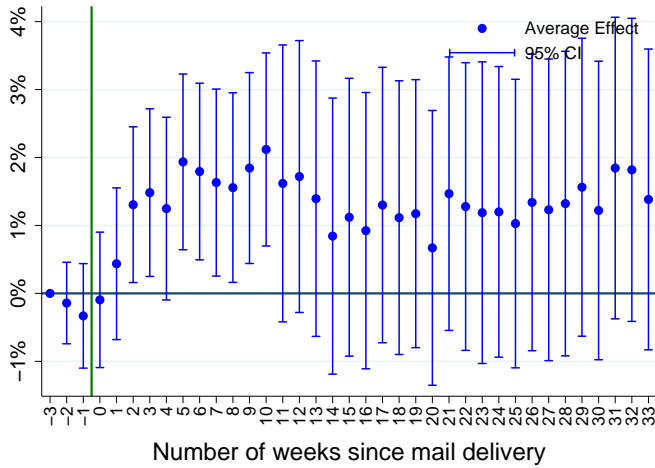
Figure 4: Effects of Shaming and Financial Penalties 10 Weeks after Mail Delivery, by State and Debt Amount



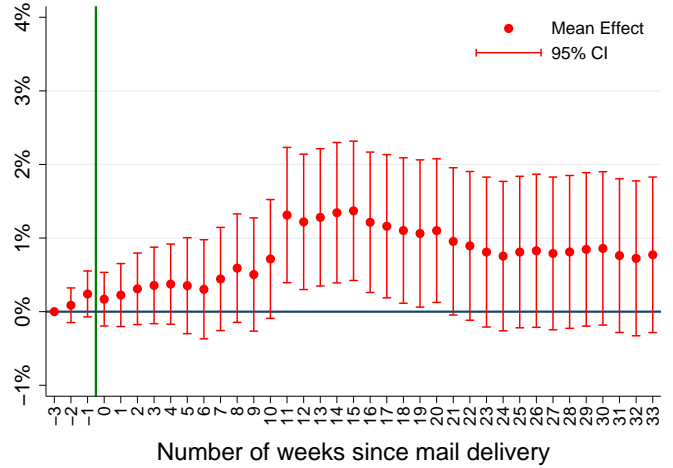
Notes: N=34,334 (9,029 from Kentucky \$250-\$2,499, 9,072 from Kentucky \$2,500+, 8,710 from Kansas and 7,523 from Wisconsin). The debt amount in the x-axis corresponds to the amount owed when the subject pool was formed (May 26, 2014). The effects were estimated from OLS regressions (one for each group in the x-axis) where the dependent variable is a dummy for whether the subject is listed as a delinquent 10 weeks after the letters were delivered, and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state dummies). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. Confidence intervals computed with heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level.

Figure 5: Week-by-week Evolution of Effects of Shaming and Financial Penalties

a. Effect of shaming penalty (Lowest Quartile)



b. Effect of Financial Penalty (All Sample)



Notes: $N = 8,584$ (a.) and $34,334$ (b.). In the x-axis, Week -3 corresponds to the date when the subject pool was formed (May 26, 2014). The green vertical line shows the approximate date when the letters were delivered. The effects were estimated from OLS regressions (one for each graph) where the dependent variable is a dummy for whether the subject is listed as a delinquent 10 weeks after the letters were delivered, and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state dummies). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. Confidence intervals computed with heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level.

Table 1: States with Online Lists of Tax Delinquents (as of December 31, 2014)

State	Start Year	Current Threshold	Type	Website
California	2007	Top-500	I, B	Link
Colorado	2003	\$20,000	I, B	Link
Connecticut	1995	Top-50	I, B	Link
Delaware	2007	Top-100	I, B	Link
Florida	2014	\$100,000	I, B	Link
Georgia	2004	\$0	I, B	Link
Indiana	2010	\$0	B	Link
Kansas	2004	\$2,500	I, B	Link
Kentucky	2007	\$250	I, B	Link
Maryland	2000	Top-25	I, B	Link
Massachusetts	2004	\$25,000	I, B	Link
Montana	2010	\$10,000	I, B	Link
Nebraska	2010	\$20,000	I, B	Link
New Jersey	2010	Unknown	I, B	Link
New York	2010	Top-250	I, B	Link
North Carolina	2001	Unknown	I, B	Link
Oklahoma	2009	\$25,000	I, B	Link
Pennsylvania	2010	Unknown	I, B	Link
Rhode Island	2003	Top-100	I, B	Link
South Dakota	2012	Top-200	B	Link
Vermont	2014	Top-100	I, B	Link
Washington	1997	\$10,000	I, B	Link
Wisconsin	2006	\$5,000	I, B	Link

Notes: Tax type indicates whether the lists includes Individuals (I) and/or Businesses (B). While some states maintain separate lists for Individuals and Businesses, some states have these combined in the same list. States that maintain lists for very specific taxes are not included in this table: e.g., Alabama for property tax and Minnesota for liquor tax. This table does not include other states which had lists of delinquents in the past but discontinued the policy (e.g., Hawaii, Illinois, Louisiana, South Carolina, Virginia).

Table 2: Descriptive Statistics and Randomization Balance Test

	Shaming Penalty		Financial Penalty		Amount Listed			Difference
	(1) No	(2) Yes	(3) No	(4) Yes	(5) Low	(6) Medium	(7) High	(8) P-value
Initial Debt Amount (\$1,000s)	12.86 (0.16)	12.90 (0.16)	12.84 (0.16)	12.87 (0.15)	12.74 (0.19)	13.15 (0.20)	12.82 (0.19)	0.43
Log(Initial Debt Amount)	8.58 (0.01)	8.58 (0.01)	8.56 (0.01)	8.58 (0.01)	8.57 (0.01)	8.60 (0.01)	8.60 (0.01)	0.28
Percent Male	64.32 (0.37)	64.56 (0.36)	68.22 (0.37)	67.60 (0.35)	60.64 (0.46)	61.11 (0.46)	61.21 (0.45)	0.40
Percent White	70.87 (0.22)	70.85 (0.22)	70.48 (0.23)	71.01 (0.21)	70.70 (0.27)	71.13 (0.26)	71.03 (0.26)	0.23
Percent Black	13.94 (0.11)	13.73 (0.11)	13.98 (0.12)	13.38 (0.11)	14.01 (0.14)	14.10 (0.14)	13.90 (0.14)	0.01
Percent Hispanic	5.86 (0.15)	5.83 (0.15)	6.44 (0.16)	6.13 (0.14)	5.18 (0.17)	5.44 (0.17)	5.61 (0.17)	0.48
Percent Other	3.33 (0.05)	3.37 (0.06)	3.23 (0.05)	3.30 (0.05)	3.40 (0.07)	3.47 (0.07)	3.46 (0.07)	0.98
Observations	17,155	17,179	16,042	18,292	11,422	11,418	11,494	

Notes: N=34,334. Pre-treatment mean individual characteristics by treatment group (standard errors in parenthesis). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. *Amount List* corresponds to the value of the weighting parameter used to select the delinquents to be listed in the table shown to the recipient, which was randomly-chosen from three possible values: low, medium and high. The p-value corresponds to the test of the null hypothesis that the average characteristics are the same in both pairs of treatment groups. The initial debt amount corresponds to the amount owed when the subject pool was formed (May 26, 2014). Gender and ethnicity are not observed directly. Data for these characteristics is imputed using data on the joint distribution of first names and gender (several sources, including data from the U.S. Census Bureau), and the joint distribution of last names and ethnicities (data from U.S. Census Bureau). The omitted category for gender is male, and the omitted category for ethnicity corresponds to unmatched last names.

Table 3: Effects of Shaming and Financial Penalties

	Probability of Leaving the List			Log(Amount)
	(1)	(2)	(3)	(4)
	Week 5	Week 10	Week 15	Week -3
Effect of Shaming Penalty:				
First Quartile (\$250-\$2,273)	1.914*** (0.661)	2.080*** (0.725)	1.075 (1.043)	0.004 (0.013)
Second Quartile (\$2,273-\$5,439)	-0.285 (0.630)	0.026 (0.796)	-0.445 (0.924)	-0.001 (0.006)
Third Quartile (\$5,439-\$13,347)	0.402 (0.694)	0.282 (0.858)	-0.000 (0.976)	0.003 (0.006)
Fourth Quartile (\$13,350-\$149,738)	-0.419 (0.637)	-0.669 (0.706)	-0.645 (0.791)	0.012 (0.014)
<i>All Quartiles</i>	0.402 (0.331)	0.429 (0.380)	-0.004 (0.475)	0.004 (0.005)
Effect of Financial Penalty:				
First Quartile (\$250-\$2,273)	0.940 (0.652)	1.065 (0.741)	1.950* (1.003)	-0.002 (0.014)
Second Quartile (\$2,273-\$5,439)	0.573 (0.619)	1.019 (0.803)	2.205** (0.883)	-0.001 (0.006)
Third Quartile (\$5,439-\$13,347)	-0.014 (0.666)	0.856 (0.820)	0.638 (0.906)	0.010* (0.006)
Fourth Quartile (\$13,350-\$149,738)	-0.124 (0.636)	-0.127 (0.765)	0.626 (0.830)	-0.009 (0.015)
<i>All Quartiles</i>	0.340 (0.333)	0.700* (0.411)	1.353*** (0.482)	-0.001 (0.005)
Mean Outcomes:				
First Quartile (\$250-\$2,273)	8.551*** (0.420)	11.067*** (0.514)	25.652*** (0.953)	6.783*** (0.007)
Second Quartile (\$2,273-\$5,439)	7.398*** (0.386)	12.933*** (0.575)	20.529*** (0.706)	8.181*** (0.003)
Third Quartile (\$5,439-\$13,347)	9.366*** (0.475)	14.504*** (0.589)	20.527*** (0.625)	9.010*** (0.003)
Fourth Quartile (\$13,350-\$149,738)	8.016*** (0.370)	11.348*** (0.470)	16.067*** (0.505)	10.344*** (0.008)
<i>All Quartiles</i>	8.333*** (0.281)	12.463*** (0.411)	20.694*** (0.497)	8.580*** (0.034)

Notes: N=34,334. * significant at the 10% level, ** at the 5% level, *** at the 1% level. Heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level. The coefficients were estimated from OLS regressions (one per column) where the right hand side variables are the treatment dummies, interacted with the quartile amount dummies, plus a set of control variables (e.g., quartile dummies, gender, state). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter, and 1 if others in the area were chosen to receive a letter too. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not.

Table 4: Evidence about the Interaction between Income Garnishability and Shaming and Financial Penalties

	Probability of Leaving the List, 16 weeks After Treatment					
	(1)	(2)	(3)	(4)	(5)	(6)
Shaming Penalty	1.095** (0.527)	1.127** (0.530)	1.150** (0.527)	1.150** (0.532)	1.115** (0.528)	1.154** (0.527)
Financial Penalty	1.146** (0.486)	1.111** (0.474)	1.130** (0.475)	1.052** (0.474)	1.091** (0.475)	1.069** (0.475)
Importance of Wages		-1.575*** (0.480)	-1.080* (0.607)	-1.028** (0.490)	-1.482*** (0.474)	-0.683 (0.610)
Interaction with Shaming Penalty		0.035 (0.539)	0.193 (0.657)	-0.146 (0.526)	0.004 (0.533)	0.042 (0.635)
Interaction with Financial Penalty		1.205*** (0.456)	1.055* (0.567)	1.207** (0.469)	1.188*** (0.458)	1.061* (0.570)
Extra Controls (with interactions)	None	None	Mean Income	EITC Bunching	Share Republican	All

Notes: N=34,334. * significant at the 10% level, ** at the 5% level, *** at the 1% level. Heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level. The coefficients were estimated from OLS regressions (one per column) where the dependent variable is a dummy for whether the subject is listed as a *delinquent* 16 weeks after the letters were delivered and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state, inverse of the initial debt amount). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter and 1 if others in the area were chosen to receive a letter too, and then it is divided by the initial debt amount. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. *Importance of Wages* is the share of gross income from wages in the 5-digit ZIP code, as reported by the Internal Revenue Service Statistics of Income (IRS-SOI) database for 2012. This variable was normalized to have mean zero and standard deviation 1 within each of the three states. The extra controls correspond to other ZIP code level variables, including the interaction with the two treatment variables. Mean Income corresponds to the average gross income in 2012 at the 5-digit ZIP code, also from IRS-SOI. EITC Bunching corresponds to the share of self-employed individuals in the 3-digit ZIP code estimated to be mis-reporting income to take advantage of EITC benefits (data source: Chetty et al., (2013)). Share republican is the county-level share of votes for the Republican candidate in the 2012 U.S. Presidential Election. The last columns includes these three control variables (plus the interactions). All these control variables were normalized to have mean zero and standard deviation 1 within each of the three states.

Table 5: Evidence about the Effect of Perceptions about the Delinquent Behavior of Others

	Probability of Leaving the List, 16 weeks After Treatment				
	(1)	(2)	(3)	(4)	(5)
Shaming Penalty	1.095** (0.527)	1.095** (0.527)	1.100** (0.529)	1.095** (0.527)	0.945* (0.538)
Financial Penalty	1.146** (0.486)	1.146** (0.486)	1.151** (0.486)	1.146** (0.486)	1.273*** (0.492)
Mean Amount in List		-0.000 (0.007)	-0.002 (0.011)		
Interaction with Shaming Penalty			0.039 (0.036)		
Interaction with Financial Penalty			-0.004 (0.014)		
Median Amount in List				0.004 (0.020)	0.030 (0.033)
Interaction with Shaming Penalty					0.115 (0.079)
Interaction with Financial Penalty					-0.064 (0.040)

Notes: N=34,334. * significant at the 10% level, ** at the 5% level, *** at the 1% level. Heteroskedastic-robust standard errors clustered at the 5-digit ZIP code level. The coefficients were estimated from OLS regressions (one per column) where the dependent variable is a dummy for whether the subject is listed as a delinquent 16 weeks after the letters were received and the right hand side variables are the treatment dummies plus a set of control variables (e.g., gender, state, inverse of the initial debt amount). *Shaming Penalty* is a dummy that takes the value 0 if the recipient was the only one in the area chosen to receive a letter and 1 if others in the area were chosen to receive a letter too, and then it is divided by the initial debt amount. *Financial Penalty* is a dummy that takes the value 1 if the letter included information about the financial penalties and 0 if not. *Mean Amount in List* is the mean debt amount among the nine individuals listed in the table from the letter sent to the recipient (not including the recipient). This variable is the difference between the actual mean amount shown in the list and the counter-factual mean amount that would have resulted from using the baseline parameters to choose the nine individuals included in the letter. *Median Amount in List* was constructed in the same way, except that using the median instead of the mean.

A Proofs of Propositions

A.1 Proof of Proposition 1

Let's start with the case $\alpha = \frac{1}{2}$. The objective function of the government becomes can be written as a function of the threshold \hat{R} :

$$\frac{1}{2} \frac{(\hat{R} - \underline{R})}{\bar{R} - \underline{R}} \cdot \left(R_g - \frac{\underline{R} + \hat{R}}{2} \right)$$

Given $\{F, p\}$ if we find a $\{F', p'\}$ such as the same threshold arises in equilibrium, then the value of the objective function of the government will be the same. When $\{F, p > 0\}$, we can use the alternative policy $\left\{ F' = F + \frac{p\eta}{q} \frac{\bar{R} - \underline{R}}{2}, p' = 0 \right\}$. And when $\{F, p = 0\}$, we can use the alternative policy $\left\{ F' = F - \frac{p'}{q} \cdot \eta \cdot \frac{\bar{R} - \underline{R}}{2}, p' \right\}$. Thus, the set of policies with and without shaming penalties are interchangeable.

When $\alpha > \frac{1}{2}$, the government's objective function is:

$$\frac{\hat{R} - \underline{R}}{\bar{R} - \underline{R}} \cdot \left(\alpha R_g - (1 - \alpha) \frac{\underline{R} + \hat{R}}{2} \right) + \frac{\bar{R} - \hat{R}}{\bar{R} - \underline{R}} \cdot q \cdot F \cdot (2\alpha - 1)$$

Given $\{F, p > 0\}$, consider the alternative policy $\left\{ F' = F + \frac{p\eta}{q} \frac{\bar{R} - \underline{R}}{2}, p' = 0 \right\}$ that attains the same \hat{R} but reduces p to zero. The first term of the objective function will be the same. The second term, provided $\hat{R} < \bar{R}$, will be even higher because the F increases. Thus, the utility of the government under $\{F', p' = 0\}$ is higher than under $\{F, p > 0\}$. The other possible case is if $\{F, p > 0\}$ was such as we are in the corner solution $\hat{R} = \bar{R}$. In that case, the second term would always be zero and thus the utility of the government would be the same under $\{F, p > 0\}$ and $\{F', p' = 0\}$. However, given Assumption 1, it follows that since the candidate $\{F', p' = 0\}$ is a corner solution it cannot be optimal, and thus there must be at least another $\{F'', p'' = 0\}$ that attains strictly more utility than $\{F', p' = 0\}$. By transitivity, this $\{F'', p'' = 0\}$ must attain strictly more utility than the original $\{F, p > 0\}$. That is, we proved that even when $\{F, p > 0\}$ is a corner solution there is an alternative $\{F'', p'' = 0\}$ that attains strictly higher utility. This completes the proof that the set of policies with $p = 0$ dominates the set of policies with $p > 0$.

A.2 Proof of Proposition 2

The proof is organized as follows. First, we prove that using the shaming penalty makes the government strictly better off if $\alpha = \frac{1}{2}$. Second, we prove that using the shaming penalty makes the government strictly worse off if $\alpha = 1$. Third, we will prove that these two results imply that there must be is a unique $\alpha^* \in \left(\frac{1}{2}, 1\right)$ such as the set of policies with $p > 0$ dominates $p = 0$

if $\alpha < \alpha^*$, the two are interchangeable if $\alpha = \alpha^*$, and the set of policies with $p = 0$ dominates $p > 0$ if $\alpha > \alpha^*$.

First, consider the case $\alpha = \frac{1}{2}$. The government's objective function can be written as:

$$\frac{1}{2} \frac{1}{\bar{R} - \underline{R}} \cdot \left(-\frac{1}{2} \left(\theta \hat{R}_{\bar{q}}^2 + (1 - \theta) \hat{R}_{\underline{q}}^2 \right) + R_g \left(\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}} \right) + \frac{R^2}{2} - \underline{R} \cdot R_g \right)$$

Given a policy $\{F, p = 0\}$, consider the alternative policy $\left\{ F' = F - \frac{\epsilon}{\theta \bar{q} + (1 - \theta) \underline{q}} \cdot \eta \cdot \frac{\bar{R} - \underline{R}}{2}, p' = \epsilon \right\}$ with ϵ positive but arbitrarily close to zero. If $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ were originally not a corner solution, this transformation leaves $\left(\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}} \right)$ unchanged while reducing the gap between $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ (and, additionally, reduces F). As a result, the only term of the objective function that changes is $-\frac{1}{2} \left(\theta \hat{R}_{\bar{q}}^2 + (1 - \theta) \hat{R}_{\underline{q}}^2 \right)$. Given that the gap between $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ is reduced, by Jensen's inequality we know that the average $\theta \hat{R}_{\bar{q}}^2 + (1 - \theta) \hat{R}_{\underline{q}}^2$ must decrease, so that the entire term $-\frac{1}{2} \left(\theta \hat{R}_{\bar{q}}^2 + (1 - \theta) \hat{R}_{\underline{q}}^2 \right)$ increases. That is, the new policy makes the government strictly better off. If, on the other hand, $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ were originally not a corner solution, due to Assumption 1 that implies that there must be another policy $\{F'', p'' = 0\}$ that is not a corner solution and it is strictly better than $\{F, p = 0\}$. Using the above method, it follows that we can find a $\{F', p' = 0\}$ that is strictly better than $\{F, p = 0\}$, completing the proof that the government is better off by using the shaming penalty than by not using it.

Second, consider the case $\alpha = 1$. The government's objective function can be written as:

$$\frac{1}{\bar{R} - \underline{R}} \left[\left(\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}} \right) R_g - R_g \cdot \underline{R} + \left(\bar{R} - \left(\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}} \right) \right) \cdot \left(\theta \bar{q} + (1 - \theta) \underline{q} \right) \cdot F \right]$$

We can show that the optimal cannot involve $p > 0$. Take any candidate $\{F, p > 0\}$. Consider the alternative $\left\{ F' = F + \frac{p \cdot \eta}{\theta \bar{q} + (1 - \theta) \underline{q}} \cdot \frac{\bar{R} - \underline{R}}{2}, p' = 0 \right\}$. There are number of possible cases. The first case is that $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ were originally not a corner solution and still are not a corner solution under the alternative policy. In this case, the transformation leaves $\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}}$ unchanged while increasing F (and, additionally, increases the gap between $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$). Note that, since we are not in a corner solution: $\bar{R} - \left(\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}} \right) > 0$. Thus, since $F' > F$ then the last term of the objective function is higher under $\{F', p' = 0\}$, meaning that the government is better off by not using the shaming penalty. A second case is that $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ were both a corner solution. In that case, the alternative $\left\{ F' = F + \frac{p \cdot \eta}{\theta \bar{q} + (1 - \theta) \underline{q}} \cdot \frac{\bar{R} - \underline{R}}{2}, p' = 0 \right\}$ must involve $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ both as corner solutions as well. This transformation still leaves $\theta \hat{R}_{\bar{q}} + (1 - \theta) \hat{R}_{\underline{q}}$ unchanged while increasing F , so that it is still true that the government is better off by not using the shaming penalty. Using the same logic, it is straightforward to prove

that the government is better off by not using the shaming penalty in the remaining cases.⁵⁹

Third, we will prove that these two results imply that there must be a unique $\alpha^* \in (\frac{1}{2}, 1)$ such as the set of policies with $p > 0$ dominates $p = 0$ if $\alpha < \alpha^*$, the two are interchangeable if $\alpha = \alpha^*$, and the set of policies with $p = 0$ dominates $p > 0$ if $\alpha > \alpha^*$. The trick for this step is that the objective function of any intermediate case, $\alpha \in (\frac{1}{2}, 1)$, can be written as a weighted average between the objective functions evaluated at $\alpha = \frac{1}{2}$ and $\alpha = 1$. Let β ($1 - \beta$) be weight on the objective function with $\alpha = 1$ ($\alpha = \frac{1}{2}$), with $\beta \in [0, 1]$ and with $\beta = 0$ and $\beta = 1$ corresponding to the extreme cases $\alpha = \frac{1}{2}$ and $\alpha = 1$. Given a policy $\{F, p > 0\}$, the alternative policy $\left\{F' = F + \frac{p\eta}{\theta\bar{q} + (1-\theta)\underline{q}} \cdot \frac{\bar{R} - \underline{R}}{2}, p' = 0\right\}$ leaves $(\theta\hat{R}_{\bar{q}} + (1 - \theta)\hat{R}_{\underline{q}})$ unchanged while increasing F and the gap between $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$. In the previous step we showed that this policy increases the objective function when $\alpha = 1$ but decreases the objective function when $\alpha = \frac{1}{2}$. By the mean value theorem, there must be a critical and unique $\alpha^* \in (\frac{1}{2}, 1)$ such as the objective function increases under the alternative policy (i.e., the shaming penalty makes the government worse off) if $\alpha > \alpha^*$ and leaves it the same if $\alpha = \alpha^*$. Finally, we can use the same method to show that the shaming penalty makes the government better off if $\alpha < \alpha^*$.

⁵⁹For instance, when the original $\hat{R}_{\bar{q}}$ and $\hat{R}_{\underline{q}}$ were not corner solutions but at least one would be a corner solution under the proposed alternative, what we can do is to propose a different alternative with $p = 0$ but where F increases such as $\theta\hat{R}_{\bar{q}} + (1 - \theta)\hat{R}_{\underline{q}}$ remains the same even though now $\hat{R}_{\bar{q}}$ and/or $\hat{R}_{\underline{q}}$ is a corner solution.

B Sample of the Envelope and the Letter

Sample Envelope



Ann Arbor, May 26th 2014

Dear [REDACTED]

This letter is part of a research study about tax delinquency conducted by researchers at University of Michigan. We would like to share with you a sample of the public records from the Kentucky Department of Revenue. **The following is a sample of tax delinquents living close to your household as of today:**

First and Last name	Debt Amount
[REDACTED]	\$68,509
[REDACTED]	\$12,051
[REDACTED]	\$2,648
[REDACTED]	\$2,638
[REDACTED]	\$2,024
[REDACTED]	\$1,944
[REDACTED]	\$1,505
[REDACTED]	\$1,158
[REDACTED]	\$873
[REDACTED]	\$269

YOUR HOUSEHOLD AND OTHER HOUSEHOLDS IN YOUR AREA WERE RANDOMLY CHOSEN TO RECEIVE A LETTER OF THIS TYPE

Names, addresses and other details about tax delinquents are freely available to see for anyone with access to the Internet. You can search for individual debtors by first and last name, or by zipcode, by visiting the following web-page from the website of the Kentucky Department of Revenue:

<http://ilp.ky.gov/ILPInterNet.aspx?dt=I>

You can find a screenshot of this search tool on the reverse of the page.

For illustration purposes, the following is a screenshot of the search tool:



This website also includes information about penalties. For instance, your tax debt is subject to, among other penalties, an annual interest rate of 4% and a monthly late payment fee of 2%.

We kindly ask you to visit our website and fill out an anonymous questionnaire:

<http://www.umich.edu/~taxproj/survey.html>

Additionally, on our website you will also be able to find more information about this project, including our contact information.

Ugo Troiano and Ricardo Perez-Truglia

Contact email: taxproject@umich.edu

Program website: <http://www.umich.edu/~taxproj/tax.html>

C Extensions to the Model

C.1 Informing Delinquents about Financial Penalties

There is a rapidly growing body of evidence about a systematic under-estimation of financial penalties in a variety of settings, such as consumer loan market (Stango and Zinman (2011)) and credit card debt (Ausubel (1991); Frank (2011)). Indeed, our experimental design exploits this tendency to identify the effects from financial penalties, by introducing an intervention that increases the salience of financial penalties and (possibly) corrects systematic biases. In this extension of our model we study whether a general policy consisting of correcting misperceptions about the interest rate would be desirable from the perspective of the tax agency.

C.1.1 The Debtor's Problem

We focus on the case of homogeneous garnishability: $q_i = q \forall i$. In reality, some individuals may under-estimate the financial penalties while some others may over-estimate it, but the evidence suggests that, on average, individuals under-estimate. For the sake of simplicity, we assume that a fraction s of individuals incorrectly perceive that the financial penalty are lower than it actually is, $F = \underline{F} < F$, while the remaining $(1 - s)$ correctly perceive the financial penalty F . Let membership in s be independent of R_i . The optimal response to the perceived penalty is characterized by one threshold for individuals who correctly perceive the financial penalty and a different threshold for individuals who incorrectly perceive the financial penalty. Peers are correctly informed about the fraction s , and both groups of debtors correctly perceive peers expectations about R_i for those who do and do not repay their debts.

Debtors who correctly perceive the financial penalty maximize:

$$U(x_i; R_i) = -R_i \cdot x_i - (1 - x_i) \cdot [q \cdot F + p \cdot \eta \cdot (E[R_i | x_i = 0] - E[R_i | x_i = 1])] \\ + \eta \cdot (1 - p) \cdot \frac{R + \bar{R}}{2}$$

Debtors who misperceive the financial penalty maximize:

$$U(x_i; R_i) = -R_i \cdot x_i - (1 - x_i) \cdot [q \cdot \underline{F} + p \cdot \eta \cdot (E[R_i | x_i = 0] - E[R_i | x_i = 1])] \\ + \eta \cdot (1 - p) \cdot \frac{R + \bar{R}}{2}$$

Define the cutoff \tilde{R} for debtors who misperceive the financial penalty and the cutoff \hat{R} for debtors who correctly perceive the financial penalty. The cutoff rules are then:

$$x^*(R) = 1[R \leq \hat{R}]; \quad \tilde{x}(R) = 1[R \leq \tilde{R}]$$

It is easy to show that, as in the model without misperception, $\hat{R} = q \cdot F + p \cdot \eta \cdot \frac{\bar{R}-R}{2}$ defines the cutoff below which the debtors who correctly infer the penalties repay their debt, and $\tilde{R} = q \cdot \underline{F} + p \cdot \eta \cdot \frac{\bar{R}-R}{2}$ defines the cutoff for the biased debtors. Note that since $\underline{F} \leq F$, $\tilde{R} \leq \hat{R}$, and types in between the two thresholds would have higher utility if they repaid their debt, but do not repay their debt due to their misperception of the financial consequences.

C.1.2 The Government's Problem

In addition to the financial and shaming penalties, the government can decrease the fraction s of debtors who misperceive the financial penalty of failing to repay at no resource cost: i.e., it chooses $s^* \in [0, s]$. The government collects greater revenues in the second period by not correcting the misperception, as the misperception leads to more failure to repay in the first period. However, the debtors who misperceive the penalty lose actual (as opposed to perceived) utility by behaving incorrectly.

The government revenues and private welfare are now:

$$T(F, p, s^*) = \int [s^* \cdot \tilde{x}(R) \cdot R_g + (1 - s^*) \cdot x^*(R) \cdot R_g + s^* \cdot (1 - \tilde{x}(R)) \cdot q \cdot F + (1 - s^*) \cdot (1 - x^*(R)) \cdot q \cdot F] dF(R)$$

$$PW(F, p, s^*) = - \int [s^* \cdot \tilde{x}(R) \cdot R + (1 - s^*) \cdot x^*(R) \cdot R + s^* \cdot (1 - \tilde{x}(R)) \cdot q \cdot F + (1 - s^*) \cdot (1 - x^*(R)) \cdot q \cdot F] dF(R)$$

The government solves:

$$\max_{F \geq 1, p \in [0, 1], s^* \in [0, s]} \alpha \cdot T(F, p, s^*) + (1 - \alpha) \cdot PWD(F, p, s^*)$$

The following proposition ranks the policies when the government can also decide whether to correct debtors' misperceptions about the financial penalties:

Proposition 3. *There is a threshold $\alpha^* \in (\frac{1}{2}, 1)$ such as:*

- *if $\alpha \leq \alpha^*$, then the set of policies $\{(F, p, s) : F \geq 0, p \in [0, 1], s^* = 0\}$ dominates $\{(F, p, s) : F \geq 0, p \in [0, 1], s \in (0, 1)\}$.*

- *if $\alpha > \alpha^*$, then the set of policies $\{(F, p, s) : F \geq 0, p \in [0, 1], s \in (0, 1)\}$ dominates $\{(F, p, s) : F \geq 0, p \in [0, 1], s = 0\}$.*

Proof. In the case where $\alpha = 1/2$, the government's objective function is now

$$\frac{1}{2} \int x^*(R)(R_g - R)dF(R) - s^* \cdot \frac{1}{2} \int [x^*(R) - \tilde{x}(R)](R_g - R)dF(R)$$

The government wants to collect if and only if $R_g \geq R_i$, which it can accomplish by setting $x^*(R)$ to the appropriate threshold. The second term indicates that the fraction s^* of debtors behave in a way that costs the government utility conditional on it setting the threshold correctly, since $x^*(R) - \tilde{x}(R)$ is either zero or one, and is only one in a range when $R_g - R_i$ is positive (as the debtors who do not pay are people who would have paid had they correctly perceived the financial penalty). Thus the government's first-best behavior sets $s^* = 0$ - it completely corrects the misperception.

The second term is:

$$-\frac{s^*}{2} \frac{\hat{R} - \tilde{R}}{\bar{R} - \underline{R}} \left[R_g - \frac{\hat{R} + \tilde{R}}{2} \right]$$

Note that $\hat{R} \geq \tilde{R}$ from above. Then setting $s^* > 0$ is not optimal so long as the average of \hat{R} and \tilde{R} is not greater than R_g , which is true so long as the government has not set F and p too much higher than optimal.

Since setting $s^* > 0$ strictly leads debtors to behave in a way that does not maximize their utility, if the government does not choose $s^* > 0$ when $\alpha = 1/2$, the government will not choose $s^* > 0$ for any $\alpha < 1/2$, as lowering α only increases the weight the government puts on debtor's welfare.

$$\begin{aligned} U(F, p, s^*) &= \int x^*(R)[\alpha R_g - (1 - \alpha)R] + (1 - x^*(R)) \cdot (2\alpha - 1) \cdot q \cdot F dF(R) \\ &\quad + s^* \int [x^*(R) - \tilde{x}(R)] \cdot [(2\alpha - 1) \cdot q \cdot F - \alpha \cdot R_g + (1 - \alpha) \cdot R] dF(R) \end{aligned}$$

Consider now the case where $\alpha = 1$, and the government maximizes total revenues, which are

$$\begin{aligned} &\int x^*(R) \cdot R_g + (1 - x^*(R)) \cdot q \cdot F dF(R) + s^* \cdot (q \cdot F - R_g) \int [x^*(R) - \tilde{x}(R)] dF(R) \\ &= \frac{1}{\bar{R} - \underline{R}} \left[R_g \cdot (\hat{R} - \underline{R}) + q \cdot F \cdot (\bar{R} - \hat{R}) + s^* \cdot (q \cdot F - R_g) \cdot (\hat{R} - \tilde{R}) \right] \end{aligned}$$

As one could see from the previous equation, the elasticity of the government's objective function with respect to the tax debtors misinformation depends on the sign of $(qF - R_g)$, which is endogenous. However, we can make the problem simpler by considering what happens

from a small deviation from the optimal policy without tax debtors misinformation. Because there is no heterogeneity in q , any optimal policy will have $p^* = 0$, following the results of the previous propositions. For simplicity, let's start from the policy $\{F, p, s\} : F \geq 0, p = 0, s = 0\}$ and show that this policy is dominated by a policy with $\{F, p, s\} : F \geq 0, p = 0, s = \varepsilon\}$. Given this assumptions, the objective function of the government simplifies to:

$$\frac{1}{\bar{R} - \underline{R}} \left[R_g \cdot (\hat{R} - \underline{R}) + q \cdot F \cdot (\bar{R} - \hat{R}) \right]$$

which is maximized when $F^* = \frac{R_g + \bar{R}}{2q}$. This trivially implies that moving to a situation where setting $\{F, p, s\} : F \geq 0, p = 0, s = \varepsilon\}$ increases the objective function of the government, because $\hat{R} > \tilde{R}$, and $q \cdot F^* > R_g$.

Last, as in the proofs to the previous propositions, we can use the same argument with the mean value theorem to prove that there must be a critical and unique $\alpha^* \in (\frac{1}{2}, 1)$ such as the objective function increases with $s > 0$ if $\alpha < \alpha^*$ and decreases with $s > 0$ if $\alpha > \alpha^*$.

The main intuition is the following. When the government cares about both welfare of tax debtors and tax revenues, the first-best can be achieved by correcting the misperceptions of everyone and setting the first-best policy. This would be true also when the government cares more about the welfare of tax debtors than raising tax revenues. However, if the government cares comparatively more about raising tax revenues, it is optimal not to correct the debtors who underestimate the financial penalties, letting them act as if the financial penalty is low and surprising them with high penalties in the second period.

C.2 Signaling Moral Type

This baseline model of social interactions assumes that peers care about financial trustworthiness. In this section, we provide an extension of the model that shows that the main results are robust if, instead, peers care about moral trustworthiness.

C.2.1 The Debtor's Problem

Suppose that all debtors have $q_i = q$, and debtors have types $\{R_i, m_i\}$, where $m_i | R_i \sim U[\underline{m}, \bar{m}]$. The new type m_i is the moral cost the debtor bears if she has unpaid debt. Peers do not care directly about the credit-constraint measure R_i , and observe R_i , while the government does not observe R_i . Neither peers nor the government observe m_i . The type m_i is correlated with likelihood that a debtor will repay social favors, so peers wish to extend more social favors to higher- m types. Debtors then receive expected social utility equal to:

$$\eta \left[pE[m_i|R_i, x_i] + (1-p) \cdot \frac{m + \bar{m}}{2} \right]$$

Where $\eta > 0$ is the relative value of social favors. Note that low- m types are now punished and high- m types are now rewarded; previously low- R types were rewarded and high- R types were punished (hence the absence of the minus sign in front of η).

Debtors' utility functions are:

$$U(x_i; R_i, m_i) = -R_i \cdot x_i - (1-x_i) \cdot [q \cdot F + m_i - p \cdot \eta \cdot (E[m_i|R_i, x_i = 0] - E[m_i|R_i, x_i = 1])] + \eta \cdot (1-p) \cdot \frac{m + \bar{m}}{2}$$

The debtor's optimal response $x^*(R_i, m_i) = \arg \max_{x \in \{0,1\}} U(x_i; R_i, m_i)$ is characterized by a threshold for each R_i , $\hat{m}(R_i)$:

$$x^*(R_i, m_i) = 1[m_i \geq \hat{m}(R_i)]$$

Peers rationally infer that:

$$E[m_i|R_i, x_i = 1] = \frac{\hat{m}(R_i) + \bar{m}}{2} \text{ and } E[m_i|R_i, x_i = 0] = \frac{m + \hat{m}(R_i)}{2}$$

Substituting into the objective function:

$$U(x_i; R_i, m_i) = -R_i \cdot x_i - (1-x_i) \cdot \left[q \cdot F + m_i + p \cdot \eta \cdot \frac{\bar{m} - m}{2} \right] + \eta \cdot (1-p) \cdot \frac{m + \bar{m}}{2}$$

Each debtor then chooses $x_i = 1$ when

$$m_i \geq -q \cdot F + R_i - p \cdot \eta \cdot \frac{\bar{m} - m}{2}$$

This confirms our guess that the optimal response is characterized by the thresholds:

$$\hat{m}(R_i) = \min \left\{ \bar{m}, \max \left\{ -q \cdot F + R_i - p \cdot \eta \cdot \frac{\bar{m} - m}{2}, m \right\} \right\}$$

As expected, the proportion of debtors paying in the first period is increasing in the financial penalty F and the shaming penalty p , and for a given moral cost debtors pay in the first period provided R_i is low enough.

C.2.2 The Government's Problem

Government revenues and private welfare of the taxpayers are:

$$T(F, p) = \int \int [x^*(R, m) \cdot R_g + (1 - x^*(R, m)) \cdot q \cdot F] dF(m|R) dF(R)$$

$$PWD(F, p) = - \int \int [x^*(R, m) \cdot R + (1 - x^*(R, m)) \cdot q \cdot F] dF(m|R) dF(R)$$

Which uses the fact that the aggregate utility from social interactions is fixed. The government again maximizes a weighted sum of tax revenue and the private welfare of debtors:

$$\max_{F \geq 1, p \in [0, 1]} \alpha T(F, p) + (1 - \alpha) PWD(F, p)$$

C.2.3 Optimal Penalties under Homogeneous q_i

The following is parallel to Proposition 1:

Proposition 4. *In the case that $\alpha = 1/2$ ($\alpha > 1/2$), for any policy $\{F, p\}$ there exists an alternative policy $\{F', p'\}$ with $p' = 0$ that attains the same (or higher) utility for the government.*

Proof. In the case where $\alpha = 1/2$, the government's objective function becomes

$$\frac{1}{2} \int [R_g - R] \frac{\bar{m} - \hat{m}(R)}{\bar{m} - \underline{m}} dF(R)$$

Then for any $\{F, p\}$, the alternative $\left\{ F' = F + \frac{p \cdot \eta}{q} \frac{\bar{m} - \underline{m}}{2}, p' = 0 \right\}$ produces the same thresholds $\hat{m}(R_i)$ for all R_i and thus produces the same utility for the government.

For $\alpha > 1/2$ the government's objective function is:

$$\int \frac{\hat{m}(R) - \underline{m}}{\bar{m} - \underline{m}} [\alpha R_g - (1 - \alpha)R] + \frac{\bar{m} - \hat{m}(R)}{\bar{m} - \underline{m}} (2\alpha - 1) \cdot q \cdot F dF(R)$$

Again, for any $\{F, p\}$, the alternative $\left\{ F' = F + \frac{p \cdot \eta}{q} \frac{\bar{m} - \underline{m}}{2}, p' = 0 \right\}$ produces the same thresholds $\hat{m}(R_i)$ for all R_i . The first term is the same under both policies, but the second term is larger under $\{F', p'\}$ since $F' \geq F$ and $2\alpha - 1 > 0$. Thus the alternative policy produces at least as much utility for the government.

C.2.4 Optimal Penalties under Heterogeneous q_i

The following is parallel to Proposition 2:

Proposition 5. *If $\underline{q} < \bar{q}$, for some values of α , and some policies $\{F, p\}$, the government can obtain strictly greater utility by choosing $\{F' < F, p' > p\}$.*

Proof. Let $\alpha = 1/2$. The government's utility function is:

$$\frac{1}{2} \int [R_g - R] \frac{\bar{m} - \hat{m}(R, \bar{q}) - \theta \cdot [\hat{m}(R, \underline{q}) - \hat{m}(R, \bar{q})]}{\bar{m} - \underline{m}} dF(R)$$

The wedge introduced by the types' difference on ability to collect is:

$$\frac{-\theta}{2(\bar{m} - \underline{m})} \int [R_g - R] [\hat{m}(R, \underline{q}) - \hat{m}(R, \bar{q})] dF(R)$$

Note that:

$$\begin{aligned} \hat{m}(R, \underline{q}) - \hat{m}(R, \bar{q}) &= \min \left\{ \bar{m}, \max \left\{ -\underline{q} \cdot F + R_i - p \cdot \eta \cdot \frac{\bar{m} - \underline{m}}{2}, \underline{m} \right\} \right\} \\ &\quad - \min \left\{ \bar{m}, \max \left\{ -\bar{q} \cdot F + R_i - p \cdot \eta \cdot \frac{\bar{m} - \underline{m}}{2}, \underline{m} \right\} \right\} \\ &\geq 0 \end{aligned}$$

If, for example, the range of m_i is sufficiently spread out that the boundaries of the $\hat{m}(\cdot)$ function do not bind, then this term is simply $F \cdot (\bar{q} - \underline{q})$. In general, the wedge will be proportional to F and $\bar{q} - \underline{q}$. Assuming that $\int [R_g - R] dF(R) \geq 0$ (which is a sufficient condition for the government wishing to raise positive revenue in the first period), then the wedge will be weakly positive. The wedge is strictly positive when both $\int [R_g - R] dF(R) > 0$ and the range of m_i is large enough relative to the policy choices $\{F, p\}$ that some types choose to pay while others do not. Using F as a policy instrument incurs this wedge, while using p as a policy instrument does not, so the government will prefer p as its first-choice policy instrument and only use F when it has set p as large as possible. Suppose, for example, that $\{F > 0, p < 1\}$. Then setting $F = 0$, $p' = p + \bar{q} \cdot F \frac{2}{\eta(\bar{m} - \underline{m})}$ maintains the same $\hat{m}(R, \bar{q})$ for all R (provided that $p' \leq 1$). This policy change also removes the wedge, and thus generates strictly greater utility for the government whenever the wedge is greater than zero.

Online Appendix: For Online Publication Only

D More Details about the Experimental Sample

D.1 Descriptive Statistics about the Place Characteristics Associated with the Number of Delinquents

In this subsection, we present some basic regression analysis aimed at identifying place characteristics that are associated with the number of delinquents in an area.

For that, we compiled a ZIP-5 level database with the number of delinquents living in each zipcode of the three experimental states: Kentucky, Kansas and Wisconsin. As a measure of delinquency, we consider the number of delinquents listed online as of May 26th 2014, which is when we first downloaded our experimental sample. The sample includes individuals who are still living in the same state where the debt originated. Given that the three states have different thresholds, the distribution of the number of delinquents would be different across states. To keep the delinquency rates comparable, we only include individuals with debts of \$5,000 or above, which coincides with the highest of the three thresholds.⁶⁰To properly account for the fact that the number of delinquents may be roughly proportional to the number of inhabitants, we include as independent variable the logarithm of population in the ZIP-5. We include a number of other independent variables, which were normalized to have mean zero and standard deviation 1. The coefficient on each of these variables can be interpreted as the effect of a one standard deviation increase in the covariate on the log of expected number of delinquents.

Table D.1 shows the regression results from a Negative Binomial regression of the number of delinquents in a ZIP-5 on the logarithm of population and a few additional place characteristics. *Mean Income* corresponds to the mean gross income at the ZIP-5 level. *Importance of Wages* is the same proxy for income garnishability used in the analysis of the field experiment, defined as the share of income originating from wage income in the ZIP-5. *EITC Bunching* is a proxy for sophisticated tax avoidance, as proxied by the share of self-employed individuals in the 3-digit ZIP code estimated to be mis-reporting income to take advantage of EITC benefits (see Chetty et al., (2013)). *Share Republican* is the county-level share of votes for the Republican candidate in the 2012 U.S. Presidential Election. *Civic Life Index* is a county-level measure of social capital based on a number of indicators such as the density of civic and non-profit organizations.

The results from column (1) pool the data for the three states. The coefficient on $\text{Log}(\text{Population})$

⁶⁰As a result, the mean number of delinquents per 1,000 inhabitants are very similar across states: 2.27 in Kentucky, 2.31 in Kansas and 2.54 in Wisconsin.

is close to one and significant (p-value<0.01), indicating that, as expected, the number of delinquents is roughly proportional to the population in the ZIP code. The coefficient on mean income is close to zero and statistically insignificant. This suggests that high-amount delinquents (i.e., delinquents owing over \$5,000) don't seem to be overly concentrated in poorer or richer areas. The coefficient on *Importance of Wages* is negative and significant (p-value<0.01). This is consistent with the prediction from the model that areas with higher income garnishability should have a lower number of delinquents: when income garnishability is lower, people will be less likely to have to pay back the debt in the last period, and, hence, can accumulate more delinquencies, ceteris paribus. The magnitude of the correlation is economically significant: a one standard deviation increase in *Importance of Wages* decreases the expected number of delinquents in the area by about 8%. The coefficient on *EITC Bunching* is positive and significant (p-value<0.01). This finding suggests that sophisticated individuals who take advantage of opportunities to evade taxes may also take advantage of opportunities to avoid tax collection. The magnitude of this correlation is large: a one standard deviation increase in *EITC Bunching* reduces the expected number of delinquents in the area by about 17%. The coefficient on *Share Republican* is negative and significant (p-value<0.01) suggesting that partisanship and tax compliance may be related (Cullen, Turner and Washington (2015)). The coefficient on *Civic Life Index* is negative and significant (p-value<0.01), suggesting that tax delinquents are more rare in areas with higher social capital, which may be suggestive of the relevance of intrinsic motivation for paying taxes.

In principle, the institutional context and regulation for tax collection may vary so much across states that there could be significant differences in the relationship between tax delinquency and the covariates across states. Columns (2) through (4) shows the results for each state on a separate basis. The results indicate that, except for a few differences, the majority of the correlations are qualitatively similar across states.

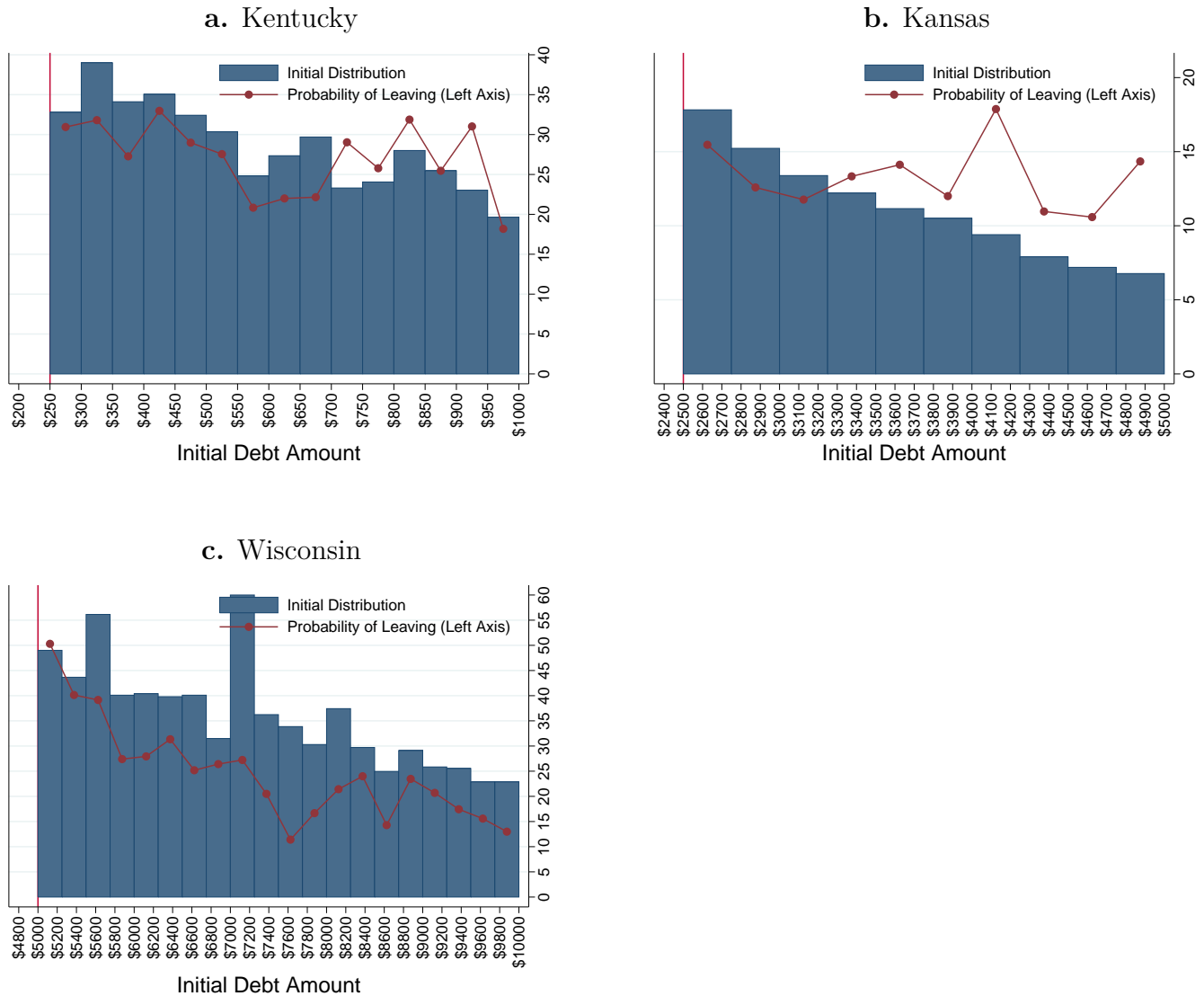
D.2 Descriptive Evidence about How Delinquents can Get Off the List

In this subsection we discuss the observational evidence supporting the statutory evidence from the statutes that, once included in the list, a delinquent can be taken off the list if and only if she commits to pay the full amount of the debt (rather than the minimum amount necessary to be below the threshold).

The evidence for Kentucky, Kansas and Wisconsin is shown in Figures D.1.a, D.1.b and D.1.c. The data corresponds to the subject pool. For each state, the figure shows the distribution of debt amounts. If individuals could pay a small amount of money to get below the threshold and get off the list, this would imply that there would be some “missing density”

at the right-hand of the threshold (i.e., those individuals could “aim” at having unpaid debts below the threshold). However, we do not find evidence of such missing density in any of the states. The graph also shows the mean probability of leaving the list in the next 6 months, for each of the bins of the initial debt. If individuals could pay epsilon below the threshold to get off the list, we should observe a spike in the probability of leaving the list at the right hand side of the threshold (in the extreme case, the individual that is \$1 to the right of the threshold could pay \$1.01 and get off the list). Again, we find no evidence of such behavior.

Figure D.1: Descriptive Evidence about the Behavior of Tax Delinquents



Notes: N=18,101 in Kentucky (a.), 8,710 in Kansas (b.) and 7,523 in Wisconsin (c.). The blue bars show the histogram with the distribution of amounts owed by the subjects who appeared on the online lists of delinquents as of May 26th 2014. The red dots indicates, for the group of individuals in a given bin of amount owed as of May 26th 2014, the share of those individuals who are not listed as delinquents in exactly 6 months after May 26th 2014.

Table D.1: Place Characteristics Associated to the Rate of Tax Delinquency

	Number of Delinquents in ZIP-5			
	(1)	(2)	(3)	(4)
	All	Kentucky	Kansas	Wisconsin
Mean Income (STD)	-0.001 (0.015)	-0.162*** (0.061)	0.064*** (0.023)	-0.056** (0.022)
Importance of Wages (STD)	-0.079*** (0.030)	-0.123* (0.073)	0.057 (0.051)	-0.115*** (0.035)
EITC Bunching (STD)	0.177*** (0.023)	0.392*** (0.054)	0.178*** (0.067)	0.225*** (0.025)
Share Republican (STD)	-0.086*** (0.029)	-0.104* (0.061)	-0.063 (0.047)	0.106*** (0.032)
Civic Life Index (STD)	-0.140*** (0.031)	0.089 (0.074)	-0.237*** (0.041)	0.017 (0.052)
Log(Population)	1.030*** (0.018)	1.088*** (0.036)	1.000*** (0.026)	0.950*** (0.021)
Observations	1,972	657	603	712

Notes: * significant at the 10% level, ** at the 5% level, *** at the 1% level. Heteroskedastic-robust standard errors in parenthesis. The coefficients correspond to a Negative Binomial Regression of the number of delinquents in the ZIP-5 on a number of place characteristics. All the independent variables (except Log(Population)) were normalized to have mean zero and standard deviation 1. *Number of Delinquents in ZIP-5* counts the number of unique individuals on the online lists of delinquents as of May 26th 2014 who owed \$5,000 or more. The sample includes individuals with debts originating from Kentucky, Kansas and Wisconsin who are still living in the same state where the debt originated. *Log(population)* is constructed at the ZIP-5 level and comes from the 2012 U.S. Census data. *Mean Income* corresponds to the mean gross income at the ZIP-5 level, based on data from 2012 IRS SOI. *Importance of Wages* is the share of income originating from wage income, also constructed at the ZIP-5 level and using data from the 2012 IRS SOI. *EITC Bunching* is the share of self-employed individuals in the 3-digit ZIP code estimated to be mis-reporting income to take advantage of EITC benefits (data source: Chetty et al., (2013)). *Share Republican* is the county-level share of votes for the Republican candidate in the 2012 U.S. Presidential Election. *Civic Life Index* is a county-level measure of social capital based on density of civic and non-profit organizations, voting turnout and census completion rates as of 2005 (Rupasingha, A.; Goetz, S. and Freshwater, D. (2006), “The Production of Social Capital in US Counties,” Journal of Socio-Economics, Vol. 35, pp. 83–101). The regression in column (1) includes state fixed effects.

E Regulations of Lists of Tax Delinquents

In this section we presents further details about the legal aspects of tax delinquencies in Kansas, Kentucky and Wisconsin.

A snapshot of the webpage with the list of tax delinquents from Kentucky is shown in Figure E.1. In Kentucky the publication of delinquents owing taxes or other fees is regulated by KRS 131.650. According to it, “a taxpayer may be included on a list if: (a) The taxes or fees owed remain unpaid at least forty-five (45) days after the dates they became due and payable; and (b) A tax lien or judgment lien has been filed of public record against the taxpayer before notice is given under KRS 131.654.” The provision related to the privacy of taxpayers are regulated by KRS 131.190. The notification to tax debtors is regulated by KRS 131.654. The requirements to qualify as tax delinquent are regulated by KRS 131.652.

A snapshot of the webpage with the list of tax delinquents from Kansas is shown in Figure E.2. In Kansas taxation matters are regulated by chapter 79 of the state Statute. Article 79-3235 regulates the collection of debts arising from state income tax. A warrant is issued if taxes are not paid within 60 days after they become due. The warrant comprises the delinquent taxes, with the added penalties, interest and the costs associated with the warrant itself. The process of state income taxation is regulated by article 32 in chapter 79 of the Kansas Statute. Article 79-3228 regulates the process of administering interests and penalties.

A snapshot of the webpage with the list of tax delinquents from Wisconsin is shown in Figure E.3. In Wisconsin the publication of tax delinquents is regulated by section 73.03(62) of the Wisconsin statute. A requirement for publication is that the amount is unpaid more than 90 days after all appeal rights have expired. The Wisconsin department will not post the accounts of taxpayers who have: entered into a valid installment agreement, submitted a complete Petition for Compromise, or filed for bankruptcy. The process of reaching a repayment plan agreement with the Wisconsin Department of Revenue is regulated by section 71.92. The process of updating the online lists is regulated by s. 562.01 (3m). The process of taxing individuals is regulated by section 71.01. The interests and penalties are regulated by sections 71.82, 71.83, 71.84 and 71.85. The expression “liable for delinquent taxes” means that a person has exhausted all legal remedies to challenge the assertion that the person owes taxes, including penalties, interest, fees and costs, under ch. 71, 72, 76, 77, 78, 125 or 139 and sufficient time has elapsed so that the person is delinquent in the payment of those taxes.

Figure E.1: Snapshot of Online Search Tool, Kentucky Department of Revenue

Individual Debtors

Pay your delinquent debt or contact the Division of Collections by [email](#) or phone **502-564-4921, ext. 5367**.

Download Listing of Delinquent Debtors [View Listing of Delinquent Debtors Disclaimer](#)

Hide Search | You may search on any of the fields below.

Name Like RICARDO

Lien Balance >>

Address Like

City Like

State =

Zip =

County of Record =

Search Clear

Show 15 records at a time Last

15 result(s) 1 - 5 of 15 Total Records

View Detail / Name	Lien Balance	Address	City	State	Zip	County
RICARDO [REDACTED]	\$24,460.91	[REDACTED]	NEW BRAUNFELS	TX	[REDACTED]	JEFFER
RICARDO [REDACTED]	\$10,408.71	[REDACTED]	LOUISVILLE	KY	[REDACTED]	JEFFER
RICARDO [REDACTED]	\$10,119.18	[REDACTED]	WESTLAND	MI	[REDACTED]	JEFFER
RICARDO [REDACTED]	\$9,850.80	[REDACTED]	LEXINGTON	KY	[REDACTED]	FAYET
RICARDO T	\$8,777.13	[REDACTED]	CRESTWOOD	KY	[REDACTED]	OLDHA

1 2 3

Figure E.2: Snapshot of Online Search Tool, Kansas Department of Revenue

Kansas
Department of Revenue

Home Personal Tax Business Tax Vehicles E-services Forms Contact Us Divisions Media Miscellaneous

Home > [Tax Delinquencies](#)

Tax Delinquencies

Click on the header below to sort by Name, County or Amount Due.
 Note: This tax delinquency list does not include all types of warrants filed by the Kansas Department of Revenue.
 Not Included Here: Warrants filed by the Division of Motor Vehicles, or the Division of Property Valuation (Property Tax).

ricardo Search Clear Search

Rows per page 10

Name and Address	County	Tax Type(s)	Total Amount Due	District Court Case Number
RICARDO [REDACTED] KANSAS CITY, KS [REDACTED]	WYANDOTTE	INCOME TAX	\$98,168.65	[REDACTED]
RICARDO [REDACTED] OVERLAND PARK, KS [REDACTED]	JOHNSON	INCOME TAX	\$52,669.65	[REDACTED]
RICARDO [REDACTED] KANSAS CITY, KS [REDACTED]	WYANDOTTE	INCOME TAX	\$18,717.43	[REDACTED]

Search Website

FILE YOUR TAXES ONLINE

Related items...

- ★ Check on your refund
- ★ Personal tax forms
- ★ Resolve tax issues
- ★ Frequently asked questions
- ★ Business topics
- ★ Policy library

Figure E.3: Snapshot of Online Search Tool, Wisconsin Department of Revenue

The screenshot shows the Wisconsin Department of Revenue website. The header includes the state seal and the text "Wisconsin Department of Revenue". Below the header is a navigation menu with buttons for "Home", "Businesses", "Individuals", "Tax Professionals", "Governments", and "Unclaimed Property". A search bar is located to the right of the menu. The breadcrumb trail reads: "Home > Wisconsin Delinquent Taxpayers > Delinquent Taxpayers by Name > Delinquent Taxpayers by Name". The main heading is "Delinquent Taxpayers by Name", followed by a list of letters from A to Z and a hash symbol. Below the letters are two links: "Go to Revoked Sellers Page" and "Back to Delinquent Page". The main content is a table with four columns: "Name/Doing Business As Name", "Last Known Mailing Address", "Tax Type", and "Amount". The table contains six rows of data, with names and addresses redacted with black boxes.

Name/Doing Business As Name	Last Known Mailing Address	Tax Type	Amount
[REDACTED]	[REDACTED]	W,S	\$14,890.88
[REDACTED]	[REDACTED]	W,Y,S,C,B	\$27,112.93
[REDACTED]	[REDACTED]	W,S	\$34,238.60
[REDACTED]	[REDACTED]	W,S	\$91,355.08
[REDACTED]	[REDACTED]	W	\$72,727.43
[REDACTED]	[REDACTED]	W,S,C	\$37,721.52