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Public trust and government betrayal

Christopher Phelan*, [1]

Federal Reserve Bank of Minneapolis, Research Department, 90 Hennepin Ave., Minneapolis, MN 55480, USA

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Abstract

This study presents a simple model of government reputation (in which government type cannot be directly observed by households) with the variation that government type, rather than being permanent, follows an exogenous Markov process. This formulation captures three characteristics of bad policy outcomes: governments which betray public trust do so erratically, public trust is regained only gradually after a betrayal, and governments with recent betrayals betray with higher probability than other governments.

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1. Introduction

Much of the theory on credible government policy concerns itself with accounting for the ability of governments to make and keep promises, given that government policymakers face a well-known *time consistency problem*. That is, it is seldom in the short-run best interest of a government to keep capital taxes low, honor its debt obligations, or inflate the

* Fax: +1 612 204 5515.
E-mail address: cjp@minneapolisfed.org.

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currency only by the expected amount. [2] In *reputation models* (such as Barro and Gordon [1]), governments are assumed to be one of two possible types, but exactly which is private information. These government types can be classified as *trustworthy* (the government is either unable to break explicit or implicit promises, or faces payoffs which directly punish it for doing so) or *opportunistic* (the government has a short-run incentive to break promises). The implicit assumption is that there is only a small probability that the government is the trustworthy type, making such models close to those where government type is common knowledge. The main finding of this literature is that there is a unique equilibrium outcome in which opportunistic governments mimic trustworthy governments, fearing the implications of the public learning for sure that they are the opportunistic type. [3] Thus the good outcome (households trust the government and the government validates this trust) occurs.

In these models, however, the government's type is assumed to be fixed over time. In this paper, I study the impact of relaxing the assumption of constancy of government type. I instead assume that the government's type follows a Markov process. The surprising result of this study (under mild parameter restrictions) is that if government type can change in this manner, then no matter how unlikely such a change is, the unique Markov perfect equilibrium has the opportunistic government following a mixed strategy for a finite number of periods after revealing its type. That is, for some time after acting badly and thus revealing its type (labeled N periods), opportunistic governments do not routinely act in a trustworthy or an untrustworthy manner, but instead randomize regarding whether or not to betray the trust of households. During this time, households gradually update their beliefs regarding the government's type, becoming more confident they are facing a trustworthy government.

This mixing occurs because neither mimicking with certainty nor always acting badly can be part of a Markov perfect equilibrium. That is, suppose opportunistic governments always betrayed household trust. Given this, if households are sufficiently confident they are facing an opportunistic government (say, because they had only recently been betrayed by the government), the government would be granted very little trust. But this implies an opportunistic government has little to gain by betraying the little trust it has been granted. As long as some probability exists that the government truly is the trustworthy type (a possibility ensured by the assumption of Markov switching), Bayesian learning implies an opportunistic government can earn a good reputation by mimicking the trustworthy type for one period. This enhanced reputation is valuable to the opportunistic government; thus, opportunistic governments always betraying trust is not an equilibrium. Suppose, instead, opportunistic governments always mimicked trustworthy governments. Here, there is no cost to betraying. It is better to betray today and follow the equilibrium from tomorrow on rather than follow the equilibrium from today on. Thus, any Markov perfect equilibrium must entail at least some mixing.

This mixing implies increasing trust. Specifically, if opportunistic governments mix, then observing good behavior by the government causes households to gradually increase their Bayesian posterior that the government is the trustworthy type.

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[2] The seminal work on this result is Kydland and Prescott [11].

[3] In finite period models, such mimicking occurs except near the end of the game, and in the unique Markov perfect equilibrium of infinite period models, such mimicking occurs in every period.

These features roughly capture several real-world characteristics. For instance, actual government betrayals tend to be associated with unpredictable government policy. That is, in countries in which the government often breaks its promises, exchange rates, tax policies, and monetary policies are often stable for long periods of time in between periods of instability. Countries which often break promises do not always break promises. Further, after betrayals, public trust (in the form of money or debt holdings or capital accumulation) is rebuilt only gradually. This characteristic is captured in the equilibrium of this game. Finally, the probability of a government betrayal is higher in some countries than others. In the equilibrium of this game, governments which have betrayed more recently have a higher probability of betraying than governments which have not betrayed for a long time.

The ability of an unobserved type to change over time plays a major role in other recent papers as well. For instance, Mailath and Samuelson [12] consider the role reputation can play if one type of firm has the ability to take a good or bad action (like the opportunistic type here) and the other type of firm can only take a *bad* action. They show that with permanent types, the possibly good firms cannot separate themselves from bad firms (in any Markov perfect equilibrium), but reputation regains a role if types can change over time. [4] In fact, Cripps et al. [7] argue in an imperfect monitoring framework with opportunistic and trustworthy types that without an ability for types to change, in the long run, reputation effects disappear, suggesting that models of long-run reputations should incorporate some mechanism (such as the one here) by which the uncertainty about types is continually replenished.

In Section 2, I present the model. In Section 3, I define Markov strategies and Markov equilibria. In Section 4, I consider the special cases in which government type is common knowledge and in which government type is private but fixed through time. In Section 5, I assume government type follows a nondegenerate Markov process. Here, I prove the main results. In Section 6, I characterize the Markov perfect equilibrium of the limiting economy in which the probability that the government is a low-tax type goes to zero. In Section 7, I consider non-Markov equilibria, and in Section 8, I conclude.

2. The model

Consider the following simple game. A continuum of households faces a sequence of governments which can be of type *low-tax* or *opportunistic*. (For convenience, assume that household names are uniformly distributed on the [0, 1] interval.) The government's type is not directly observable by households. [5]

In each time period $t = 0, \dots, \infty$, households move first, simultaneously. Each household can produce at cost c a good with value q or not produce. The government and the households observe the measure (or fraction) μ of households which produce, but the action of any particular household is private to that household. (This implies that no individual

[4] See also the firm reputation model of Tadelis [14]. The work of Bénabou and Laroque [2], on the reputation of market insiders, and Kennan [9], on reputation in labor bargaining, are also related predecessors.

[5] This makes the model close to the reputation models of Kreps and Wilson [10], Milgrom and Roberts [13], Barro and Gordon [1], and their successors. In particular, Cukierman and Meltzer [8], Cole et al. [5], Celentani and Pesendorfer [3], and Cole and Kehoe [6] deal with reputation in a government policy setting.

household can affect what the government sees and thus cannot affect how the government acts.) After households move, the government moves. An opportunistic government can either tax output at an exogenous rate $\tau < 1$ or confiscate all output. A low-tax government has no choice to make; it always sets the tax to τ.[6]

If measure μ of households produce, an opportunistic government's static payoff is $\mu\tau q$ if it taxes at rate τ and μq if it confiscates all output. A low-tax government's payoffs are not defined because it never makes a choice. A household which does not produce receives a static payoff of zero regardless of what the government does. A household which produces receives a payoff of $(1-\tau)q-c > 0$ if the government taxes at rate τ and a payoff of $-c < 0$ if the government confiscates all output. These assumptions ensure that a household should produce if it anticipates that the government will tax at rate τ and should not produce if it anticipates confiscation.

In period $t = 0$, the government is the low-tax type with probability $\rho_0 \geqslant 0$. At the start of each period, a government may die and be replaced with one of the other type. An opportunistic government is replaced by a low-tax government with probability $\varepsilon \geqslant 0$; a low-tax government, by an opportunistic government with probability $\delta \geqslant 0$. These transitions, or government death and rebirth, are not observed by and cannot be directly communicated to households. Both households and the opportunistic government discount at the rate $0 < \beta < 1$. The only additional restrictions on the parameters $(c, q, \tau, \rho_0, \varepsilon, \delta)$ are the assumptions

$$\delta < 1 - \frac{c}{(1-\tau)q} \tag{1}$$

and

$$\varepsilon < \frac{c}{(1-\tau)q}. \tag{2}$$

Assumptions (1) and (2) require that the transition probabilities δ and ε are sufficiently small to ensure that it is possible to sufficiently trust and sufficiently distrust a government to allow for interesting dynamics. Assumption (1) requires that if households are certain that a government is the low-tax type at date $t-1$, their date t posterior, $1-\delta$, is high enough to ensure that producing at date t dominates not producing. Assumption (2) requires that if households are certain that a government is the opportunistic type at date $t-1$, their date t posterior, ε, is low enough to ensure that producing at date t does *not* dominate not producing. No restrictions are put on the discount rate β (other than that $0 < \beta < 1$), and no restrictions are put on the invariant (or long-run) probability that the government is the low-tax type, $\varepsilon/(\varepsilon+\delta)$. Thus, ρ_0 and ε can be set arbitrarily close to zero, which implies that this model can be made (in a sense) arbitrarily close to a model where it is common knowledge that the government is opportunistic.

[6] It is assumed that the government observably moves (determines a tax rate on production) even if $\mu = 0$, or almost all households do not produce. To check whether not producing is a best response for households given $\mu = 0$, one needs to be able to define household payoffs not only for the measure one of households which do not produce but also for a measure zero of households which do produce.

3. Markov strategies and Markov equilibria

Now consider the strategies for this game.

First, define Markov strategies relative to the state variable ρ—the households' posterior probability that the government is the low-tax type. Instead of specifying each household's strategy, it is more convenient to specify the fraction of households which produce as a function of ρ, denoted $\mu(\rho)$. This corresponds to households $[0, \mu(\rho)]$ producing and households $(\mu(\rho), 1]$ not producing. Similarly, an opportunistic government's strategy is a function $\pi(\rho)$—the probability that it confiscates. (An opportunistic government's strategy need not depend on the realized μ since $\mu \neq \mu(\rho)$ implies a deviation by a positive measure of households.) A *Markov strategy* is a specification $(\mu(\rho), \pi(\rho))$.

Since households are anonymous in this model, they cannot individually affect the play of the government or the future values of ρ and, thus, cannot individually affect the future play of the game. Whether a household should produce depends solely on whether the probability that the government confiscates in the current period is at or below a cutoff value, π^*. In particular, define π^* such that

$$(1 - \pi^*)(1 - \tau)q - c = 0,$$

which implies that

$$0 < \pi^* = 1 - \frac{c}{(1 - \tau)q} < 1.$$

Households are said to be *optimizing* if for all ρ, $\mu(\rho) > 0$ implies that $(1 - \rho)\pi(\rho) \leqslant \pi^*$ and $\mu(\rho) < 1$ implies that $(1 - \rho)\pi(\rho) \geqslant \pi^*$. (Together, these inequalities imply that if $0 < \mu(\rho) < 1$, then $(1 - \rho)\pi(\rho) = \pi^*$.)

Note that if ρ is sufficiently high (or households are sufficiently confident that they are facing a low-tax government), then households should produce regardless of the probability that an opportunistic government confiscates. Specifically, if $\rho > 1 - \pi^*$, then $(1 - \rho)\pi < \pi^*$ for all $\pi \in [0, 1]$; thus, household optimization implies that $\mu(\rho) = 1$. Thus, while π^* is the *cutoff probability of confiscation*, $\rho^* \equiv 1 - \pi^*$ can be considered the *cutoff posterior*.

Unlike households, an opportunistic government can affect the future play of the game and thus cares how it affects future values of ρ. If a government confiscates in period t, it must be the opportunistic type. Given that the government is opportunistic in period t, the posterior in period $t + 1$ is $\rho' = \varepsilon$, the probability that an opportunistic government is replaced by a low-tax government. If the government does not confiscate in period t, when it was expected to confiscate with probability π, Bayes' rule implies an updated posterior $\rho/(\rho + (1 - \rho)(1 - \pi))$ at the end of period t. This implies the posterior at the beginning of period $t + 1$ as

$$\rho'(\rho, \pi) = (1 - \delta)\left[\frac{\rho}{\rho + (1 - \rho)(1 - \pi)}\right] + \varepsilon\left[1 - \frac{\rho}{\rho + (1 - \rho)(1 - \pi)}\right]. \quad (3)$$

This function is strictly increasing in π. In particular, $\rho'(\rho, 1) = 1 - \delta$, the highest possible value for ρ. If households expect an opportunistic government to confiscate with probability one, then an opportunistic government can achieve the best possible reputation by not confiscating.

Let $V(\rho)$ denote the expected lifetime payoff to an opportunistic government associated with strategy (μ, π). The function $V(\rho)$ can be defined recursively as

$$V(\rho) = \pi(\rho)[q\mu(\rho) + \overline{\beta}V(\varepsilon)] + [1 - \pi(\rho)][\tau q\mu(\rho) + \overline{\beta}V(\rho'(\rho, \pi(\rho)))],$$

where $\overline{\beta} \equiv \beta(1 - \varepsilon)$.

A Markov strategy is said to *respect government optimization* if and only if for all (μ, ρ) such that $\pi(\rho) > 0$, confiscating is weakly preferred to not confiscating, or

$$q\mu + \overline{\beta}V(\varepsilon) \geqslant \tau q\mu + \overline{\beta}V(\rho'(\rho, \pi(\rho)))$$

and for all (μ, ρ) such that $\pi(\rho) < 1$, not confiscating is weakly preferred to confiscating, or

$$q\mu + \overline{\beta}V(\varepsilon) \leqslant \tau q\mu + \overline{\beta}V(\rho'(\rho, \pi(\rho))).$$

(Together, these inequalities imply that if $0 < \pi(\rho) < 1$, then the opportunistic government must be indifferent between confiscating and not confiscating. Thus, the above inequalities must hold as an equality.)

A Markov strategy is said to be a *Markov perfect equilibrium* if it respects both household and government optimization.

4. Special cases

Before examining the general version of my model where the transition probabilities ε and δ are greater than zero, and the initial probability that the government is the low-tax type, ρ_0, is also greater than zero, it is useful to examine the special cases where some or all of these parameters are set to zero.

First consider the complete information game. That is, assume that $\rho_0 = \varepsilon = 0$, or that after all histories, it is common knowledge that the government is the opportunistic type. In this case, a Markov perfect equilibrium is simply the fraction of households which produce, μ, and a probability that the opportunistic government confiscates, π, which in turn have an implied value

$$V = \pi[q\mu + \beta(1 - \varepsilon)V] + (1 - \pi)[\tau q\mu + \beta(1 - \varepsilon)V].$$

Given $\rho_0 = \varepsilon = 0$, household and government optimization imply $\mu = 0$, $\pi \geqslant \pi^*$, and $V = 0$. The argument is as follows: If $\pi = 1$, household optimization implies $\mu = 0$. If $\pi < 1$, government optimization requires $q\mu + \beta V \leqslant \tau q\mu + \beta V$, which, since $\tau < 1$, also implies $\mu = 0$. Thus $\mu = 0$ is necessary for (μ, π) to be a Markov perfect equilibrium. Given $\mu = 0$, an opportunistic government is indifferent between confiscating or not, but household optimization requires $\pi \geqslant \pi^*$. That $\mu = 0$ also implies $V = 0$. This no production result is not surprising. Without history-dependent strategies, only repetition of one-shot equilibria is possible, and all equilibria of the one-shot game have $\mu = 0$.

Next, assume that $\varepsilon = \delta = 0$, but $\rho_0 > 0$. Here, households are uncertain about the type of government, but know that whatever type the government is at period 0, it will always be that type. This assumption brings the model more in line with those in most work regarding reputation in game theory (Kreps and Wilson [10], Milgrom and Roberts [13], Celentani and Pesendorfer [3], among others). That is, government type is permanent (governments are never replaced), but is not observed by households. Here, similar to the chain-store paradox work, if the government ever confiscates, then its type is known forever ($\rho = 0$). Given this, $V(0) = 0$ because the subgame following a confiscation is identical to the case considered above. If $\tau q/(1-\beta) > q$ (or imitating the low-tax type forever is preferred to the one-shot gain from confiscating all output), then Markov perfect equilibria take the form $\mu(0) = 0$, $\pi(0) \geqslant \pi^*$, and $V(0) = 0$, and for all $\rho > 0$, $\mu(\rho) = 1$, $\pi(\rho) = 0$ (and, thus, $\rho' = \rho$), and $V(\rho) = \tau q/(1-\beta)$. This is, again, not surprising given the earlier work on reputation.

5. The general case

Now turn to the general version of the model. Assume that $\varepsilon > 0$ and $\delta > 0$; that is, at the start of each period, governments have a positive probability of dying and being reborn as the other type. For simplicity, also assume that $\rho_0 = \varepsilon$, implying that the game starts as if the government had confiscated in the previous period. I show here that these assumptions imply a unique Markov perfect equilibrium which always has the same structure. First, I construct the equilibrium strategy and show it is, in fact, a Markov perfect equilibrium. Then I show that no other Markov perfect equilibrium exists. And finally, I consider what happens when $\rho_0 \neq \varepsilon$.

5.1. Candidate Markov perfect equilibrium

Let $(\hat{\mu}, \hat{\pi})$ denote the candidate Markov perfect equilibrium. First, define $\hat{\pi}(\rho)$ such that if $\rho < \rho^*$, the opportunistic government randomizes to make households indifferent to producing or not, or $(1-\rho)\hat{\pi}(\rho) = \pi^*$. For $\rho \geqslant \rho^*$, let $\hat{\pi}(\rho) = 1$. This completely specifies the behavior of the opportunistic government. To specify household behavior, $\hat{\mu}(\rho)$, we must first derive the evolution of government reputation given that the opportunistic government is following $\hat{\pi}(\rho)$:

When $\pi = \hat{\pi}(\rho) = \pi^*/(1-\rho)$, the function $\rho'(\rho, \pi)$ simplifies to

$$\rho'(\rho) = [\rho(1-\delta-\varepsilon)/\rho^*] + \varepsilon.$$

If $(1-\delta-\varepsilon)/\rho^* \geqslant 1$, then this function is linear, has a positive intercept, ε, and a slope weakly greater than one. If $(1-\delta-\varepsilon)/\rho^* < 1$, Assumption (1) ($\rho^* < 1-\delta$) ensures that the unique fixed point of $\rho'(\rho)$ is greater than ρ^*.[7] In either case, starting from ε, we can successively apply $\rho'(\rho)$ to step weakly above ρ^* in a finite number of steps (denoted N) (see Fig. 1). That is, under $\hat{\pi}$, $\rho < \rho^*$ if fewer than N periods have passed since the last confiscation, and $\rho \geqslant \rho^*$ otherwise. For convenience, let $\hat{\rho}_i$ equal the value of ρ (determined by successively applying $\hat{\rho}'(\rho)$) after i consecutive nonconfiscations. Generically, $\hat{\rho}_N$ will strictly exceed ρ^*, and this will be assumed hereafter. Since $\hat{\pi}(\rho) = 1$ for $\rho \geqslant \rho^*$, Eq. (3) implies that $\rho_i = 1-\delta$ for $i \geqslant N+1$. Given this characterization of equilibrium updating, it

[7] Let $\tilde{\rho} = \rho'(\tilde{\rho})$, which implies $\tilde{\rho} = \varepsilon\rho^*/(\rho^* - (1-\delta-\varepsilon)) > \varepsilon\rho^*/(1-\delta-(1-\delta-\varepsilon)) = \rho^*$.

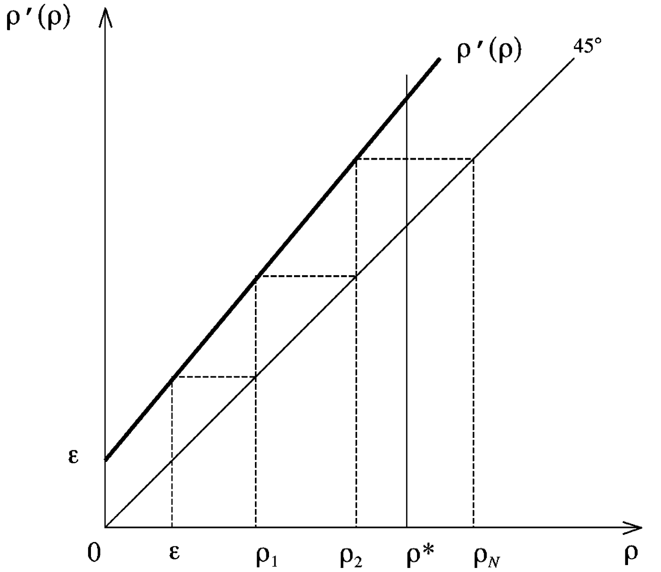

Fig. 1. Equilibrium updating.

is now possible to specify household behavior for $\rho \in \{\hat{\rho}_0, \hat{\rho}_1, \ldots\}$. Just as the probabilities of confiscation, $\hat{\pi}_i$, $i \leqslant N-1$, are constructed to make households indifferent between producing or not, the fractions of households which produce, $\hat{\mu}_i$, $i \leqslant N-1$, are constructed to make an opportunistic government indifferent between confiscating or not. This implies that, for $i \leqslant N-1$,

$$\hat{V}_i = q\hat{\mu}_i + \overline{\beta}\hat{V}_0, \tag{4}$$

$$\hat{V}_i = \tau q\hat{\mu}_i + \overline{\beta}\hat{V}_{i+1}. \tag{5}$$

Expressions (4) and (5) define a sequence of $2N$ equations with $2N+1$ unknowns ($\hat{V}_i$ for $i \in \{0, \ldots, N\}$ and $\hat{\mu}_i$ for $i \in \{0, \ldots, N-1\}$) with full rank. That the government confiscates with probability one for $i \geqslant N$ implies for $i \geqslant N$ that

$$\hat{V}_i = q + \overline{\beta}\hat{V}_0. \tag{6}$$

Expression (6) for $i = N$ adds another equation to this linear system, (4) and (5), without adding another unknown; thus, the system has a unique solution. The vector $\{\hat{\mu}_0, \hat{\mu}_1, \ldots, \hat{\mu}_{N-1}\}$ from this solution describes household play for $i \leqslant N-1$. By solving for the $\hat{\mu}_i$, we can verify that for $i \leqslant N-1$, $0 < \hat{\mu}_i < 1$. In particular,

$$\hat{\mu}_i = \frac{\overline{\beta}^N + \overline{\beta}^{N-1}(1-\tau) + \cdots + \overline{\beta}^{N-i}(1-\tau)^i}{\overline{\beta}^N + \overline{\beta}^{N-1}(1-\tau) + \cdots + \overline{\beta}(1-\tau)^{N-1} + (1-\tau)^N},$$

which implies $0 < \hat{\mu}_i < 1$ since each term in the numerator and denominator is positive, each term in the numerator is also in the denominator, and the denominator has at least one extra positive term. For $i \geqslant N$, $\hat{\mu}_i$ is set equal to unity. Given $\rho_0 = \varepsilon$, under $\hat{\pi}$, ρ must always take on values on the grid $\{\hat{\rho}_0, \hat{\rho}_1, \ldots\}$ even given a deviation by the opportunistic government. Thus, specifying $(\hat{\mu}_i, \hat{\pi}_i)$ for $i \geqslant 0$ completes the description of household and government play.

Is $(\hat{\mu}, \hat{\pi})$ a Markov perfect equilibrium? Given the strategy of the opportunistic government, household optimization is immediate. By construction, households are indifferent between producing or not when $\rho < \rho^*$ and weakly prefer to follow the equilibrium (produce) when $\rho \geqslant \rho^*$. (Households strictly prefer to produce if $\rho > \rho^*$.) Thus, households are optimizing. Again, by construction, an opportunistic government is indifferent between confiscating or not when $\rho < \rho^*$. Thus, if (and only if) the opportunistic government weakly prefers to confiscate when $\rho \geqslant \rho^*$, $(\hat{\mu}, \hat{\pi})$ is a Markov perfect equilibrium. This is implied by the following lemma:

Lemma 1. *For $i \geqslant N$, $\hat{V}_i > \tau q + \overline{\beta} \hat{V}_{i+1}$.*

Proof. Suppose that $\tau q + \overline{\beta} \hat{V}_{N+1} \geqslant q + \overline{\beta} \hat{V}_0$, or

$$\hat{V}_{N+1} \geqslant \frac{q(1-\tau)}{\overline{\beta}} + \hat{V}_0.$$

Then, since $0 < \hat{\pi}(\hat{\rho}_{N-1}) < 1$, we have that $\tau q \hat{\mu}_{N-1} + \overline{\beta} \hat{V}_N = q \hat{\mu}_{N-1} + \overline{\beta} \hat{V}_0$, or

$$\hat{V}_N = \frac{q(1-\tau)\hat{\mu}_{N-1}}{\overline{\beta}} + \hat{V}_0$$

and thus, $\hat{V}_{N+1} > \hat{V}_N$ (from $\hat{\mu}_{N-1} < 1$), a contradiction, since $\hat{V}_N = \hat{V}_{N+1} = q + \overline{\beta} \hat{V}_0$. $\square$

The idea behind Lemma 1 is that the temptation for an opportunistic government to confiscate is proportional to the fraction of households producing. After $N - 1$ confiscations, not all households are producing, and $\hat{V}_N$ is an exactly sufficient reward for nonconfiscation. After N nonconfiscations, all households produce, and thus, $\hat{V}_{N+1} = \hat{V}_N$ is a strictly insufficient reward for nonconfiscation.

5.2. Uniqueness of Markov perfect equilibrium

Now I show that no other Markov perfect equilibria exist and, in the process, attempt to give the intuition regarding why mutual optimization implies the characteristics of the Markov perfect equilibrium of the last section, $(\hat{\mu}, \hat{\pi})$.

Let (μ, π) denote an arbitrary Markov perfect equilibrium. Analogously, let ρ_i, for all $i \geqslant 0$, denote the value of ρ induced by π if i consecutive periods have passed without a confiscation, and let $\mu_i = \mu(\rho_i)$, $\pi_i = \pi(\rho_i)$, and $V_i = V(\rho_i)$. The first step in showing that $(\hat{\mu}, \hat{\pi})$ is unique is to show that in any Markov perfect equilibrium, $\mu(\varepsilon) = \mu_0 > 0$. This eliminates, among other things, a Markov equilibrium in which no household ever produces because of fear that the opportunistic government will confiscate with probability one. This cannot be an equilibrium outcome because by deviating, the government can costlessly earn a higher ρ and ensure a higher payoff.

Lemma 2. *In any Markov perfect equilibrium, a positive fraction of households produce in the period following a confiscation* ($\mu_0 > 0$).

Proof. If $\mu_0 = 0$, then household optimization implies that $\pi_0 \geqslant \pi^*/(1-\varepsilon)$. Thus, the government's reputation if it does not confiscate in the first period, ρ_1, is weakly greater under the arbitrary Markov equilibrium (μ, π) than under the candidate equilibrium $(\hat{\mu}, \hat{\pi})$, or $\rho_1 \geqslant \hat{\rho}_1$. (Recall that $\rho'(\rho, \pi)$ is increasing in both arguments.) For an opportunistic government to confiscate with positive probability, its payoff must be that of confiscating with certainty; that is, $V_0 = \overline{\beta} V_0$ or $V_0 = 0$. Further, V_0 must be weakly greater than the payoff to not confiscating; thus, $V_0 \geqslant \overline{\beta} V_1$, which implies that $V_1 = 0$. That result implies that $\mu_1 = 0$ since $V_1 \geqslant \mu_1 q$. Since $\mu_1 = 0$, this implies that $\rho_2 \geqslant \hat{\rho}_2$, $V_2 = 0$, and $\mu_2 = 0$ from the same logic as above. Repeating, we derive $\mu_N = 0$, which contradicts household optimization for $\rho_N \geqslant \hat{\rho}_N > \rho^*$. □

In essence, μ_0 is strictly positive since otherwise, obtaining a better reputation costs an opportunistic government too little (in fact, nothing). In order for μ_0 to equal zero, households must believe that an opportunistic government will confiscate with sufficiently high probability. But then, the updating function $\rho'(\rho, \pi)$ implies a gain in reputation from not confiscating. Such a gain is valuable to the opportunistic government since eventually a good enough reputation will cause households to produce, and the gain is costless to obtain since there is nothing to confiscate from the fact that $\mu_0 = 0$.

An immediate implication of Lemma 2 is that since $V_0 \geqslant q\mu_0 + \overline{\beta} V_0$, $V_0 > 0$. The next result shows that in any Markov perfect equilibrium, $\mu(\varepsilon) = \mu_0 < 1$. This result eliminates, among other things, a strategy in which all households always produce because neither type of government will confiscate.

Lemma 3. *In any Markov perfect equilibrium, a positive fraction of households do not produce in the period following a confiscation* ($\mu_0 < 1$).

Proof. Suppose that $\mu_0 = 1$. Since confiscating with certainty is always feasible, the equilibrium payoff to the opportunistic government, V_0, must weakly exceed the payoff to confiscating with certainty, or $V_0 \geqslant q + \overline{\beta} V_0$. Solving this for V_0 implies that $V_0 \geqslant q/[1-\overline{\beta}]$. Since $\mu_0 = 1$, household optimization implies that $\pi_0 \leqslant \pi^*/(1-\varepsilon) < 1$ (from Assumption (2)). Since the opportunistic government is confiscating with less than full probability ($\pi_0 < 1$), its equilibrium payoff must also equal the payoff from not confiscating with certainty, or $V_0 = \tau q + \overline{\beta} V_1$. Thus, $\tau q + \overline{\beta} V_1 \geqslant q + \overline{\beta} V_0$, and thus, $V_1 > V_0$ (since $\tau < 1$). This implies that $V_1 > q/[1-\overline{\beta}]$. Such a lifetime payoff is incompatible with a maximum per-period payoff of q. □

The intuition behind this result is simple. If μ_0 equals unity, then by definition all households produce in the period after a confiscation. But given this, government confiscation has no drawbacks; thus, the opportunistic government will confiscate following a confiscation. This contradicts households being willing to produce.

Lemmas 2 and 3 imply that $0 < \mu_0 < 1$ and, thus, that $\pi_0 = \hat{\pi}_0 = \pi^*/(1-\varepsilon)$, which implies that $\rho_1 = \hat{\rho}_1$. That is, the behavior of the opportunistic government after a confiscation is the same under the arbitrary equilibrium as under the constructed equilibrium. Thus, the reputation of the government after one nonconfiscation is the same under the two proposed equilibria. The next two lemmas establish an induction argument to show that $0 < \mu_i < 1$ for all $i < N$. These are used to show that the behavior of the opportunistic government is the same after $i < N$ nonconfiscations under the arbitrary equilibrium as under the constructed equilibrium.

Lemma 4. *In any Markov perfect equilibrium, if an opportunistic government is indifferent between confiscating or not following $i-1$ nonconfiscations, then a positive fraction of households produce after i confiscations.* (*For* $i \geqslant 1$, *if* $q\mu_{i-1} + \overline{\beta}V_0 = \tau q \mu_{i-1} + \overline{\beta}V_i$, *then* $\mu_i > 0$.)

Proof. If $\mu_i = 0$, then household optimization implies that $\pi_i \geqslant \pi^*/(1-\rho_i) > 0$. This implies that $V_i = \overline{\beta}V_0$, or $V_i < V_0$ since $V_0 > 0$. Next, since $q\mu_{i-1} + \overline{\beta}V_0 = \tau q\mu_{i-1} + \overline{\beta}V_i$ and $\mu_{i-1} \geqslant 0$, we have $V_i \geqslant V_0$. Thus, $V_i \geqslant V_0$ and $V_i < V_0$. □

The idea behind Lemma 4 is that if $\mu_i = 0$, then an opportunistic government is worse off after *i* nonconfiscations than just after a deviation ($V_i < V_0$). However, in order for the opportunistic government to be indifferent between confiscating or not after $i-1$ confiscations, it must be rewarded for not confiscating. That is, it must be in a better position after *i* nonconfiscations than immediately after a confiscation ($V_i \geqslant V_0$). This is a contradiction.

The next lemma uses indifference after $i-1$ nonconfiscations to show that $\mu_i < 1$.

Lemma 5. *In any Markov perfect equilibrium, if, following $i-1$ nonconfiscations, not all households produce and an opportunistic government is indifferent between confiscating or not, and, after i nonconfiscations, $\rho < \rho^*$, then, after i nonconfiscations, not all households produce.* (*For* $i \geqslant 1$, *if* $\mu_{i-1} < 1$, $\rho_i < \rho^*$, *and* $q\mu_{i-1} + \overline{\beta}V_0 = \tau q\mu_{i-1} + \overline{\beta}V_i$, *then* $\mu_i < 1$.)

Proof. If $\mu_i = 1$ and $\rho_i < \rho^*$, then $\pi_i \leqslant \pi^*/(1-\rho_i) < 1$. This implies that $V_i = \tau q + \overline{\beta}V_{i+1} \geqslant q + \overline{\beta}V_0$, or

$$V_{i+1} \geqslant \frac{q(1-\tau)}{\overline{\beta}} + V_0.$$

Since $\tau q\mu_{i-1} + \overline{\beta}V_i = q\mu_{i-1} + \beta(1-\varepsilon)V_0$,

$$V_i = \frac{q(1-\tau)\mu_{i-1}}{\overline{\beta}} + V_0,$$

and, thus, $V_{i+1} > V_i$. The fact that $V_{i+1} > V_i$ implies that $V_{i+1} > q + \overline{\beta}V_0$. Thus, $\pi_{i+1} = 0$, which implies that $\mu_{i+1} = 1$ and $V_{i+1} = \tau q + \overline{\beta}V_{i+2}$. Since $V_i = \tau q + \overline{\beta}V_{i+1}$, $V_{i+1} > V_i$ implies that $V_{i+2} > V_{i+1}$. However, we can continue in this way, getting $\mu_{i+n} = 1$ for all $n \geqslant 1$ and $V_{i+n} > q + \overline{\beta}V_0$, so that the opportunistic government never confiscates. But the opportunistic government never confiscating implies that $V_{i+n} = \tau q/[1-\overline{\beta}]$ for all $n \geqslant 0$, which contradicts $V_{i+1} > V_i$. □

The intuition behind Lemma 5 is similar to that of Lemma 1. Recall that the temptation for an opportunistic government to confiscate is proportional to the fraction of households producing. By supposition, after $i-1$ confiscations, not all households are producing, and by supposition, V_i is an exactly sufficient reward for nonconfiscation. If after i nonconfiscations, all households produce, this implies that a greater reward must be given for nonconfiscation, or $V_{i+1} > V_i$. But if all households are producing after i nonconfiscations, then the opportunistic government is already in the best of possible situations, regardless of whether it is better to confiscate or not at that point. Thus, there is no way to make $V_{i+1} > V_i$ if $\mu_i = 1$.

Lemmas 4 and 5 allow the following induction argument:

Lemma 6. *In any Markov perfect equilibrium, if $\rho < \rho^*$, then some, but not all, households produce, and the probability of confiscation is the same as under the candidate Markov perfect equilibrium $(\hat{\mu}, \hat{\pi})$. (For $i < N$, $0 < \mu_i < 1$ and $\pi_i = \hat{\pi}_i = \pi^*/(1-\hat{\rho}_i)$, and for $i \leqslant N$, $\rho_i = \hat{\rho}_i$.)*

Proof. From Lemmas 2 and 3, $0 < \mu_0 < 1$. That μ_0 is interior implies that $\pi_0 = \hat{\pi}_0 = \pi^*/(1-\varepsilon)$, which in turn implies that $\rho_1 = \hat{\rho}_1$. That π_0 is interior implies that $q\mu_0 + \overline{\beta}V_0 = \tau q\mu_0 + \overline{\beta}V_1$. Lemmas 4 and 5 then establish that $0 < \mu_1 < 1$. This likewise implies that $\pi_1 = \hat{\pi}_1 = \pi^*/(1-\hat{\rho}_1)$, $\rho_2 = \hat{\rho}_2$, and $q\mu_1 + \overline{\beta}V_0 = \tau q\mu_1 + \overline{\beta}V_2$. Repeated applications of Lemmas 4 and 5 then deliver the desired result, since for $i < N$, $\rho_i < \rho^*$. □

By definition, $\rho_N > \rho^*$, and thus, $\mu_N = 1$. Lemma 7 establishes that an opportunistic government after N consecutive nonconfiscations sets $\pi = 1$.

Lemma 7. *In any Markov perfect equilibrium, after N or greater nonconfiscations, an opportunistic government strictly prefers to confiscate. (For $i \geqslant N$, $\pi_i = 1$ and $V_i = q + \overline{\beta}V_0 > \tau q + \overline{\beta}V_i > \tau q/[1-\overline{\beta}]$.)*

Proof. First consider $i = N$. Suppose that $\tau q + \overline{\beta}V_{N+1} \geqslant q + \overline{\beta}V_0$, or

$$V_{N+1} \geqslant \frac{q(1-\tau)}{\overline{\beta}} + V_0.$$

Since $0 < \mu_{N-1} < 1$, $\tau q\mu_{N-1} + \overline{\beta}V_N = q\mu_{N-1} + \overline{\beta}V_0$, or

$$V_N = \frac{q(1-\tau)\mu_{i-1}}{\overline{\beta}} + V_0,$$

and thus, $V_{N+1} > V_N$. The fact that $V_{N+1} > V_N$ and $V_N \geqslant q + \overline{\beta}V_0$ implies that $V_{N+1} > q + \overline{\beta}V_0$. This in turn implies that $\pi_N = 0$, which implies that $\rho_{N+1} = \rho_N$, $\mu_{N+1} = 1$, and $V_{N+1} = \tau q + \overline{\beta}V_{N+2}$. Since $V_N = \tau q + \overline{\beta}V_{N+1}$, $V_{N+1} > V_N$ implies that $V_{N+2} > V_{N+1}$. Here, as in the proof of Lemma 5, we can continue in this way, getting $\mu_{N+n} = 1$ for all

$n \geqslant 1$ and $V_{N+n} > q + \overline{\beta} V_0$, so that the opportunistic government never confiscates. But given this, $V_{N+n} = \tau q/[1 - \overline{\beta}]$ for all $n \geqslant 0$, which contradicts $V_{N+1} > V_N$.

Thus, $\tau q + \overline{\beta} V_{N+1} < q + \overline{\beta} V_0$. This implies that $\pi_N = 1$ and $\rho_{N+1} = 1 - \delta > \rho^*$; thus, $\mu_{N+1} = 1$. The same logic implies that $\tau q + \overline{\beta} V_{N+2} < q + \overline{\beta} V_0$. Thus, by induction, $\pi_i = 1$, $\mu_i = 1$, and $V_i = q + \overline{\beta} V_0$ for all $i \geqslant N$. Since for $i \geqslant N$, $V_i > \tau q + \overline{\beta} V_{i+1}$ and $V_{i+1} = V_i$, $V_i > \tau q/[1 - \overline{\beta}]$. □

The intuition behind this result is straightforward: an opportunistic government must be rewarded for not confiscating, but the size of the reward has a limit which kicks in when $\mu = 1$. Specifically, the present payoff to confiscating is greater than the present payoff to not confiscating, and the difference between these present payoffs is proportional to μ_i. Thus, the reward to not confiscating (the difference between V_{i+1} and V_0) must be proportional to μ_i. After $N - 1$ nonconfiscations, an interior fraction of households are producing, and the opportunistic government is willing to mix. Thus, after N nonconfiscations, when all households produce, the reward to not confiscating must be greater than the reward when fewer than all households produce, or $V_{N+1} - V_0 > V_N - V_0$. However, V_{N+1} cannot exceed V_N. The situation after N nonconfiscations is the same as after $N+1$—all households produce and will continue to produce until a confiscation.

Lemmas 2–7 are sufficient to imply uniqueness.

Theorem 8. *The Markov perfect equilibrium* $(\hat{\mu}, \hat{\pi})$ *is unique.*

Proof. Lemmas 2 through 7 directly prove that for all i, $\rho_i = \hat{\rho}_i$ and $\pi_i = \hat{\pi}_i = \pi^*/(1-\hat{\rho}_i)$. Further, the same system of equations implied by expressions (4), (5), and (6) holds regarding μ_i, $i \leqslant N - 1$, and V_i, $i \leqslant N$. Since this system is linear (and full rank), its unique solution is $(\hat{\mu}_i, \hat{V}_i)$. Thus, $\mu_i = \hat{\mu}_i$, all i. □

The fact that μ_i and V_i are strictly monotonic for $i \leqslant N$ follows quickly. That μ_i is strictly increasing in i establishes one of my primary results: household trust increases the longer it has been since a betrayal.

Theorem 9. *In the unique Markov perfect equilibrium, for a finite number of periods, the fraction of households which produce is increasing in the number of periods since a confiscation.* (*For all* $(i, j) \in \{0, \ldots, N\}^2$, *such that* $i < j$, $\mu_i < \mu_j$, *and* $V_i < V_j$.)

Proof. The fact that the government is mixing between confiscating and not confiscating when $\rho = \varepsilon$ implies that

$$q\mu_0 + \overline{\beta} V_0 = \tau q \mu_0 + \overline{\beta} V_1.$$

Since $\mu_0 > 0$ and $\tau < 1$, this implies that $V_1 > V_0$. Given that

$$V_0 = q\mu_0 + \overline{\beta} V_0$$

and

$$V_1 = q\mu_1 + \overline{\beta} V_0,$$

the fact that $V_1 > V_0$ implies that $\mu_1 > \mu_0$. For all $i < N$, government mixing from ρ_i implies that

$$q\mu_i + \overline{\beta}V_0 = \tau q\mu_i + \overline{\beta}V_{i+1}$$

or, rearranging,

$$V_{i+1} = V_0 + \frac{q(1-\tau)\mu_i}{\overline{\beta}}.$$

Since $\mu_1 > \mu_0$, $V_2 > V_1$. Here, as above, we can use this to show that $\mu_2 > \mu_1$, and so on. □

5.3. Varying the initial reputation

So far, I have assumed that $\rho_0 = \varepsilon$, or that the game starts with the government having confiscated in the preceding period. Now I consider initial ρ values other than $\rho = \varepsilon$, but require that $\rho \in [\varepsilon, 1)$. Here, I simply assert and verify the equilibrium.

An essential characteristic of this equilibrium is that after the first confiscation, $\rho = \hat{\rho}_0 = \varepsilon$, and thus, the equilibrium of the previous sections describes the ensuing play. Another characteristic of this equilibrium is that play before the first confiscation mimics the strategy of the previous sections for $i > 0$. To see this, one must first partition $[\varepsilon, 1)$ into subintervals. To this end, first let the interval $\Gamma_N = [\rho^*, 1)$ (and, thus, Γ_N contains $\hat{\rho}_n$ for all $n \geqslant N$). Next, let $\rho(\rho') = (\rho' - \varepsilon)/(1 - \delta - \varepsilon)$ denote the inverse function of $\rho'(\rho)$ and $\rho^t(\rho')$ denote applying the function $\rho(\rho')$ t times. Let $\Gamma_{N-1} = [\rho(\rho^*), \rho^*)$, $\Gamma_{N-2} = [\rho^2(\rho^*), \rho(\rho^*)), \ldots, \Gamma_0 = [\varepsilon, \rho^{N-1}(\rho^*))$. By construction, we know that $\hat{\rho}_i \in \Gamma_i (i \in \{0, \ldots, N\})$ and $\Gamma_0, \ldots, \Gamma_N$ is a partition of $[\varepsilon, 1)$.

For each ρ in Γ_i, $i \geqslant 0$, let $\mu(\rho) = \hat{\mu}_i$, $\pi(\rho) = \pi^*/(1 - \rho)$, and $V(\rho) = \hat{V}_i$. Thus, $\mu(\rho)$ and $V(\rho)$ are step functions. This specification satisfies household optimization because $(1 - \rho)\pi(\rho) = \pi^*$, and thus, households are indifferent between producing or not. To see that the specification also satisfies (opportunistic) government optimization, consider $\rho \in \Gamma_N$. Following the equilibrium and confiscating delivers a value $\hat{V}_n = q + \overline{\beta}\hat{V}_0$. Deviating by not confiscating delivers a value $\tau q + \beta(1-\varepsilon)\hat{V}_N < q + \beta(1-\varepsilon)\hat{V}_0$ (from Lemma 7). For $\rho \in \Gamma_{N-1}$, for the government to be willing to randomize, $V(\rho)$, $\mu(\rho)$ must satisfy both of these expressions:

$$V(\rho) = \tau q\mu(\rho) + \overline{\beta}\hat{V}_N,$$

$$V(\rho) = q\mu(\rho) + \overline{\beta}\hat{V}_0.$$

These two linear equations are uniquely solved by $V(\rho) = \hat{V}_{N-1}$ and $\hat{\mu}(\rho) = \mu_{N-1}$. I can continue in this fashion to $\rho \in \Gamma_0$.

6. Limits and discontinuities

An interesting question is whether, as this model becomes closer to one with complete information, $(\varepsilon = \rho_0 = 0)$, the characteristics of the Markov perfect equilibrium become more in line with those of the complete information Markov perfect equilibrium ($\mu = 0$, $\pi = 1$, $V = 0$.) The answer is no. The limit of the sequence of Markov perfect equilibria as the game approaches the complete information game is not, in a sense to be made clear, the Markov perfect equilibrium of the complete information game.

In Section 4, I established that for $\rho_0 > 0$, the Markov perfect equilibrium when $\varepsilon = \delta = 0$ has $\mu = 1$ and $\pi = 0$ in all periods along the equilibrium path and delivers the value $\tau q/(1-\beta)$, as long as there is not too much discounting. Since when $\rho_0 = 0$, $\varepsilon = 0$, the Markov perfect equilibrium has $\mu = 0$ and $\pi = 1$ in all periods along the equilibrium path and delivers a value of zero, there is a discontinuity at $\rho_0 = 0$ ($\lim_{\rho_0 \to 0} V(\rho_0) \neq V(0)$). This discontinuity is not a new result. It could be considered the main point of the standard reputation models of Kreps and Wilson [10] and Milgrom and Roberts [13].

A similar discontinuity occurs in this model. Consider a sequence of economies which converges to the common knowledge benchmark. That is, let $\varepsilon \to 0$ with $\rho_0 = \varepsilon$ (the worst possible continuation reputation) at each point in the sequence. I show that this sequence has $\lim_{\rho_0=\varepsilon\to 0} \mu(\rho_0) > 0$ and $\lim_{\rho_0=\varepsilon\to 0} V(\rho_0) > 0$. This contrasts to the case $\varepsilon = \rho_0 = 0$ in which $\mu = 0$ and $V = 0$.

To this end, define $N(\varepsilon)$ as the smallest integer such that $\rho'^{N(\varepsilon)}(\varepsilon) > \rho^*$. The following limiting results are obtained: First, as ε goes to zero, $N(\varepsilon)$ goes to infinity. That is, after a confiscation, it takes an arbitrarily large number of consecutive nonconfiscations for all households to produce. Second, as $\varepsilon \to 0$, $\pi(\varepsilon) \to \pi^*$ (which is interior) and (as stated earlier) $\mu(\varepsilon)$ remains interior and $V(\varepsilon) > 0$. Since the posterior ρ evolves according to $\rho'^*(\rho) = \rho(1-\delta-\varepsilon)/\rho^* + \varepsilon$, this implies that as $\rho_0 = \varepsilon \to 0$, ρ is almost always very near zero. Thus, μ is almost always approximately equal to $\lim_{\varepsilon\to 0} \mu(\varepsilon)$, and π is almost always approximately equal to π^*. These results are proved in the following lemma:

Lemma 10. *For given values of* $(c, q, \tau, \beta, \rho_0, \delta)$, *such that* $\tau q/(1-\beta) > q$, $\lim_{\varepsilon\to 0} N(\varepsilon) = \infty$, $\lim_{\varepsilon\to 0} \pi(\varepsilon) = \pi^*$, $0 < \lim_{\varepsilon\to 0} \mu(\varepsilon) < 1$, *and* $\lim_{\varepsilon\to 0} V(\varepsilon) > 0$.

Proof. The function $\rho'(\rho) = [\rho(1-\delta-\varepsilon)/\rho^*] + \varepsilon$ implies that as $\varepsilon \to 0$, $\rho'(\rho) = \rho(1-\delta)/\rho^*$. Since $\rho^* < 1-\delta$, this function is simply a constant greater than one multiplied by ρ, implying that $\lim_{\varepsilon\to 0} N(\varepsilon) = \infty$. Next, since $\pi(\rho) = \pi^*/(1-\rho)$, $\lim_{\varepsilon\to 0} \pi^*/(1-\varepsilon) = \pi^*$. From Lemma 7, we know that

$$q + \beta(1-\varepsilon)V(\varepsilon) > \frac{\tau q}{1-\beta(1-\varepsilon)}.$$

This implies that

$$\lim_{\varepsilon\to 0} V(\varepsilon) \geqslant \frac{1}{\beta}\left[\frac{\tau q}{1-\beta} - q\right].$$

Since $\tau q/(1-\beta) > q$, this is positive. Finally, since $V(\varepsilon) = q\mu(\varepsilon) + \beta(1-\varepsilon)V(\varepsilon)$, the preceding inequality implies that

$$\lim_{\varepsilon\to 0} \mu(\varepsilon) \geqslant \frac{1}{\beta}\left[\tau - (1-\beta)\right],$$

which completes the proof. □

7. Other equilibria

The Markov perfect equilibrium examined here is not the unique equilibrium for this model. Consider the following history-dependent strategy starting from $\rho_0 = \varepsilon$. For the first $N-1$ periods (where N is as defined above), $\mu = 0$ and $\pi(\hat{\rho}_i) = \pi^*/(1-\hat{\rho}_i)$ (where for all i, $\hat{\rho}_i$ is the same as in the Markov perfect equilibrium). From period N on, regardless of the play of the government from periods 1 to $N-1$, $\mu = 1$ and $\pi = 0$. If the government confiscates in period N or later, then this strategy starts over. This strategy always satisfies household optimization and satisfies the optimization of the opportunistic government if $[1-\beta^N(1-\varepsilon)^N]\tau q/[1-\beta(1-\varepsilon)] \geqslant q$. Further, as $\varepsilon \to 0$, because $N(\varepsilon) \to \infty$, this equilibrium has a value which converges to zero, the value of the Markov perfect equilibrium and the worst equilibrium when $\rho_0 = \varepsilon = 0$. Thus, while there is a discontinuity in the value of the Markov perfect equilibrium at $\rho_0 = \varepsilon = 0$, there is no discontinuity at this point in the value of the worst equilibrium.

8. Concluding remarks

I have presented a simple model in which the unique Markov perfect equilibrium displays three characteristics which loosely fit actual experiences: governments which betray trust do so erratically, public trust is rebuilt only gradually after such a betrayal, and governments with recent betrayals betray with higher probability than those without recent betrayals. One characteristic that is missed by this model is that trust sometimes falls even before a government betrays. One conjecture is that if the model is extended to allow for the government's value for current revenue to observably vary over time, then trust itself will vary inversely with the government's value of current revenue. Put simply, if a government looks like it is going to face a fiscal crisis, trust falls.

While not proved here, the logic that an opportunistic government always acting in an untrustworthy manner cannot be a Markov perfect equilibrium should generalize to other models. In the model of Chari and Kehoe [4], the Markov perfect equilibrium (which is also the worst equilibrium) has no household ever investing because the benevolent government always confiscates whatever investment is made. However, if, as in my model, households always know there is a positive probability that the government simply cannot confiscate, then by deviating and not confiscating, a government can cheaply acquire a reputation as the type which cannot confiscate. This logic should hold in models of monetary growth, debt repudiation, and capital taxation, with or without a benevolent government.

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