Applying Models of Tax Collection to Contracting Out Federal Delinquent Income Tax

By: Robert Eger and Sungkyu Jang

ABSTRACT

The use of external tax collectors has been a highly politicized compromise between administrative effectiveness and procedural fairness. Addressing the issue of private tax collectors, we develop three basic analytical models of tax collection based on tax farming and agency theory. Our analytical results provide both clarity and ambiguity associated with contract types for external tax collectors. We then apply our analytical results to the current issue of contracting out federal delinquent income tax collection. The effectiveness benefits under incentive-based contracts are diluted not only by potentially increasing compensation but by a potentially more destructive result, the social costs associated with taxpayer harassment. Our results offer explanatory power for the resulting backlash to external federal tax collectors in prior iterations and potential hope for the current use of private tax collectors.

Keywords*:* tax collection, agency theory, contract incentives

JEL Classification: H21, H26

Data Availability: Data are available from the public sources cited in the text.

I. INTRODUCTION

While many tax systems are self-compliance based (Slemrod 2007), and large numbers of taxpayers comply without any enforcement effort, growing delinquent taxes show that the tax system and administration are imperfect. We can observe the imperfection through the federal unpaid tax debt inventory. The inventory rose from $290.1 billion in 2007 (US Government Accountability Office 2008) to $398 billion in 2018 (IRS FS-2019-11 2019) in nominal dollars.

One way to reduce tax delinquency is in the decision to use an in-house or an outsourced tax collector. This decision is related to the trade-off between administrative effectiveness and procedural fairness in tax collection. To explore this decision, we analyze the relative costs and benefits of tax collection contracts. We develop three analytical models showing optimal tax collection contracts under the agency problem and the expected values of optimal tax collection contracts. For simplification, we assume that the government wants to maximize its tax revenue, thereby assuming the government desires to minimize tax delinquency and evasion. Our analytical results partially capture the conditional aspect of revenue maximization by considering monitoring costs.

To analyze the tax collector's behavior conditional on the level of compensation in tax collection and corresponding agency costs, we adopt the theory of agency, incorporating the literature associated with tax farming. Using agency theory and tax farming contracts, we develop analytical models to find the effect of collection effort on tax revenue in different tax collection contracts given the true tax base and optimal tax rate.

Our motivation is the limited evidence on delinquent tax collection, a prominent issue from both the theoretical and practical tax policy standpoints. We contribute to the taxation literature by focusing on optimal tax collection efforts. We use a static optimization process

to generate our comparative statics, optimal conditions, and relative value—the net effect of costs and benefits—of tax collection contracts.

Seven principal elements of contracts are motivated by the analysis. We find relatively straightforward comparability of each level of the agent's collection effort, compensation cost, and gross tax revenue among contracts. We observe ambiguity for net tax revenue, agency cost, agency cost adjusted net tax revenue, and change of tax base.

The analytics give rise to the following implications. The government can indirectly choose the level of effort of the tax collection agent by offering each a different compensation scheme to maximize its tax revenue. Compensation-to-effort mapping, however, leads to a trade-off among agency costs. When choosing a contractual form of tax collection, government consideration would incorporate not only the compensation-to-effort mapping but also agency costs resulting from such a mapping. Additionally, effects on the tax base expand beyond short-run revenue and expenses, thereby affecting the level of collection efforts and agency costs in the long run.

Using our analytical results, we apply the implications of the model to the contemporary case of outsourcing the collection of federal delinquent income tax. One of the current issues in governmental tax policy has been growing delinquencies. To address increasing delinquent taxes since the 1990s, the federal government has considered, implemented, then eliminated, and implemented again the contracting out of delinquent income tax collection with private debt collection firms. Changes in collection policy are associated with the dilemma of efficient collection and the protection of delinquent taxpayers' rights due to the potentially invasive behavior of debt collection firms. Our application implies that federal delinquent income tax collection outsourcing may increase gross tax revenue and the tax collection rate. Still, these benefits, under incentive-based

contracts, are shown to be offset by not only increased compensation but also by a potentially more destructive result, that of the social costs associated with taxpayer harassment.

In the remainder of the paper, we review related research providing the theoretical base of the model. Next, we offer a static model of tax collection. We then show our application of the model to the federal tax collection process. Last, we provide our discussion and conclusion.

II. TAX ADMINISTRATION

Tax revenue production is a joint effort of assessing and searching the tax base, setting the tax rate, and distributing the tax administrator's collection effort. The historical and contemporaneous literature focuses on two aspects of this process: the assessment and inspection of the tax base and the setting of the tax rate, providing limited evidence of the administrative effort in collecting the tax.

Since the 1960s, the dominant theme in the tax literature is the search for optimal rates of taxation given tax bases through formal modeling (Slemrod and Yitzhaki 1996). Although a social planner may optimally choose both the tax rate and tax base, the optimally chosen tax system may be implemented imperfectly because of taxpayer cheating (tax evasion) and the tax collector shirking of their delegated tasks. Therefore, economically and politically preferred tax rates and bases should be followed by an effective implementation process, tax collection administration.

Since the works of Allingham and Sandmo (1972) and Srinivasan (1973) on the formal model of tax evasion, which built on Becker's (1968) crime and punishment framework, formal models of tax administration have developed with a focus on the relationship between tax collectors (auditors) and taxpayers (tax evaders) (Nagin 2013). The literature concentrates on the taxpayer's behavior conditional on the audit rate (Law and Mills 2015) and the level of punishment in the tax collection process, developing studies that

examine the optimal tax rate and the level of penalty to coerce taxpayers into reporting their exact tax (Slemrod 2019). Incorporated in this literature is the assumption that if the government knows the actual tax base (zero tax evasion) and chooses an optimal tax rate, tax revenue collection would be uncomplicated. For this reason, the literature on taxation has focused on searching for the optimal level of audit, penalties, and rates at the expense of searching for an optimal level of effort to collect delinquent taxes.

Relatively little tax administration literature has explored modeling the relationship between the government (principal) and tax collectors (agent) to increase tax revenue collection given a tax base and rate. The government can increase tax revenue (or tax compliance) not only by expanding the audit rate, the level of punishment, and the tax rate but also by increasing the level of effort for collecting tax liabilities.

III. TAX COLLECTION

In contemporary governments, the dominant method of tax collection is in-house, where the government has a hierarchical tax bureaucracy that uses an internal tax collector. For millennia the government contracted out tax collection with an external tax collector, which the literature identifies with the terminology “tax farmers” (Johnson and Koyama 2014; Webber and Wildavsky 1986). Under tax farming practices, the ruler and crown sold the right to collect taxes—tax receivabless—to merchants for a fixed fee, a discounted value of the tax receivabless, or a proportional fee based on their performance. Although the tax farmer system was in existence for centuries, it was eventually replaced in the nineteenth century by the evolution of the tax bureaucracy collection method. Recently, the external collector (tax farmer) has returned to prominence within the federal government, while state governments have been using outside collectors for decades (Jang and Eger 2019).

To explore these tax collection methods, we adopt the theory of agency (Ross 1973; Jensen and Meckling 1976; Mirrlees 1976; and Eisenhardt 1989) to assess the collection

effort and the corresponding agency cost. We condition the effort and cost on the compensation scheme underlying the collection method. Through the lens of the theory of agency, an in-house tax collection is a fixed-wage contract under which the internal tax collector tends to shirk their duty given the non-incentive based contract. Meanwhile, tax farming practices are fixed-rent contracts and revenue share contracts under which the external tax collector tends to exploit taxpayers since the benefit linkage is to performance (Webber and Wildavsky 1986; Levi 1988; and Azabou and Nugent 1988).

Recently several studies have begun to consider contract forms in the search for optimal audit rates and penalties in the development of a tax collection model. E. F. Toma and M. Toma (1992) and Escobari (2012) model a relationship between the tax auditor and the taxpayer in a tax evasion situation. E. F. Toma and M. Toma (1992) examine wage and rent contracts focusing on agency costs such as shirking and overdetection. They find that a profit-maximizing tax auditor lowers tax evasion, but at the expense of overdetection. Escobari (2012) explains wage and share contracts with a level of corruption, a type of agency problem. He finds that giving the tax auditor a monetary share of the evasion detected decreases the level of tax evasion. While these studies are useful in searching for an optimal audit rate and degree of the penalty within incentive-based contracts, it is difficult to assess the tax administration implications from these models. This difficulty is due to the infrequent use of private tax auditors or public tax auditors who received performance-based compensation in practice.

Coşgel and Miceli (2009) formalize historically observed tax collection contracts such as wage, rent, and share contracts. They argue that the government's choice of a tax collection contract depends on the measurability of tax information. According to their model, when the government can easily observe tax revenue collected by the agent, it chooses a share contract. In addition, when the government can easily measure the tax base, it selects

a rent contract. When the government can easily monitor the effort of agents, it adopts a wage contract. Coşgel and Miceli (2009) partially consider agency cost and collection effort, but their model focuses on the measurability of information. While their model is useful in understanding the choice of tax collection forms throughout history, the model lacks implication in the contemporary tax collection setting. The fundamental dilemma that modern governments face in their selection of tax collection is the trade-off between effective enforcement and procedural fairness to enhance the collection of delinquent taxes.

IV. MODELS OF DELINQUENT TAX COLLECTION CONTRACT FORMS

To address effective enforcement and procedural fairness, we model tax collection choice in the contemporary setting. Suppose the amount of gross tax revenue, G, is a function of the tax base, B, tax rate, σ, and the collection agent's level of collection effort, e. The production function of tax revenue is

$$G = f(e)\sigma B \tag{1}$$

where $f(e)$ is the effort function. The level of e varies with differing contract forms. For simplification, tax rate, σ, and tax base B, are considered as constants in the model. We assume B is observable to the government and honestly reported by taxpayers, which leads to zero tax evasion. We also assume the tax authority optimally chooses σ. Therefore, the focus is on the collection effort. Because the tax receivables, R, is calculated by multiplying the tax base and the tax rate, σB, the production function of tax revenue is

$$G = f(e)R \tag{2}$$

where R is constant and observable. The government puts in tax collection effort to realize the tax receivabless, an asset. The government controls tax revenue by choosing a contract form that induces the tax collector to input a particular level of collection effort. The government chooses among three different contract forms, fixed-wage, fixed-rent, and revenue share contracts. To analyze the relative benefits of tax collection contracts, we allow

the amount of tax revenue collected to be a function of the effort exerted by the tax collector. To analyze the relative cost of this decision, we include the monitoring of the tax collector.

Fixed-Wage Contract

Under the fixed-wage contract, the government's problem is to choose the level of effort of the agent, *e*, and fixed-wage payment, *w*, to maximize its return subject to the agent's participation constraint:

$$V_w \equiv \underset{e,\, w}{\text{maximize}}\, f(e_w^L)R - w - m(e_w^L) \tag{3}$$

subject to

$$w - e_w^L \geq U_0. \tag{4}$$

The government collects the revenue, $f(e_w^L)R$. To calculate net tax revenue, the government considers compensation costs and agency costs. The government pays a fixed wage, *w*, to its employees and confronts bureaucratic shirking as an agency cost, $m(e_w^L)$. The public employee's return U_w, is a fixed wage, *w*, minus their costs of labor, e_w^L:

$$U_w = w - e_w^L. \tag{5}$$

In the fixed-wage contract, the public employee chooses a lower level of effort to maximize the tax collection return since U_w falls as e_w^{L*} rises given the fixed wage, *w*. In the fixed-wage contract, the public employee has a disincentive to choose the high level of effort given that this effort level reduces their return, U_w. This disincentive leads to the public employee shirking under the fixed-wage contract.

To mitigate the public employee's shirking, the government monitors the level of effort of the public employee at a cost, $m(e_w^L)$, a variable cost, given that monitoring costs vary with the level of shirking. As the public employee shirking increases, the monitoring costs increase.

In the fixed-wage contract, the government's problem is subject to the participation constraint only, indicating that the contract with the public employee has to meet their reservation utility, U_0. The reservation utility is the utility that the employee can receive from their best option among the alternatives. The government's problem is not subject to the incentive compatibility constraint, where the employee's return is increasing in their level of effort.

The optimal conditions for a fixed-wage contract are

$$e_w^{L*}, \text{ which solves } f'(e_w^L)R = 1 + m'(e_w^L), \tag{6}$$

$$w^* = U_0 + e_w^{L*}. \tag{7}$$

Under the optimal fixed-wage contract, the return to the government is

$$V_w^* = f(e_w^{L*})R - (U_0 + e_w^{L*}) - m(e_w^{L*}). \tag{8}$$

Under the fixed-wage contract, the public employee inputs their optimal level of effort, e_w^{L*}, to realize the tax receivables, R. The government pays the optimal wage, w^*, meeting the employee's reservation utility, U_0,—a kind of opportunity cost—and their effort, e_w^{L*}. The government's compensation cost is equal to w^* or $U_0 + e_w^{L*}$. In the optimal fixed-wage contract, the government collects the gross tax revenue, $f(e_w^{L*})R$. The net tax revenue, however, includes the expected cost of compensation, w^*, or $U_0 + e_w^{L*}$, and the agency cost resulting from shirking, $m(e_w^{L*})$.

Fixed-Rent Contract

Under the fixed-rent contract, the government's objective is to choose the level of effort of the agent, e, and a fixed fee, F, to maximize its return subject to the agent's participation constraint, (10), and incentive compatibility constraint, (11):

$$V_R \equiv \underset{e,\, F}{\text{maximize}}\ F - k(e_r^H), \tag{9}$$

subject to

$$f(e_r^H)R - F - e_r^H \geq U_0, \tag{10}$$

$$f(e_r^H)R - F - e_r^H \geq f(e_r^L)R - F - e_r^L. \tag{11}$$

The government sells the tax receivables to the external collection agent (tax farmer) for the fixed-rent fee, *F*. This fee is the discounted price of the face value of the tax receivables, *R*, with the government transferring all risk to the tax farmer where

$$F < R. \tag{12}$$

A fixed-rent contract is an investment contract from the tax farmer's viewpoint. The tax farmer's return is

$$U_R = f(e_r^H)R - F - e_r^H \tag{13}$$

where the return includes the purchase price of the tax receivables, *F*, and their labor costs, e_r^H, from the gross tax revenue, $f(e_r^H)R$.

The fixed-rent contract induces the tax farmer to choose a high level of effort, e_r^H, to assure their profit. Under such incentive contracts, the government may save monitoring costs associated with the public employee but must monitor and mitigate the tax farmer's over-enforcement at cost, $k(e_r^H)$. The cost associated with over-enforcement is a variable cost given that the cost depends on the degree of over-enforcement by the tax farmer.

The optimal conditions for a fixed-rent tax collection contract are

$$e_r^{H*}, \text{ which solves } f'(e_r^{H*})R = \frac{k'(e_r^{H*}) + 1 + \pi_r^*}{(1+\pi_r^*)}. \tag{14}$$

$$F^* = f(e_r^{H*})R - U_0 - e_r^{H*} \tag{15}$$

Under this optimal contract, the return to the government is

$$V_R^* = f(e_r^{H*})R - (U_0 + e_r^{H*}) - k(e_r^{H*}). \tag{16}$$

Under the fixed-rent contract, the tax farmer inputs an optimal level of effort, e_r^{H*}, to realize the tax receivables, R. Determining the level of effort includes the level of monitoring to

mitigate overzealous collection, k, and an incentive to work hard, π_r^*. The government collects the optimal fixed-rent fee, F^*, as tax revenue from the tax farmer. The tax revenue collected is equal to the gross tax revenue, $f(e_r^{H*})R$, minus the expected cost of compensation, $U_0+e_r^{H*}$.

Under the fixed-rent contract, the government does not compensate the tax farmer directly. Instead, the government indirectly pays the tax farmer by selling the tax receivables to them at the discounted price. The expected cost of compensation would be F^* or $f(e_r^{H*})R - (U_0 + e_r^{H*})$, which is the difference between the face value of the tax receivables, R, and the discounted value of the tax receivables, $F^* = f(e_r^{H*})R - (U_0 + e_r^{H*})$. As the tax farmer increases their level of effort, $f(e_r^{H*})R$ is closer to R. Under the fixed-rent contract, the expected cost of compensation is $U_0 + e_r^{H*}$. The government's return is equal to the tax revenue minus the agency cost resulting from monitoring for overzealous collection, $k(e_r^{H*})$.

Revenue Share Contract

Under the revenue share contract, the government's problem is to choose the level of effort of the tax farmer, e, and the proportional fee rate, s, to maximize its return subject to the participation constraint, (18), and the incentive compatibility constraints, (19), such that

$$V_S \equiv \underset{e,\, s}{\text{maximize}}\ (1-s)f(e_s^M)R - d(e_s^M) \tag{17}$$

subject to

$$sf(e_s^M)R - e_s^L \geq U_0, \tag{18}$$

$$sf(e_s^M)R - e_s^M \geq sf(e_s^L)R - e_s^L. \tag{19}$$

Suppose a sharing rule is $f(e_s^M)R = sf(e_s^M)R + (1-s)f(e_s^M)R$, where $0 \leq s \leq 1$. Under this sharing rule, the tax farmer retains $sf(e_s^M)R$, which is a percentage of the total tax revenue, $f(e_s^M)R$, collected by them. The tax farmer's return function is

$$U_s = sf(e_s^M)R - e_s^M. \tag{20}$$

The government receives $(1-s)f(e_s^M)R$, of the total revenue.

The share contract leads to the over-enforcement issue as found in the fixed-rent contract, but the extent of the over-enforcement is modest. If the tax farmer's portion, *s*, is equal to zero, the share contract becomes similar to the fixed-wage contract. If *s* is equal to one, the share contract becomes similar to the fixed-rent contract. The *s* leads to the share contract as a contract that lies between the fixed-wage and fixed-rent contracts. Under the share contract, the level of effort of the agent for tax collection is modest, e_s^M. It is lower than the effort level under the rent contract but higher than the effort level of the wage contract. In the share contract, the government confronts the cost of modest over-enforcement, $d(e_s^M)$, which is lower than the cost resulting from monitoring for overzealous collection, $k(e_r^H)$.

The optimal conditions for the revenue share contract of tax collection are as follows:

$$e_s^{M*}, \text{ which solves } f'(e_s^{M*})R = \frac{d'(e_s^{M*})+\lambda_s^* + \pi_s^*}{1- s^*(1+\lambda_s^*+\pi_s^*)} \tag{21}$$

$$s^* = \frac{U_0 + e_s^{M*}}{f(e_s^{M*})R} \tag{22}$$

Under the optimal contract, the return to the government is

$$V_S^* = f(e_s^{M*})R - (U_0 + e_s^{M*}) - d(e_s^{M*}). \tag{23}$$

In this contract, the tax farmer inputs the optimal level of effort, e_s^{M*}, to realize a tax receivables, R. The effort level is a function of the level of monitoring to mitigate overzealous collection, *d*, the propositional fee rate, s^*, the Lagrangian multiplier for the participation constraint, λ_s^*, and the Lagrangian multiplier for the incentive compatibility constraint, π_s^*. The optimal proportional fee rate is s^*, which is the compensation, $U_0 + e_s^{M*}$, divided by the gross tax revenue, $f(e_s^{M*})R$. The net tax revenue is equal to the gross tax revenue, $f(e_s^{M*})R$, minus the expected cost of compensation, $U_0 + e_s^{M*}$. In the revenue share contract, the expected cost of compensation is the tax farmer's portion of tax revenue.

Finally, the government's return is equal to the net tax revenue minus the agency costs resulting from the modest over-enforcement, $d(e_s^{M*})$.

Table 1 shows each component of the optimal contract value functions: the level of the agent's collection effort, gross tax revenue, compensation cost, net tax revenue, agency costs, and agency-cost adjusted net tax revenue.

[Table 1 about here]

The first observation using Table 1 is that the three levels of effort can be ordered, $e_w^{L*} < e_s^{M*} < e_r^{H*}$. The rent contract induces the highest level of the tax collection agent's effort, and the wage contract produces the lowest level of the tax collection agent's effort. The second observation is that as the level of collection effort increases, the gross tax revenue increases. The government's gross tax revenues can be ordered, $G_w < G_s < G_r$. Correspondingly, the third observation is that if the wage contract changes to an incentive-based contract, the corresponding compensation level increases. The relevant compensation is ordered, $C_w < C_s < C_r$. These results imply that the government can increase gross tax revenue by increasing the collection effort, which causes the compensation cost to increase.

The fourth observation is that the order of net tax revenues is not evident since as compensation costs increase, gross tax revenue increases. We do not know the exact differences among gross tax revenues for each contract and the differences among each compensation cost. We can see the order of gross tax revenues and order of compensation costs. The fifth observation is that agency costs resulting from the overzealous collection associated with tax farming contracts can be ordered, $d(e_s^{M*}) < k(e_r^{H*})$, because the over-enforcement under the share contract is less severe than under the rent contract. It is difficult, however, to compare overall agency costs among contracts.

Although the results of the comparison of the relative values of each contract based on the comparative statics without numeric values are not straightforward, the model implies that increased net tax revenue is smaller than an increased gross tax return. This result is due to the increased compensation cost partially offsetting the increased gross tax revenue. Furthermore, we need to adjust net tax revenue for agency costs. Finally, agency-cost adjusted net tax revenue, which is the final return to the government, is smaller than the net tax revenue. To choose a contractual type of tax collection, we have to compare each agency-cost adjusted net tax revenue for the contractual forms: results and implications of the model help in thinking about modern tax collection issues.

V. AN APPLICATION: CONTRACTING OUT FEDERAL DELINQUENT INCOME TAX COLLECTION

The contemporary contracting out of delinquent tax collection differs from historical tax farming in its pure form. The modern version of tax farming is a hybrid privatized tax collection process. Current outsourcing of delinquent tax collection is a complement to the voluntary public tax collection process, while historical tax farming was a substitute for the bureaucratic collection system. The modern contracting out of the tax collection process is different from ancient tax farming in terms of the extent to which the legal and administrative systems protect the taxpayer. Implications of the analytics, however, are useful in investigating contemporary issues associated with using private debt collection agencies for the collection of delinquent taxes.

A Public Problem: Growing Amount of Delinquent Taxes

During times of financial crisis or fiscal hardship, such as the Credit Crisis of 2007, the Government Debt Crisis of 2011, or the Pandemic Crisis of 2020, public policy-makers usually contemplate two basic financial choices, engage in tax increases or cut the budget, to overcome tough financial situations. There is the third financial option, however: delinquent

tax collection, which has received minimal attention. This option will "raise revenues without raising taxes" (US Senate, Republican Policy Committee 2006, 3). In Fiscal Year 2018, the federal delinquent non-tax debt, such as administrative debt (e.g., fines, penalties, and overpayments), defaulted guaranteed loans (e.g., rehabilitated loans), and direct loans (e.g., student loans) totaled $203 billion, an increase of $18.0 billion (10 percent) from FY2017 (US Department of the Treasury 2019). The status of federal delinquent tax debts, however, is more serious. In Fiscal Year 2018, the federal unpaid tax debt inventory totaled $389 billion, a debt inventory that is almost twice that of delinquent non-tax debt (US Department of the Treasury 2018a).

[Figure 1 about here]

As presented in Figure 1, tax delinquency over the last 15 years has continued to grow. Tax delinquency has a destructive effect on the government's fiscal health in terms of both revenue and equity. First, tax delinquency leads to a loss of revenues and a higher cost of collection. Delinquency compels the government to implement enforcement collection processes that are more costly to both the government and the taxpayer. Furthermore, every year the IRS writes off an average of 35 percent of delinquent taxes from the unpaid tax inventory due to statutory limits on the IRS collection period (US Government Accountability Office 2008). Second, tax delinquency reduces the taxpayer's voluntary compliance rate. Tax delinquency encourages the honest taxpayer not to comply with the tax system, leading to the violation of the equity principle of taxation. It is, therefore, crucial for the government to effectively collect the taxes already imposed, not just to find new tax bases or raise tax rates. In other words, the government's contractual choice of tax collection may be a key component in reducing the non-payment of taxes.

IRS's Collection Method: A Fixed-Wage Contract

Following our analytics, the implication is that the most prominent characteristic of the fixed-wage contract is that there is no direct or indirect functional relation between the tax collection agent's performance and its wage, which results in a low level of collection effort.

The IRS's tax collection staff receives a fixed wage, *w,* regardless of the amount of taxes collected through its efforts. According to Section 1204 (a) of the IRS Restructuring and Reform Act of 1998, "the Internal Revenue Service shall not use records of tax enforcement results (1) to evaluate employees; or (2) to impose or suggest production quotas or goals with respect to such employees" (Guenther 2006, 14). Before the *IRS Restructuring and Reform Act of 1998*, the *Technical and Miscellaneous Revenue Act of 1988* and the 1988 *IRS Policy Statement P-1-20* prohibited the IRS from using tax collection performance, including enforcement data, to evaluate an employee's performance or wage (US Government Accountability Office 2008).

Under the current prohibitions and contractual form against performance-based compensation in the IRS, it is difficult to expect the IRS tax collection employee to choose anything other than a low level of effort to collect delinquent taxes. The wage contract leads to a net tax revenue received including the expected cost of compensation, w^*, or $U_0 + e_w^{L*}$, and the agency cost resulting from shirking, $m(e_w^{L*})$. Thus, the growing amount of delinquent taxes, noted in Figure 1, is partly due to the inefficiency of the bureaucratic tax collection system. Congress has not endorsed repeated budget requests for hiring IRS tax collection staff because Congress has questioned the effectiveness of the IRS in delinquent tax collection. This questioning underpins why Congress and the Clinton administration, in 1993, began to consider alternative ways to collect federal delinquent income tax through contracting out the collection activities with private debt collection companies.

VI. CONTRACTING OUT DELINQUENT TAX COLLECTION

At the federal level, agencies, except for the IRS, have been using private debt collection companies to collect their non-tax debts, such as penalties, fees, and student loans. Local and state governments in the United States have been using private debt collection agencies to collect their delinquent taxes since the 1980s. Internationally, Australia and Japan use private debt collectors to collect delinquent taxes. Since 2013, South Korea has used the Korea Asset Management Corporation (KAMCO), a government-funded public corporation, to collect delinquent national taxes.

In the federal system, the *Federal Claims Collection Act of 1966* first allowed federal agencies to contract out the collection of federal non-tax debts in the United States, with the Department of Education beginning to use private debt collectors to collect student loan debt (Resnick 2005). The *Debt Collection Act of 1982*, as amended by the *Debt Collection Improvement Act of 1996*, permitted most federal agencies, except the IRS, to use private collection companies to collect non-tax debts (US Government Accountability Office 1993). Currently, the US Department of Education, the Department of Health and Human Services, and the Department of the Treasury's Bureau of Financial Management Service (FMS) use private collection agencies (OMB 2013). In particular, the FMS has been implementing a federal government-wide delinquent non-tax debt collection program since 1996 to collect non-tax debts referred from other federal agencies (OMB 2013). In Fiscal Year 2010, private collection agencies, under contract with federal agencies, collected $777 million of federal non-tax delinquent debts and reduced $1.7 billion of federal delinquent debts by arranging loan consolidations and rehabilitations (US Department of the Treasury 2011).

Vice President Al Gore suggested the expansion of using private debt collection agencies in his *National Performance Review* report in 1993, which led to the Clinton administration initiating private tax collection of delinquent federal taxes. In 1996 and 1997, Congress gave the IRS the authority to establish and manage a pilot project—known as the

Contracting Out Collection Activities Project—using private debt collection agencies (PCA). In the appropriations bills enacted in 1996 and 1997, Congress authorized the IRS to spend up to $13 million each year to experiment with the use of PCAs in the collection of delinquent individual taxes. Addressing the mandate, the IRS set up a program that hired PCAs to assist the IRS collection staff by locating and contacting individual taxpayers to remind them of their overdue tax liabilities and inform them of payment options. Taxpayers who agreed to a payment plan were referred to an employee of the IRS's collection division to arrange a payment schedule. The pilot project detailed that only IRS employees could collect funds to settle delinquent accounts. PCAs received a fixed fee for assisting the IRS, regardless of the amount of overdue taxes collected.

The termination of the pilot project by the IRS occurred in 1997. The disbanding was due to dissatisfaction with the results among some in Congress and within the Clinton administration. The GAO examined the effects of the project in a report issued in 1997 (US Government Accountability Office 1997). The report noted the failure of the project to live up to initial expectations. GAO said that failure was due to the limitations imposed on the work PCAs were allowed to undertake, the number and types of cases referred to PCAs, and repeated problems in using the IRS's computer system to identify, select, and transmit collection cases to PCAs.

After the failure of the Contracting Out Collection Activities Project in 1997, the IRS continued with its internal collection. The issue of contracting out delinquent individual taxes appeared again in 2003, under the Bush administration. In 2004, the *American Jobs Creation Act of 2004* permitted the IRS to hire PCAs to assist in the collection of delinquent taxes. The request included a proposal to allow the IRS to hire PCAs, with the intent of the project to address the buildup of potentially collectible inventory that was not being worked by the IRS.

The PCAs would help collect the aging receivables in exchange for commissions based on the amounts collected (Hamilton 2003).

Under the *American Jobs Creation Act of 2004*, the use of PCAs was to be limited to locating individual taxpayers with overdue tax liabilities. The PCAs contacted individuals who were not contesting their tax assessments requesting from them the full and immediate payment of these debts. If the taxpayer could not immediately pay the debt, PCA's could offer the option of paying in installments over three years. If no such agreement was possible, the PCAs obtained needed financial information about the taxpayer and transmitted it to the IRS. PCA assignments were cases with resolutions that were obtainable in one or two phone calls and required no "exercise of discretion."

These limitations to the PCAs provided the IRS, under 26 US Code § 6301, to meet the criteria that only officers, employees, and agencies of the Treasury Department may collect "taxes imposed by the internal revenue laws," a point of much contention and debate. Reinforcing the dispute with the *American Jobs Creation Act of 2004* was the prohibition on outsourcing federal tax collection existing in the *Federal Activities Inventory Reform Act of 1998* (FAIR Act). The act barred federal agencies from hiring the private sector to conduct activities regarded as inherently governmental. Incorporated in FAIR's Section 5, the action is inherently governmental if "it is so intimately related to the public interest as to require performance by Federal Government employees" and necessitates the "exercise of discretion" in applying governmental authority or the "making of value judgments relating to monetary transactions and entitlements." To address these issues, Congress, under the *American Jobs Creation Act of 2004*, enacted 26 US Code § 6306, focusing on limiting the PCAs to matters that did not include the "exercise of discretion."

The IRS, under the new 26 US Code § 6306, provided PCAs with cases on taxpayers who had filed tax returns showing unpaid taxes owed or taxpayers who made three or more payments against a tax assessment by the IRS but stopped the payments before full payment.

Revenue collected, through the activities of PCAs, was routed into a revolving fund that would compensate the PCAs. Quality of service provided, taxpayer satisfaction, and case resolution were factors in the amount of compensation for the PCAs. The rules that are protecting fundamental taxpayer rights and confidentiality of information applied to PCA employees. Taxpayers contacted by PCAs who believed a PCA's actions had violated their rights could sue the PCA for civil damages, with the IRS held harmless for any illegal act committed by a PCA employee.

The IRS implemented the PCA project in September 2006. The project was discontinued in March 2009 when the IRS issued IR-2009-19, a report that found that the IRS was a more effective collector than the PCAs. A review of the report's findings raised serious questions about the methodology used and the outcomes expressed (US Government Accountability Office 2010). During the PCA project, hearings were held in Congress regarding the PCAs' economic incentives to assist taxpayers. The hearings focused on special needs taxpayers, the utilization of psychological techniques by the PCAs to collect the maximum amount from taxpayers, and the fear PCAs applied to frighten taxpayers to comply (*Written Statement of Nina Olson* 2007). Using both testimony and IR-2009-19, Congress discontinued funding the PCA project due to its contentious nature. Using *The Omnibus Appropriations Act of 2009*, enacted March 11, 2009, Congress prevented the IRS from using FY2009 appropriated funds "to enter into, renew, extend, administer, implement, enforce, or provide oversight of any qualified tax collection contract (as defined in IRC § 6306 of the Internal Revenue Code of 1986)." Due to the elimination of appropriated funds, the IRS funded the administrative costs of the PCA project through its user fees until the IRS was

able to end all PCA activities. *The Consolidated Appropriations Act of 2010* prohibited the IRS from using FY2010 funds for the PCA project, effectively eliminating the project (US Government Accountability Office 2010).

In April 2017, after the passage of the Fixing America's Surface Transportation Act in 2015, the IRS began sending letters to a small group of taxpayers who had overdue federal tax accounts. The letters notified the taxpayer of the assignment of the outstanding tax receivables to one of four qualified private-sector collection agencies. This new initiative follows 26 US Code § 6306, amended in 2015, which is similar to the prior PCA implementation in 2006. 26 US Code § 6306 allows the IRS to outsource "inactive tax receivables," defined as any tax receivables removed from the IRS active inventory, or with more than one-third (two years) of the statute of limitations expired, or without IRS or third-party interaction with the taxpayer for more than 365 days. Under this new implementation, fees associated with the PCA may not exceed 25 percent of the amount collected. Reporting of the results of the PCA collections must be to Congress no later than 90 days after the last day of each fiscal year. At the end of FY2018, more than 600,000 taxpayers' debts were in the PCA inventory. Of this inventory, 400,000 taxpayers' liabilities had no installment agreement (IA) or payment for more than 90 days after the assignment. On average, this inventory was 244 days old (Olson 2018). The Taxpayer First Act of 2019 requires—beginning on January 1, 2021—that the IRS excludes specific accounts from collection by PCAs. Accounts omitted are those where substantially all of a taxpayer's income is attributable to Social Security Disability Insurance (SSDI) or Supplemental Security Income (SSI), or a taxpayer's adjusted gross income is at or below 200 percent of the Federal Poverty Level.

Analytic Application Using the IRS's 1996 and 1997 Pilot Programs

Our initial application of the analytic models is to the IRS's 1996 and 1997 pilot program, the Contracting Out Collection Activities Project. Analysis of the Contracting Out Collection Activities Project identifies the program as a fixed-wage contract. The indication is that given the fixed-price contract focus, the pilot program was a labor substitute that used private contractors instead of hiring additional IRS employees. The model implies that the expectation of a private collection agent's high level of performance under this pilot program would be erroneous. Given that the pilot program was a fixed fee, *w*, the expectation would be a low effort level by the contractor, e_w^{L*}. What the GAO (1997) audit report identifies is the fixed-fee aspect of the PCA contracts leading to poor outcomes and dissatisfaction with the financial results of the program. As expected in our analytical presentation, the pilot program funding detachment from revenue generation by the PCAs, that is, funding by appropriations results in low revenue generation performance. Table 1 shows that the levels of effort can be ordered, $e_w^{L*} < e_s^{M*} < e_r^{H*}$. The wage contract, as used in the pilot program of 1996 and 1997, produces the lowest level of the PCAs' effort, e_w^{L*}, leading to a poor financial outcome. According to the GAO (1997), the Office of Management and Budget and IRS consider the "collection of taxes" to be an "inherently governmental" function requiring performance by government employees. The program's private collectors only located and contacted taxpayers to remind them of their outstanding tax liability, while suggesting various payment methods. Under this legal interpretation barring the PCAs from actually collecting the funds to settle delinquent accounts, we order the government's gross tax revenues as $G_w < G_s < G_r$, where the PCAs act similarly to a government employee, leading to the lowest level of gross tax revenues, G_w, as observed in the model. Although data is unavailable for the pilot program, the analytics tell us that ordering the third observation the corresponding compensation level is $C_w < C_s < C_r$. These results imply that compensation cost is at its lowest, C_w. We assume that, as observed in the pilot program financial inference

by GAO (1997), net tax revenues are potentially detrimental to the program. In fact, after including start-up costs, the net income for the program was a loss of $17 million. In short, the pilot program's failure is the model's expected outcome, given the lack of incentives structured within the contract.

Analytic Application Using the IRS's 2006 Initiative

The IRS's 2006 PCA initiative fits the revenue share contract model. Under this plan, the IRS paid a commission of 25 percent of collected delinquent tax revenue to the private collection agencies, *s*. The IRS isolated these collected delinquent tax revenues into a revolving fund, paying the compensation for the collection effort of the PCAs (Guenther 2006), a self-financing structure. Thus, the IRS's PCA initiative in 2006 was a typical revenue share contract of tax farming.

Table 1 indicates that the government's gross tax revenues are G_s. Although we question the data used by the IRS, Table 1 identifies the corresponding compensation level as C_s. We note that effort will be moderate, e_s^M in the analytic model. These assumptions imply that net revenue would be $f(e_s^{M*})R - (U_0 + e_s^{M*}) - d(e_s^{M*})$ under the assumption that monitoring costs of $d(e_s^{M*})$ are lower than $k(e_s^M) = (U_0 + e_s^M)$. This outcome implies that net tax revenues are potentially positive, indicating the financial validity of the revenue share contract. According to the Treasury Inspector General for Tax Administration 2018 report (TIGTA), PCAs collected $98.2 million, $f(e_s^{M*})R$, from delinquent IRS accounts, accounts that were considered low yield, and in general, not worked by the IRS. Commission costs were $16.5 million, with operating expenses of $30.7 million. The initiative's net operating revenue is $51.0 million. Unfortunately, the IRS treated its start-up costs for the initiative ($55.4 million) as an operating expense, not a sunk cost; thus, it interpreted the financial results of the initiative as a small net operating revenue loss of $4.4 million. The IRS saw the

negative balance as instrumental in restricting the initiative's life to three fiscal years and finding that the IRS was more cost-effective in tax collections (IRS 2009).

The demise of the initiative in 2009 focused on the financial results of IRS (2009), but further analysis indicates that the issues with the PCAs were much deeper than the financial results. As seen in the analytical model, the dynamic nature of incentive-based contracts mitigates a shirking problem but leads to other moral hazard issues, the PCAs' overzealous collection tactics. There are legal protections to prevent the PCAs from these types of collection tactics. The *Fair Debt Collection Practice Act of 1977* (FDCPA) regulates third-party collection businesses, and the Federal Trade Commission enforces it. This act prohibits "abusive, deceptive, and other improper collection practices by the third-party collection" (Federal Trade Commission 2006, 1). The *Debt Collection Improvement Act of 1996* not only enhances federal debt collection but also "provides greater safeguards for a debtor's due process right" (Resnick 2005, 131). Additional taxpayer protections include Section 1203 of the *IRS Restructuring and Reform Act of 1998* and *Internal Revenue Code Section 7811*, which requires tax collectors to inform the taxpayer to seek assistance from the IRS National Taxpayer Advocate (Guenther 2006). Also, there is another administrative process to mitigate the possibility of overzealous collections, given that PCA employees undergo a background investigation to prevent misusing taxpayer information (IRS 2005). In particular, PCAs do not "handle actual payments because all payments are routed directly to the IRS" (US Senate, Republican Policy Committee 2006, 7).

Available data on the 2006 PCA initiative, albeit highly suspect, indicates that the issue that led to the demise of the PCA initiative appears to be overzealous collection activities. During the 2006–2008 period, complaints to the FTC regarding the FDCPA and external PCAs increased in absolute terms from 69,249 in 2006 to 78,925 in 2008. As a proportion of total FDCPA complaints, including both external and in-house collectors, the

percentage of complaints attributable to external PCAs was about 76.4 percent of total complaints. PCA complaints are over three times the number of complaints vis-à-vis in-house collectors.

An additional complaint measure includes testimony from the IRS's National Taxpayer Advocate (NTA). During the period in which the PCAs were actively collecting delinquent individual taxes, the NTA testified that the Taxpayer Advocate Service (TAS) received 318 direct complaints regarding PCAs from 9/2006 until 5/2007 (Olson 2007). In 18 percent of the TAS cases, the taxpayer indicated that they previously contacted the IRS to resolve the tax issue. In comparison, 14 percent of the cases the taxpayer requested TAS assistance when contacted by the PCA. In 6 percent of the cases, the taxpayer indicated that they wanted to work with the IRS, not the PCA. In 2 percent of the cases, the taxpayer had a complaint about the PCA. These two measures may be indicative of overzealous collection activities by the PCAs, which contributed to the demise of the 2006 PCA project in 2009. This outcome is present in our model when the tax farming collection activity is under a share contract constraint.

Analytic Application Using the IRS's 2017 Initiative

Similar to the project in 2006, Congress in 2015, under the *Fixing America's Surface Transportation Act* (FAST Act), compelled the IRS to enter into "qualified tax collection contracts" for "inactive tax receivables" (Guenther 2020). The Joint Committee on Taxation (JCT) estimated that expected revenue from the new initiative would be $2.4 billion over the period FY2016 to FY2025. The new initiative was a share contract with as much as 25 percent of gross revenue raised going to the PCAs, noted in our model $(1-s)f(e_S^M)R$. Before launching the initiative, the NTA voiced her concern that the initiative would create or exacerbate taxpayers' economic hardships. Using the IRS's projections under the proposed legislation, about 79 percent of the taxpayers whose debts would be eligible for assignment to

PCAs had incomes below 250 percent of the federal poverty level. As we indicated in the modeling, shared contracts introduce modest over-enforcement by the tax farmers, PCAs.

Our analytical model implies that the government's gross tax revenues are G_s as noted in Table 1. Following Table 1, the corresponding compensation level is C_s. These results imply that net tax revenues are potentially positive, assuming that monitoring for over-enforcement is modest. According to the *Internal Revenue Service – Private Debt Collection Program 4th Quarter Update 2019*, PCAs have collected a total of $301.7 million from delinquent IRS accounts defined as any tax assessment in the IRS's inventory that meets at least one of the following four criteria: (1) the assessed tax was removed from the active inventory due to a lack of IRS resources for collecting the tax assessment or the IRS cannot locate the taxpayer; (2) more than one-third of the statute of limitation has lapsed; (3) the tax assessment is not assigned to an IRS employee for collection; or (4) the tax assessment had been assigned to an IRS employee for collection and the last communication between the IRS and the taxpayer to collect the tax owed is more than 365 days (Guenther 2020). Commission costs are $54.6 million, with operating expenses of $77.1 million. The initiative's net operating revenue is $170.0 million through FY2019.

Although this initiative is financially rewarding to the IRS, with program revenues surpassing program costs, achieving the surplus is through the collection of tax receivables from economically vulnerable taxpayers (Olson 2018). Using IRS databases for FY2018, the NTA shows that about $28 million of the $82.1 million collected, or about 34 percent, was attributable to PCA activity with taxpayers whose incomes were at or below their allowable living expenses (ALEs).[1] Olson (2018) states that of the initiative's revenue, only about a third of those revenues attributable to PCA activity in FY2018 made their way to the federal

[1] Internal Revenue Manual (IRM) 5.15.1.8, Allowable Expense Overview, https://www.irs.gov/irm/part5/irm_05-015-001#idm140164197759840 (July 22, 2020).

government's General Fund. By the end of FY2018, over 400,000 PCA cases had no payment and no agreement to pay, although the cases were at least 90 days old. Cases retained without resolution of the liability allows PCAs to receive commissions on any payments taxpayers happen to make in the absence of any PCA collection activity (Olson 2018). We note here that our analytical model shows that a trade-off between administrative effectiveness and procedural fairness in tax collection exists and that this trade-off leads ambiguity in the results of our analytic presentation.

VII. CONCLUSION

Prior literature on taxation focuses on finding optimal tax rates and determining tax bases rather than tax collection efforts. In addition, much of the tax collection literature focuses on the tax evasion issue rather than the tax collection process itself. Prior research on the history of tax collection has implicitly established the importance of agency costs in both bureaucratic tax collection and tax farming systems by identifying lessons and features of tax collection contracts. However, such previous studies tend to focus on historical descriptions regarding tax collection methods rather than modeling the underlying mechanisms of tax collection contracts, offering an analysis, and applying it to a recent tax collection case. In this paper, we seek to understand the tax collection method by developing a model to explicitly incorporate the trade-off of agency costs among tax collection contracts.

Our key argument is that the government can indirectly choose the level of effort of the tax collection agent by offering each a different compensation scheme to maximize its tax revenue. A compensation-to-effort mapping, however, leads to a trade-off among agency costs. We find that when choosing a contractual form of tax collection, the government needs to consider not only the compensation-to-effort mapping issue but also the agency costs resulting from such a mapping.

Although the optimization processes derive our optimal conditions of contracts, it is not straightforward to compare the relative values of contracts. The formal analysis derives six central comparative statics. It is relatively straightforward to compare each level of an agent's collection effort, compensation cost, and gross tax revenue among contracts. Ambiguity, however, is present when comparing net tax revenue, agency cost, and agency cost adjusted net tax revenue.

The formal model is not enough to compare relative values among contracts and to select the best tax collection contract among them but provides useful theoretical implications about the relative value of each contract. The impact is that as the government increases the compensation for the tax collector, the level of effort of the tax collection agent will increase, and correspondingly, the gross tax revenue will increase. Insistent collection behavior of the agent motivated by the incentive compensation can, however, offset the benefits of an incentive contract by escalating other types of agency costs in the long run.

Application of the model to the IRS outsourced (tax farming) collection process is evaluated, indicating that the model helps us understand what costs were associated with these tax farming outcomes. We find that low levels of effort in the 1996 PCA pilot project, a consistent result related to our model, led to financially detrimental consequences for the project. We find, consistent with our model, that share contracts led to potential over-enforcement by the PCA in the 2006 PCA contract, leading to the demise of the project in 2009. We explore the current share contract initiative that began in April 2017. To date, we find the initiative's gross debt collections are lower than anticipated. However, total debt collections are over $300 million, with expenses at about $130 million, for a surplus of about $170 million. As shown by our analytical model, over-enforcement is occurring, which is confirmed by the NTA when she notes that most of the gross debt collections are from those where the means of paying over a long period is questionable.

Implications of the model assist us in thinking about the current issue of contracting out delinquent tax collection with private debt collection companies. Contracting out delinquent tax collection may increase gross tax revenue and the tax collection rate. These benefits of an incentive-based contract, however, may be offset by increasing compensation cost and social costs associated with taxpayer harassment.

REFERENCES

Allingham, M. G., and A. Sandmo. 1972. Income tax evasion: A theoretical analysis. *Journal of Public Economics* 1 (3–4): 323–338.

Azabou, M., and J. B. Nugent. 1988. Contractual choice in tax collection activities: Some implications of the experience with tax farming. *Journal of Institutional and Theoretical Economics* 144: 684–705.

Becker, G. S. 1968. Crime and punishment: An economic approach. *Journal of Political Economy*, 76: 169–217.

Coşgel, M. M., and T. J. Miceli. 2009. Tax collection in history. *Public Finance Review* 37 (4): 399–420.

Eisenhardt, K. M. 1989. Agency theory: An assessment and review. *Academy of Management Review* 14 (1): 57–74.

Escobari, D. 2012. Imperfect detection of tax evasion in a corrupt tax administration. *Public Organization Review* 12 (4): 317–330.

Executive Office of the President, Office Of Management and Budget. 2013. *Circular No. A-129 Policies for Federal Credit Programs and Non-Tax Receivables.*

Fixing America's Surface Transportation Act (FAST Act), Pub. L. No. 114-94, Div. C, Title 23, § 32102, 129 Stat.1312, 1733-36 (2015). (adding subsections (c) and (h) to IRC § 6306).

Guenther, G. 2006. *The Internal Revenue Service's (IRS) use of private debt collection agencies: Current status and issues for Congress. CRS Report RL33231.* Washington, DC: Congressional Research Service.

Guenther, G. 2020. *The Internal Revenue Service's private tax debt collection program. CRS Report IF10339, Version 8 Updated*. Washington, DC: Congressional Research Service.

Hamilton, A. 2003. Bush proposes private agencies collect known tax delinquencies. *Tax Notes*, February 10, 2003: 885–887.

Jang, S., and R.J. Eger III. 2019. The effects of state delinquent tax collection outsourcing on administrative effectiveness, efficiency, and procedural fairness. *The American Review of Public Administration* 49 (2): 236-251.

Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4): 305–360.

Johnson, N. D., and M. Koyama. 2014. Tax farming and the origins of state capacity in England and France. *Explorations in Economic History* 51: 1–20.

Levi, M. 1988. *Of Rule and Revenue.* Berkeley, CA: University of California Press.

Law, K. K., and L. F. Mills. 2015. Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research* 53 (4): 777–819.

Mirrlees, J. A. 1976. The optimal structure of incentives and authority within an organization. *Bell Journal of Economics* 7: 105–31.

Nagin, D. S. 2013. Deterrence: A review of the evidence by a criminologist for economists. *Annual Review of Economics* 5(1): 83–105.

Olson, N. E. 2018. *National Taxpayer Advocate annual report to Congress.* Available at: www.TaxpayerAdvocate.irs.gov/2018AnnualReport

Olson, N.E. *Use of Private Collection Agencies by the IRS: Testimony before the Subcommittee on Oversight of the House Committee on Ways and Means*, 108th Cong. (May 13, 2003).

Resnick, M. T. 2005. Outsourcing federal tax collection. *Houston Business and Tax Law Journal* 5: 128–159.

Ross, S. A. 1973. The economic theory of agency: The principal's problem. *The American Economic Review* 63 (2): 134–139.

Slemrod, J. 2007. Cheating ourselves: The economics of tax evasion. *Journal of Economic Perspectives* 21 (1): 25–48.

Slemrod, J. 2019. Tax compliance and enforcement. *Journal of Economic Literature* 57 (4): 904–954.

Slemrod, J., and S. Yitzhaki. 1996. The costs of taxation and the marginal efficiency cost of funds. *IMF Staff Paper* 43 (1): 172–198.

Srinivasan, T. N. 1973. Tax evasion: A model. *Journal of Public Economics* 2 (4): 339–346.

Toma, E. F., and M. Toma. 1992. Tax collection with agency costs: Private contracting or government bureaucrats? *Economica*, New Series, 59 (233): 107–120.

US Department of the Treasury. 2019a. *Fiscal Year 2018 Report to the Congress: US Government Receivables and Debt Collection Activities of Federal Agencies*. Washington, DC: Financial Management Service, US Government Printing Office.

US Department of the Treasury. 2019b. Private Debt Collection Program 4th Quarter Update 2019. *Internal Revenue Service.* Washington, DC: Internal Revenue Service.

US Department of the Treasury. 2018a. *Agency Financial Report.* Washington, DC: US Department of the Treasury, US Government Printing Office.

US Department of the Treasury. 2018b. *Private Debt Collection Was Implemented Despite Resource Challenges; However, Internal Support and Taxpayer Protections Are Limited. Treasury Inspector General for Tax Administration (TIGTA) Report 2018-30-052*. Washington, DC: Treasury Inspector General for Tax Administration.

US Department of the Treasury. 2009. IRS Private Debt Collection. *Internal Revenue Service.* Washington, DC: Internal Revenue Service.

US Department of the Treasury. 2005. *Request for Quotation. Internal Revenue Service #TIRNO-05-Q-00187*. Washington, DC: Internal Revenue Service.

US Government Accountability Office. 1993. *Tax Administration: New Delinquent Tax Collection Methods for IRS. GAO/GGD-93-67.* Washington, DC: USGAO.

US Government Accountability Office. 1997. *Issues Affecting IRS's Collection Pilot. GAO/GGD-97-129R.* Washington, DC: USGAO.

US Government Accountability Office. 2008. *Tax Debt Collection: IRS Has a Complex Process to Attempt to Collect Billions of Dollars in Unpaid Tax Debt. GAO-08-728*. Washington, DC: USGAO.

US Government Accountability Office. 2010. *Tax Debt Collection: IRS Could Improve Future Studies by Establishing Appropriate Guidance. GAO-10-963*. Washington, DC: USGAO.

US Government Accountability Office. 2012. *Federal Tax Debts: Factors for Considering a Proposal to Report Tax Debts to Credit Bureaus. GAO-12-939*. Washington, DC: USGAO.

US Senate, Republican Policy Committee. 2006. *Private Collection Agencies: Addressing a Piece of the Tax Gap Pie*. Washington, DC: RPC.

Webber, C., and A. Wildavsky. 1986. *A History of Taxation and Expenditure in the Western World.* New York, NY: Simon & Schuster.

Written Statement of Nina E. Olson, National Taxpayer Advocate Before the Committee on Ways and Means. US House of Representatives Hearing on IRS Private Debt Collection Program, 110th Cong. (2007).

Table 1: Components of Optimal Contract Value Function in Dynamic Models: Costs and Benefits

Contract Form	[(Net Tax revenue	= Gross tax revenue	− Compensation Cost)	− Agency cost]	= Agency-cost Adjusted Net Tax Revenue
Fixed Wage	$f(e_w^{L*})R - w^*$	= $f(e_w^{L*})R$	$-(U_0 + e_w^{L*})$	$-m(e_w^{L*})$	$= V_w^*$
Revenue Share	$(1-s^*)f(e_s^{M*})R$	= $f(e_s^{M*})R$	$-(U_0 + e_s^{M*})$	$-d(e_s^{M*})$	$= V_s^*$
Fixed Rent	F^*	= $f(e_r^{H*})R$	$-(U_0 + e_r^{H*})$	$-k(e_r^{H*})$	$= V_r^*$

Contract Form	[(Net Tax revenue	= Gross tax revenue	− Compensation Cost)	− Agency cost]	= Agency-cost Adjusted Net Tax Revenue
Fixed Wage	N_w	$= G_w$	$- C_w$	$-A_w$	= Adj.N_w
Revenue Share	N_s	$= G_s$	$- C_s$	$-A_s$	= Adj.N_s
Fixed Rent	N_r	$= G_r$	$- C_r$	$-A_r$	= Adj.N_r

Figure 1: Total Unpaid Tax Debt
(in Millions of Nominal Dollars)