On the Form of Transfers to Special Interests

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An important question in political economy concerns the form of transfers to special interests. The Chicago view is that political competition leads politicians to make such transfers efficiently. The Virginia position is that lack of information on the part of voters leads politicians to favor inefficient "sneaky" methods of redistribution. This paper analyzes the form of transfers in a model of political competition in which politicians have incentives to make transfers to special interests. It shows that when voters have imperfect information about both the effects of policy and the predispositions of politicians, inefficient methods of redistribution may be employed.

I. Introduction

A significant portion of government activity is devoted to the transfer of resources between citizens. Some of these transfers, such as those to the poor, seem to be consistent with traditional social welfare objectives. Others are directed to so-called special-interest groups, such as farmers, unions, professional groups, or particular firms and industries, and seem harder to justify on normative grounds. Political economy suggests at least two reasons why politicians may choose to make such transfers. First, interest groups may be able to enhance politicians' chances of reelection by providing campaign contributions or political support. Second, interest groups can improve politicians' financial well-being by, for example, providing bribes, business for

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firms in which they have a financial interest, or future employment opportunities.

An important question in political economy concerns the *form* of transfers to special interests. While redistribution toward the poor generally takes the form of cash and in-kind transfers, redistribution to special interests is typically much less direct. Measures that increase the demand for an interest group's services, such as government purchases and price subsidies, are common. So, too, are price controls and regulations that serve to restrict competition, such as licensing requirements and import quotas. What explains the methods chosen to redistribute to special interests?

One perspective on this issue, often associated with the "Chicago school" of political economy, is that political competition will ensure that the most efficient method of redistribution available is chosen (see Stigler 1971, 1982; Becker 1976, 1983, 1985; Wittman 1989). Thus, to take an example discussed by Stigler (1971), the fact that the U.S. government imposed oil import quotas, rather than made direct cash transfers to the oil industry, reflected the superior efficiency of such quotas. (Stigler suggests that they may have targeted benefits more accurately to existing members of the refining industry.) The logic underlying this view is simple and compelling: if a politician were making transfers in an inefficient manner, he or she would be voted out of office.[1] The Chicago view has the provocative implication that if standard economic analysis suggests that an observed method of redistribution is inefficient, this analysis must be missing something (Stigler 1982). The challenge for political economy, therefore, is to provide efficiency explanations for observed transfer mechanisms (Becker 1976).[2]

An alternative view, associated with the "Virginia school" of political economy,[3] stresses the importance of imperfect information in explaining the form of transfers (see, e.g., Nelson 1976; Tullock 1983, 1989; Crew and Rowley 1988; Crew and Twight 1990). Citizens

[1] It is important to stress that the Chicago view does not imply that a politician will be voted out for making transfers to special interests, just that he will be voted out for doing so inefficiently. As Becker (1976, p. 248) notes, "the efficiency of methods should not be confused with the attractiveness of the ends themselves."

[2] There is a large literature in this tradition on transfers to the poor. This literature seeks to explain both the design of cash transfer schemes (e.g., Zeckhauser 1971; Besley and Coate 1992) and the widespread use of in-kind transfers (e.g., Olsen 1969; Nichols and Zeckhauser 1982; Bruce and Waldman 1989; Coate 1995). A similar perspective is used by Gardner (1987) and Gisser (1993) to explain the form of transfers to farmers and by Rasmusen and Zupan (1991) for transfers to industrial producers.

[3] For useful overviews of the Chicago and Virginia schools of thought and a discussion of their historical development, see Mitchell (1988, 1989), Tollison (1989), Pasour (1992), Rowley (1992), and Breton (1993).

are presumed to be poorly informed about the effects of different policies, and this leads politicians to select inefficient "sneaky" methods of redistribution over more transparent efficient methods.[4] For example, politicians will favor policies that serve to transfer resources but may be justifiable on other, more palatable, grounds—so-called *disguised* transfer mechanisms (Tullock 1983). To take one of Tullock's examples, a road may be laid out in such a way as to increase the value of certain pieces of real estate when laying out the road in its optimal location and making cash transfers to the owners of this real estate would be more efficient. The idea is that voters do not know the optimal location of the road and therefore are unable to detect the real motivation for its location. Politicians will also prefer transfer policies with *concealed costs*.[5] Policies that transfer resources by changing market prices, such as quotas or mandates, fall into this category.

While the Virginia view is intuitively appealing,[6] it lacks a solid analytical foundation. The idea that voters lack information is not controversial; voters remain rationally ignorant because the expected benefits from becoming informed are small relative to the costs. However, Becker (1976) and Wittman (1989) question why voters should have biased beliefs about the effects of policies and how they could be persistently fooled. It is by no means clear that the Virginia view can be justified without making such unreasonable assumptions.

To understand the importance of imperfect information, it is necessary to analyze the selection of transfer mechanisms in models of political competition in which voters are imperfectly informed but rational. This paper represents a first step in this direction. It focuses on understanding the form of transfers in an environment in which politicians have a financial incentive to make transfers to a special interest and have available both direct cash transfers and a disguised transfer mechanism. In the model we develop, the disguised transfer mechanism is a public project. Introducing the project not only benefits the special interest but also, under certain conditions, enhances

[4] A further argument against the Chicago position is that it ignores the endogeneity of the level of transfers. Switching from a less efficient to a more efficient transfer instrument might change the level of influence activities and hence the level of transfers. It is possible, therefore, that switching to a more efficient policy may make the majority worse off. Thus citizens may support the imposition of constitutional restrictions on the use of more efficient instruments. For arguments along these lines, see Brennan and Buchanan (1980), Rodrik (1986), Wilson (1990), and Grossman and Helpman (1994).

[5] The logic is similar to that in the fiscal illusion literature, which argues that governments will prefer to finance expenditures with hidden rather than efficient taxes (see, e.g., Buchanan and Wagner 1977).

[6] Even writers in the Chicago tradition have stressed the likely importance of imperfect information (see Becker 1985; Stigler 1988).

the welfare of the citizens. There is asymmetric information in the sense that the incumbent politician has more information about whether these conditions are satisfied than the citizens do. Furthermore, since the benefits of the project are stochastic, citizens observe only a noisy signal of whether it was warranted ex post.[7] Thus when they observe the implementation of the project, they cannot tell whether the politician is acting in their interest or simply making transfers to the special interest.

Our model suggests that if politicians are all identical and known to be so, transfers to the special interest will be made efficiently despite the availability of a disguised transfer mechanism. Citizens will allocate political support in such a way as to make efficient behavior in the incumbent politician's interest. However, if politicians differ, some being susceptible to bribes and others not, and if politicians' types are not perfectly observable to citizens, then transfers to the special interest will sometimes be made inefficiently. This reflects the fact that politicians have incentives to build reputations. "Bad" politicians (i.e., those susceptible to bribes) will sometimes prefer to implement the project when it is not warranted because making direct cash transfers does greater damage to their reputations. The paper therefore shows how a combination of asymmetric information about policies and politicians can explain the choice of inefficient methods of redistribution in a world in which voters are rational.

This paper should be contrasted with other work that has sought to identify inefficiencies in public choice.[8] Much of this work has analyzed models of political competition that determine the equilibrium level of a single policy variable. A given method of financing is assumed, and the equilibrium level of the policy is determined. In equilibrium, politicians set the policy at a level that maximizes the well-being of those groups or individuals who hold political power. Since these agents do not care about the costs and benefits that fall on others in society, the equilibrium level of the policy is claimed to be "inefficient."[9] As has been stressed by Wittman (1989), this reasoning is incorrect. To establish inefficiency, one must show that all individuals could be made better off *given the instruments of redistribution that are available.* By assumption, politicians are constrained to use a given tax rule and can redistribute only by choosing different levels

[7] Implicit in Tullock's example was the assumption that the public could not be completely sure that the road was in the wrong place after it was built.

[8] Wittman (1989) provides a critical review of this literature.

[9] Consider, e.g., the textbook treatment of the public supply of public goods. A given method of financing is assumed, and the equilibrium level of public goods is shown to be that demanded by the median voter. This level is claimed to be "inefficient" because, in general, it does not satisfy the Samuelson rule.

of the policy. At an equilibrium, any change in the level of the policy will reduce the well-being of the politically influential. The equilibrium utility allocation is therefore on the (second-best) Pareto frontier. The distinctive feature of this paper is that it assumes that politicians have two different methods of redistribution available. This provides a framework for a substantive analysis of the efficiency of public choice.

Other strands of the literature have been more convincing in their identification of "government failures." The recent macro policy literature identifies a number of dynamic inefficiencies arising from political competition. Persson and Svensson (1989) and Tabellini and Alesina (1990) show that uncertainty about their ability to hold on to power may lead those who currently have political influence to run budget deficits. This serves to constrain the choices of those in power in the future.[10] Rogoff (1990) shows that voter uncertainty about politicians' competence may lead incumbents to distort the mix of public consumption and investment expenditure to signal their abilities to the electorate. As in this paper, concern about reputation is key to explaining the inefficiency.

The literature on legislative behavior has focused on the static inefficiencies arising from too many pork barrel projects. This literature assumes that politicians care only about the interests of their own districts and that locally beneficial public projects are financed from general revenues. This gives rise to a common pool problem whereby inefficiently many public projects are financed (see, e.g., Weingast, Shepsle, and Johnsen 1981).[11] Our analysis, which can be seen as providing a reputational explanation for a static inefficiency, should be regarded as complementing the work discussed here.

The remainder of the paper is organized as follows. Section II outlines the model, and Section III establishes that inefficient transfer mechanisms are employed in equilibrium. Section IV shows that this result would not arise without uncertainty about the predispositions of politicians. Section V discusses the type of policies to which the analysis applies and some potential criticisms of the model. A brief conclusion is contained in Section VI.

II. The Model

We employ an agency style model of political competition of the sort pioneered by Barro (1973) and Ferejohn (1986) and further devel-

[10] A related point is made by Glazer (1989).

[11] While plausible, this view leaves a number of questions unanswered, including why local politicians ask for their transfers in the inefficient form of public projects rather than (say) lower taxes. See Wittman (1989) for some further discussion.

oped by Austen-Smith and Banks (1989) and Banks and Sundaram (1993). We consider a two-period model. In the first period, an incumbent politician must decide whether or not to introduce a public project. The project may or may not benefit citizens, but always provides income for a "special interest." The incumbent also has the ability to make direct cash transfers from the citizens to the special interest, so that there is no need to use the project as a transfer device. At the end of the first period, an election is held. The incumbent faces a randomly drawn challenger. The political power is held by the citizens, who alone determine the outcome of the election. In the second period, the winner of the election simply selects a cash transfer to the special interest.

Citizens and the Special Interest

A single representative citizen receives income y_c at the beginning of both periods. The citizen gets utility from consumption and public projects. His utility per period is given by $u_c = y_c - t + B$, where t denotes taxes and B represents the benefits from public projects. His sole decision is whether to reelect the incumbent at the end of the first period.

Along with the citizen, there is a special interest that derives income indirectly from public projects (e.g., the special interest might be a firm that supplies publicly provided goods). The special interest may also receive income directly through government transfers. The special interest's income in each period is given by $y_s = R + T$, where R denotes the income derived from public expenditures and T is the direct cash transfer.

Policies

In each period, the politician holding office chooses a cash transfer $T \geq 0$ to the special interest. In the first period, the incumbent must also decide whether or not to implement a public project. The project costs an amount C and is financed by taxation of the citizen. It provides income R_s for the special interest. The benefit the project provides to the citizen is uncertain. It may produce B_H or B_L units of benefits, $B_H > B_L > 0$. The probability that the project will produce high benefits (i.e., that $B = B_H$) is denoted θ. This probability can take on one of two values, θ_0 or θ_1, $\theta_0 < \theta_1$. The incumbent is assumed to observe the value of θ prior to deciding whether to implement the project (imagine him commissioning a study to investigate the likelihood that the project will yield high benefits). The ex ante probability that the project is likely to yield high benefits (i.e., that $\theta = \theta_1$)

is π. The expected net gain to the citizen from the project when the probability that it produces high benefits is θ is denoted $\Delta(\theta)$; that is, $\Delta(\theta) = \theta B_H + (1 - \theta)B_L - C$.

We make the following key assumption concerning the efficiency of the project.

ASSUMPTION 1. (i) $\Delta(\theta_1) > 0$ and (ii) $\Delta(\theta_0) < -R_s$.

Part i of this assumption says that when $\theta = \theta_1$, the project yields a positive expected net gain to the citizen. Part ii says that when $\theta = \theta_0$, not only is the reverse true, but the citizen would actually be better off with a tax-financed transfer of R_s to the special interest than with the implementation of the project. Thus when $\theta = \theta_1$, the project is efficient; when $\theta = \theta_0$, introducing the project is an inefficient way to make a transfer of R_s to the special interest.

Politicians

Politicians come in two types: "good" ($i = g$) and "bad" ($i = b$). Both types of politicians receive zero utility when not in office and discount the future according to the discount rate δ. When a good politician is in office, his payoff depends positively on the utility gain his decisions generate for the citizen. Thus a good politician's utility per period is $v_g(u_c - y_c)$, where $v_g(\cdot)$ is some smooth, increasing function. The good politician's utility when he generates zero additional utility for the citizen, $v_g(0)$, can be interpreted as the "ego rent" stemming from holding office (Rogoff 1990).

A bad politician cares not only about the utility he generates for the citizen, but also about the income received by the special interest. One interpretation is that a bad politician is susceptible to bribes and other nonmonetary rewards offered by the special interest. The more income the special interest receives, the greater the reward given to the politician. Thus, when a bad politician is in power, his utility per period is $v_b(u_c - y_c, y_s)$, where $v_b(\cdot)$ is smooth, increasing in both arguments, and strictly concave. Again, $v_b(0, 0)$ can be interpreted as a bad politician's ego rent from holding office.[12]

We make two assumptions concerning a bad politician's preferences. The first is that, from a bad politician's viewpoint, the gain to

[12] Labeling the two types of politicians "good" and "bad" may be objected to on two grounds. First, from a social viewpoint, there seems nothing inherently bad about caring about the income of the special interest. It might simply be that this type of politician has preferences more in tune with the special interest. Second, even from the viewpoint of the citizen, a good politician is not a perfect agent, since he cares only about the citizen's well-being when in power. Nonetheless, these labels are easy to remember and are justified by the fact that, in equilibrium, the citizen will always be better off with a good politician in power than with a bad one.

the special interest resulting from introducing the project when $\theta = \theta_0$ is more than sufficient to offset the loss to the citizen.

ASSUMPTION 2. $v_b(\Delta(\theta_0), R_s) > v_b(0, 0)$.

For the second assumption, let $T^*(x, z)$ denote the direct cash transfer that would maximize a bad politician's utility per period when the pretransfer utility gain for the citizen is x and the pretransfer income for the special interest is z; that is,

$$T^*(x, z) = \text{argmax } v_b(x - T, z + T). \tag{1}$$

Let $v_b^*(x, z)$ denote the resulting utility level.

ASSUMPTION 3. For all $(x, z) \in [0, \Delta(\theta_1)] \times [0, R_s]$, (i) $T^*(x, z) \in (0, y_c - C)$ and (ii) $v_b^*(x, z) - v_b(x, z) < \delta v_b^*(0, 0)$.

Part i says that over the relevant range, a bad politician wishes to make some transfers to the special interest but does not want to bankrupt the citizen. Part ii implies that the loss in utility resulting from forgoing the optimal direct cash transfer is always less than the discounted value of the maximal utility obtainable when $(x, z) = (0, 0)$.

The Information Structure

The citizen's decision whether to reelect the incumbent politician at the end of the first period is complicated by imperfect information. First, there is "policy uncertainty": the citizen is unable to observe the realization of the random variable θ. Thus only the incumbent knows whether the project is or is not in the citizen's interest. The idea is that the results of the study are observed only by the incumbent, and there is no way of credibly conveying them to the citizen. Naturally, the citizen can observe the level of benefits generated by the project, but this is not a perfectly revealing signal. Even when $\theta = \theta_1$ and the project is warranted, it may fail to produce high benefits. The public project is therefore a disguised transfer mechanism in the sense discussed by Tullock (1983).

The citizen also faces "politician uncertainty": he cannot directly observe whether politicians are good or bad. The citizen is not completely uninformed for, when he first encounters a politician, he does observe some signal of his type. This signal, which can be thought of as an assessment of the politician's character, allows the citizen to form an initial estimate of the likelihood that the politician is good. Let $\lambda_I \in (0, 1)$ denote the citizen's estimate of the probability that the incumbent is good at the beginning of the first period. We shall refer to λ_I as the incumbent's *initial reputation.* The incumbent is assumed to be aware of his initial reputation. Let λ_C denote the challenger's initial reputation, that is, the citizen's estimate of the probability that the challenger is good. This is not known by the citizen or the incum-

bent until the end of the first period, when the challenger is selected. Rather than characterize the signaling technology explicitly, we simply assume that λ_C is drawn from some cumulative distribution function $G(\lambda)$. This cumulative distribution function is assumed to be smooth and increasing and to satisfy the property that $G(0) = 0$.

The Game and the Definition of Equilibrium

This two-period model defines a game among the incumbent, challenger, and citizen. At the beginning of the game, nature chooses the type of the incumbent ($i \in \{b, g\}$). Nature then chooses the probability that the project will produce high benefits ($\theta \in \{\theta_0, \theta_1\}$). This choice is observed solely by the incumbent. The citizen knows only that the probability that $\theta = \theta_1$ is π. The incumbent must then choose a transfer to the special interest and decide whether or not to implement the project. Formally, the incumbent can be thought of as choosing a project decision-transfer pair $(D, T) \in \{P, N\} \times \mathbb{R}_+$, where $D = P$ (N) means that the project is (is not) implemented. The incumbent's choices are observed by the citizen. If the project is implemented, nature chooses the benefits it produces for the citizen. These benefits are B_H with probability θ and B_L with probability $1 - \theta$. The incumbent's first-period record is the triple (D, T, B).

The election is held at the end of the first period. Nature chooses the type of the challenger ($i \in \{b, g\}$), and the citizen observes some noisy information about his type. In particular, the noise is such that his estimate of the probability that the challenger is good is λ_C, where λ_C is drawn from the cumulative distribution function $G(\lambda)$. Knowing λ_C and the incumbent's first-period record, the citizen must decide whom to elect. Once the election is over, the winning politician makes a transfer decision and the game ends.

A strategy for the incumbent has two components. The first is a rule that specifies a project and transfer decision in the first period for each type the incumbent might be and each realization of θ. The second component is a rule that specifies a transfer decision in the second period should the incumbent be reelected. Since the game ends at the end of the second period, this second-period decision depends only on the incumbent's type.[13]

A strategy for the challenger is simply a rule that specifies the transfer he will make should he be elected. Again, this decision will simply depend on his type. A strategy for the citizen is a rule that

[13] We shall see that the incumbent has a strict best response depending only on his type, so there is no loss of generality in not making this depend on other aspects of history.

specifies the probability that he will reelect the incumbent. This rule will depend on the incumbent's first-period record (D, T, B) and the initial reputation of the challenger, λ_C. In addition to a strategy for the citizen, we must also specify his beliefs about the relevant unobservables. The unobservables are the incumbent's type (i.e., whether he is good or bad) and the realization of θ in the first period. Of these, only the incumbent's type is relevant for the citizen's decision. The citizen's beliefs about the incumbent's type will depend on his initial reputation and his first-period record.

A perfect Bayesian equilibrium of this game consists of a strategy for the incumbent, a strategy for the challenger, and a strategy and beliefs for the citizen that satisfy four properties. First, the citizen's beliefs are consistent with the incumbent's strategy in the sense that they are generated by Bayes updating where possible. Second, the citizen's strategy is optimal given these beliefs and the strategies of the incumbent and challenger. Third, the incumbent's strategy is optimal given the citizen's beliefs and strategy and the challenger's strategy. Fourth, the challenger's strategy is optimal.

III. Inefficient Transfers

The task of this section is to solve for the equilibrium of the game and to analyze the incumbent's equilibrium policy choices. Equilibrium will be solved for by backward induction.

Second-Period Behavior of Politicians

Suppose that the incumbent is in power in the second period. If he is good, he will make no cash transfers to the special interest and his second-period utility will be $v_g(0)$. If he is bad, he will make a cash transfer $T_0 = T^*(0, 0)$, where $T^*(\cdot)$ is as defined in (1), and obtain a utility level $v_b^*(0, 0)$. If the challenger is in power in the second period, he will follow exactly the same strategy as the incumbent. If good, he will make no transfer; if bad, he will make a transfer T_0.

The Citizen's Behavior

The citizen will be better off with a good politician in power in the second period than with a bad one. He will therefore elect that politician who he believes is most likely to be good. Thus if $\alpha(D, T, B)$ denotes the citizen's estimate of the probability that the incumbent is good when his first-period record is (D, T, B) and if the challenger's reputation is λ_C, the citizen will reelect the incumbent if and only if

$\alpha(D, T, B) > \lambda_C$.[14] Since the challenger's reputation is a random draw from the cumulative distribution function $G(\lambda)$, the probability that the incumbent will be reelected is simply $G(\alpha(D, T, B))$.

The Incumbent's First-Period Behavior and the Citizen's Beliefs

Suppose that the probability that the project will yield high benefits is θ. If the incumbent is good and selects a transfer T, his expected payoff will be

$$V_g(N, T, \theta) = v_g(-T) + \delta G(\alpha(N, T, 0))v_g(0) \tag{2}$$

if he does not implement the project and

$$\begin{aligned} V_g(P, T, \theta) = v_g(\Delta(\theta) - T) + \delta[\theta G(\alpha(P, T, B_H)) \\ + (1 - \theta)G(\alpha(P, T, B_L))]v_g(0) \end{aligned} \tag{3}$$

if he does. If the incumbent is bad, his expected payoff will be

$$V_b(N, T, \theta) = v_b(-T, T) + \delta G(\alpha(N, T, 0))v_b^*(0, 0) \tag{4}$$

if the project is not implemented and

$$\begin{aligned} V_b(P, T, \theta) = v_b(\Delta(\theta) - T, R_s + T) + \delta[\theta G(\alpha(P, T, B_H)) \\ + (1 - \theta)G(\alpha(P, T, B_L))]v_b^*(0, 0) \end{aligned} \tag{5}$$

if it is.

The first-period strategy that maximizes the incumbent's expected payoff will obviously depend on the citizen's beliefs. In equilibrium, for any first-period record that arises with positive probability, these beliefs must be computed from the incumbent's strategy via Bayes's rule. While this requirement ties down the citizen's beliefs along the equilibrium path, the definition of perfect Bayesian equilibrium does not tie down the citizen's beliefs after first-period records that do not arise with positive probability in equilibrium. In this game, as in others, there exist equilibria that depend on rather unnatural out-of-equilibrium beliefs. Thus there exist equilibria in which the incumbent (whether good or bad) always makes cash transfers to the special

[14] We can ignore the possibility that $\alpha(D, T, B) = \lambda_C$, which will be a zero probability event under our assumptions about the distribution function $G(\cdot)$. On the other hand, in Sec. IV, where we consider the possibility that all politicians are bad, we shall have $\alpha(D, T, B) = \lambda_C = 0$, and we must deal with the case of equality.

interest. These equilibria are supported by the out-of-equilibrium belief that any incumbent carrying out zero transfers must be bad.[15]

We shall focus on equilibria in which the citizen's beliefs (on and off the equilibrium path) satisfy a simple monotonicity property. This property is that, ceteris paribus, a first-period record with lower cash transfers cannot result in more pessimistic beliefs about the incumbent. More formally, we say that the citizen has *monotonic beliefs* if, for any pair of first-period records (D, T, B) and (D, T', B) such that $T' > T$, $\alpha(D, T', B) \leq \alpha(D, T, B)$. We shall refer to an equilibrium with this property as an *equilibrium with monotonic beliefs* (EMB).

If the citizen's beliefs are monotonic, the equilibrium first-period strategy of the incumbent must take a simple form. A good incumbent will never choose to make cash transfers to the special interest in the first period. Making such transfers lowers his first-period utility and, if the citizen has monotonic beliefs, reduces his probability of reelection. It follows that if the citizen observes the incumbent making a cash transfer, he will conclude that he is bad and vote him out of office. This implies that if a bad incumbent does choose to make cash transfers in the first period, he might as well act in an unconstrained way, that is, choose those actions that maximize his first-period utility. When $\theta = \theta_0$, this means not implementing the project and choosing the cash transfer T_0. When $\theta = \theta_1$, this implies undertaking the project and selecting the cash transfer $T_1 = T^*(\Delta(\theta_1), R_s)$, where $T^*(\cdot)$ is as defined in (1). We therefore have the following result.

LEMMA. In an EMB, a good incumbent chooses $(P, 0)$ or $(N, 0)$. A bad incumbent chooses $(P, 0)$, $(N, 0)$, or (P, T_1) when $\theta = \theta_1$ and $(P, 0)$, $(N, 0)$, or (N, T_0) when $\theta = \theta_0$.

We let $\sigma_P^g(\theta)$ ($\sigma_N^g(\theta)$) denote the probability that a good incumbent will choose (not) to implement the project when the probability that it yields high benefits is θ. A good incumbent will be said to *behave efficiently* if he always implements (does not implement) the project when $\theta = \theta_1$ ($\theta = \theta_0$), that is, if $\sigma_P^g(\theta_1) = 1$ and $\sigma_N^g(\theta_0) = 1$. Similarly, we let $\sigma_P^b(\theta)$ denote the probability that a bad incumbent chooses $(P, 0)$ when the probability that the project will yield high benefits is θ,

[15] These equilibria are not ruled out by equilibrium dominance type arguments (Cho and Kreps 1987). The reason is that both good and bad politicians might prefer to make zero cash transfers, over their equilibrium actions, if they thought that the citizen would reelect them with probability one. This implies that the citizen's belief that anyone carrying out zero transfers is a bad politician cannot be ruled out. In fact, the game is not a standard signaling game: the "receiver" (i.e., the voter) makes an observation (the benefits of the project) that is not chosen directly by the "sender" (the incumbent politician) but is correlated with both the sender's "type" (i.e., the probability of success of the project, θ) and the sender's action (whether or not to implement the project). Thus it is not possible to directly apply more complex signaling game refinements (e.g., divinity as in Banks and Sobel [1987]).

$\sigma_N^b(\theta)$ denote the probability that he chooses $(N, 0)$, and $\sigma_U^b(\theta)$ denote the probability that he acts in an unconstrained manner. Acting in an unconstrained manner involves choosing (P, T_1) when $\theta = \theta_1$ and (N, T_0) when $\theta = \theta_0$. Again, we shall say that a bad incumbent *behaves efficiently* if he always chooses (not) to implement the project when $\theta = \theta_1$ ($\theta = \theta_0$), that is, if $\sigma_P^b(\theta_1) + \sigma_U^b(\theta_1) = 1$ and $\sigma_N^b(\theta_0) + \sigma_U^b(\theta_0) = 1$. A bad incumbent *makes inefficient transfers to the special interest* if he ever implements the project when $\theta = \theta_0$, that is, if $\sigma_P^b(\theta_0) > 0$.

Given an incumbent's first-period strategy of the simple form described in the lemma, it is straightforward to solve for the citizen's beliefs along the equilibrium path. For example, if the incumbent's first-period record in equilibrium is $(P, 0, B_H)$, then Bayes's rule implies that

$$\alpha(P, 0, B_H) = \frac{\lambda_I[\pi\theta_1\sigma_P^g(\theta_1) + (1 - \pi)\theta_0\sigma_P^g(\theta_0)]}{\lambda_I[\pi\theta_1\sigma_P^g(\theta_1) + (1 - \pi)\theta_0\sigma_P^g(\theta_0)] + (1 - \lambda_I)[\pi\theta_1\sigma_P^b(\theta_1) + (1 - \pi)\theta_0\sigma_P^b(\theta_0)]}. \quad (6)$$

The numerator is the probability that a good incumbent would generate this record, and the denominator is the probability that either type of incumbent would generate it. Similar expressions can be derived for the records $(P, 0, B_L)$ and $(N, 0, 0)$. If the citizen observes the records (P, T_1, B_H), (P, T_1, B_L), or $(N, T_0, 0)$, α will equal zero.

An equilibrium first-period strategy maximizes the incumbent's expected payoff given that the citizen is updating his beliefs in a manner consistent with the strategy. Identifying equilibria is, in principle, straightforward. The incumbent's strategy is determined by five probabilities, and the task is to find values of them that maximize the incumbent's payoff given the beliefs they imply.

Analysis of Equilibrium

Our first proposition provides a general inefficiency result: if the incumbent's initial reputation is above a certain level, equilibrium cannot involve efficient behavior.

PROPOSITION 1. Under assumptions 1–3, there exists some $\hat{\lambda} \in (0, 1)$ such that, in any EMB, at least one type of incumbent behaves inefficiently if the incumbent's initial reputation λ_I exceeds $\hat{\lambda}$.

Proof. Define $\hat{\lambda}$ from the equality

$$G(\hat{\lambda}) = \max\left\{\frac{v_b^*(0, 0) - v_b(0, 0)}{\delta v_b^*(0, 0)}; \frac{v_b^*(\Delta(\theta_1), R_s) - v_b(\Delta(\theta_1), R_s)}{\delta v_b^*(0, 0)}\right\}. \quad (7)$$

That $\hat{\lambda} \in (0, 1)$ follows from assumption 3. The proof has two steps. The first involves showing that in any EMB in which both types of incumbent behave efficiently, a bad incumbent does not make positive cash transfers if $\lambda_I > \hat{\lambda}$.

If both types of incumbent behave efficiently, then when $\theta = \theta_0$, a good incumbent selects $(N, 0)$ and a bad incumbent selects $(N, 0)$ or (N, T_0); when $\theta = \theta_1$, a good incumbent selects $(P, 0)$ and a bad incumbent selects $(P, 0)$ or (P, T_1). Thus the citizen's beliefs must be such that

$$\alpha(P, 0, B_H) = \alpha(P, 0, B_L) \geq \lambda_I$$

and

$$\alpha(N, 0, 0) \geq \lambda_I.$$

If in equilibrium a bad incumbent chooses cash transfers, then he must choose either (N, T_0) when $\theta = \theta_0$ or (P, T_1) when $\theta = \theta_1$. Consider the first possibility. Since $\alpha(N, T_0, 0)$ must equal zero, his payoff from choosing (N, T_0) is $v_b^*(0, 0)$. But the payoff from selecting $(N, 0)$ is

$$v_b(0, 0) + \delta G(\alpha(N, 0, 0))v_b^*(0, 0) \geq v_b(0, 0) + \delta G(\lambda_I)v_b^*(0, 0).$$

Since $\lambda_I > \hat{\lambda}$, (7) implies that this payoff exceeds $v_b^*(0, 0)$. Thus equilibrium cannot involve his choosing (N, T_0). The possibility of his choosing (P, T_1) is similarly eliminated.

The proof is completed by showing that there is no EMB in which both types of incumbent behave efficiently and do not make cash transfers. Suppose that there existed such an equilibrium. Then

$$\alpha(P, 0, B_H) = \alpha(P, 0, B_L) = \alpha(N, 0, 0) = \lambda_I,$$

and the equilibrium payoff to a bad incumbent from choosing $(N, 0)$ when $\theta = \theta_0$ is $v_b(0, 0) + \delta G(\lambda_I)v_b^*(0, 0)$. Assumption 2 implies that this is less than $v_b(\Delta(\theta_0), R_s) + \delta G(\lambda_I)v_b^*(0, 0)$, which is the payoff from choosing $(P, 0)$—a contradiction. Q.E.D.

The logic underlying this proposition is straightforward. If a bad incumbent's initial reputation is high, he is unwilling to lose it by making cash transfers to the special interest. It follows that equilibrium cannot involve such transfers. In any efficient equilibrium, therefore, there can be no reputational penalty for simply implementing the project (i.e., $\alpha(P, 0, B_H) = \alpha(P, 0, B_L) = \alpha(N, 0, 0)$). However, if this were the case, a bad incumbent would always implement the project irrespective of θ, which is inefficient. Thus equilibrium cannot be efficient.

While proposition 1 provides a general inefficiency result, it does not establish that equilibrium will involve inefficient transfers to the

special interest. Our next proposition addresses this issue. First, we introduce an additional assumption.

ASSUMPTION 4. (i) $v_g(\Delta(\theta_1)) - v_g(0) > \delta v_g(0)$, and (ii) $v_g(0) - v_g(\Delta(\theta_0)) > \delta v_g(0)$.

This assumption essentially guarantees that a good incumbent will behave efficiently. Part i states that the utility gain of generating the citizen an expected utility increase of $\Delta(\theta_1)$ exceeds the discounted value of one period of ego rent. Part ii states a similar condition for the utility loss from generating the citizen an expected utility gain of $\Delta(\theta_0)$.

PROPOSITION 2. Under assumptions 1–3, there exists $\lambda^* \in (0, 1)$ such that a bad incumbent's always choosing $(P, 0)$ and a good incumbent's behaving efficiently is an EMB if the incumbent's initial reputation exceeds λ^*. Moreover, if assumption 4 is satisfied, this is the unique EMB.

Proof. See the Appendix.

Proposition 2 demonstrates the existence and, under assumption 4, uniqueness of an equilibrium in which a bad incumbent makes inefficient transfers to the special interest.[16] The intuition underlying the result is simple. In equilibrium, a bad incumbent knows that if he chooses to make direct cash transfers, his type will be revealed and he will be voted out of office. An alternative way of transferring extra income to the special interest is to undertake the project when $\theta = \theta_0$. The reputational penalty for doing this in equilibrium will be less severe than that for choosing cash transfers. While the citizen understands the bad incumbent's incentives, he cannot perfectly infer from a record of introducing the project that an incumbent is bad. The reason is that a good incumbent undertakes the project when $\theta = \theta_1$ and the citizen cannot observe the realization of θ.

It is key to this result that the citizen is unable to commit to a voting strategy ex ante. If the citizen could commit, transfers would be made efficiently. For example, while keeping the reelection probabilities for the first-period records $(N, 0, 0)$, $(P, 0, B_L)$, and $(P, 0, B_H)$ the same as in the no-commitment equilibrium, the citizen could commit to reelecting the incumbent with probability $\theta_0 G(\alpha(P, 0, B_H)) + (1 - \theta_0)G(\alpha(P, 0, B_L))$ if he chose not to introduce the project and made a cash transfer R_s to the special interest. A bad incumbent would then

[16] In an earlier version of this paper, we showed that, under assumptions 1–4, for every initial reputation of the incumbent there exists a unique EMB. For low initial reputations, this equilibrium involves efficient behavior by both types of incumbents. Rather than implement the project when $\theta = \theta_0$, a bad incumbent randomizes between choosing $(N, 0)$ and (N, T_0). For a bad incumbent with a low initial reputation, the prospects of remaining in office are bleak whatever his strategy. Thus the reputational gain from undertaking the project is not sufficient to make the former action attractive.

have no incentive to introduce the project when $\theta = \theta_0$. However, by choosing to make the cash transfer, an incumbent would reveal himself to be bad, and the citizen is unable to commit not to using this information against him.

It is also critical that there is some probability that a good incumbent will choose to undertake the project when $\theta = \theta_1$. If a good incumbent never undertook the project, the reputational penalty for implementation would be the same as that for choosing cash transfers. When part i of assumption 4 is not satisfied, a good incumbent would rather forgo the current benefits of the project when $\theta = \theta_1$ than lose the future benefits of holding office. In such circumstances, there exist equilibria in which the inefficiency takes the form of too few public projects rather than too many. Before we can show this, we must introduce one final assumption.

ASSUMPTION 5. (i) $v_g(\Delta(\theta_1)) - v_g(0) < \delta v_g(0)$, and (ii) $v_b^*(\Delta(\theta_1), R_s) - v_b(0, 0) < \delta v_b^*(0, 0)$.

Part i simply reverses part i of assumption 4, and part ii says that a bad incumbent would also be willing to forgo the gains from unconstrained behavior when $\theta = \theta_1$ to stay in office.

PROPOSITION 3. Under assumptions 1–3 and 5, there exists $\tilde{\lambda} \in (0, 1)$ such that both types of incumbent always choosing $(N, 0)$ is an EMB if the incumbent's initial reputation exceeds $\tilde{\lambda}$.

Proof. Define $\tilde{\lambda}$ by the equality

$$G(\tilde{\lambda}) = \max\left\{\frac{v_g(\Delta(\theta_1)) - v_g(0)}{\delta v_g(0)}; \frac{v_b^*(\Delta(\theta_1), R_s) - v_b(0, 0)}{\delta v_b^*(0, 0)}\right\}. \quad (8)$$

That $\tilde{\lambda} \in (0, 1)$ follows from assumption 5. We claim that if $\lambda_I > \tilde{\lambda}$, both types of incumbent choosing $(N, 0)$ is an EMB supported by the out-of-equilibrium beliefs $\alpha(D, T, B) = 0$ for all $(D, T, B) \neq (N, 0, 0)$.

If both types of incumbent always choose $(N, 0)$, then $\alpha(N, 0, 0) = \lambda_I$. Thus the payoffs to the two types of incumbents from choosing $(N, 0)$ are $v_g(0) + \delta G(\lambda_I) v_g(0)$ and $v_b(0, 0) + \delta G(\lambda_I) v_b^*(0, 0)$. The maximum payoffs that the two types of incumbents could get if they deviated are $v_g(\Delta(\theta_1))$ and $v_b^*(\Delta(\theta_1), R_s)$, respectively. Equation (8) therefore guarantees that deviation is not worthwhile. Q.E.D.

IV. The Importance of Politician Uncertainty

It is clearly key to our theory of inefficient transfers that there be both policy and politician uncertainty. Without the latter, the incumbent would have no reason to worry about his reputation. However, writers in the Virginia tradition make little mention of uncertainty

concerning the predispositions of politicians. They focus on the role of imperfect information about the effects of policies in generating inefficiencies. This raises the question of whether the assumption of politician uncertainty is superfluous. Perhaps policy uncertainty alone is sufficient to generate the selection of inefficient transfer mechanisms?

This issue can be addressed in the model by examining what would happen if both politicians were known to be bad. The main change implied by this assumption occurs in the citizen's behavior. At the time of the election, if both incumbent and challenger are bad, the citizen will be indifferent as to which one wins. Thus, if $\mu(D, T, B)$ denotes the citizen's reelection rule (i.e., the probability that the incumbent is reelected when his first-period record is (D, T, B)), any specification of $\mu(\cdot)$ is consistent with optimizing behavior on the part of the citizen.

Nonetheless, the reelection rule employed by the citizen does influence the incumbent's first-period choices and hence the citizen's ex ante payoff. The standard procedure in such models is therefore to focus on the equilibrium in which the citizen employs a reelection rule that maximizes his equilibrium payoff. The citizen is thought of as a "principal" designing a reward scheme for the incumbent—his "agent." We follow this procedure here.[17] We shall refer to the reelection rule used in this equilibrium as the *optimal reelection rule*.[18]

If there were no policy uncertainty (i.e., the citizen could observe the realization of θ), then, under assumption 3, the incumbent could be induced to choose $(N, 0)$ when $\theta = \theta_0$ and $(P, 0)$ when $\theta = \theta_1$ by a reelection rule that promises not to reelect him if he does anything else. The introduction of policy uncertainty means that the citizen cannot make his voting contingent on the (unobservable) realization of θ. This creates a potential incentive problem. Suppose, for example, that the reelection rule promises to reelect the incumbent if and only if he selects $(N, 0)$ or $(P, 0)$. Then, under assumption 2, the incumbent will choose to implement the project when $\theta = \theta_0$, thereby making inefficient transfers.

The citizen can try to correct the incumbent's incentives by offering him a lower probability of reelection if he undertakes the project or allowing him to make cash transfers if he does not implement the project. The question to be addressed, therefore, is whether the in-

[17] As in the principal-agent literature, this approach assumes that the incumbent's choices when he is indifferent between alternatives reflect the voter's preferences.

[18] It is worth noting that the equilibrium in which the citizen employs the optimal reelection rule would be the unique equilibrium of our game if we appended a prior stage in which the citizen could announce his reelection rule.

cumbent will make inefficient transfers under the optimal reelection rule. The following proposition establishes that the answer is no.

PROPOSITION 4. The optimal reelection rule induces the incumbent to behave efficiently.

Proof. See the Appendix.

It is important to note that this proposition does not imply that the optimal reelection rule induces the incumbent to behave as he would if there were no policy uncertainty. The incumbent may make cash transfers to the special interest under the optimal reelection rule. All the proposition says is that, while policy uncertainty may have a distributional effect, it will not result in an inefficiency. Thus, in our model, the Virginia view that politicians will choose disguised transfer mechanisms is difficult to justify without the assumption that voters are uncertain as to politicians' types.

V. Discussion

The "public project" in our model has four key features. First, it indirectly benefits a special interest. Second, it may or may not benefit the rest of society. Third, citizens have less information about whether it will benefit them than politicians do. Fourth, citizens cannot perfectly observe whether its implementation was in their interest even ex post because its outcome is stochastic. The logic of our argument suggests that any policy that shares these four features may be used to redistribute even when cash transfers are both feasible and more efficient. The first feature implies that the policy can be used to transfer resources to special interests. The remaining features imply that the reputational penalty for using the policy to make transfers may be less than that for making direct cash transfers. By the second feature, even good politicians will implement the policy under some conditions, and by the third and fourth features, the citizens cannot observe whether these conditions are satisfied.

Almost all public expenditure projects have these four features. Building a new city airport, for example, benefits the local construction industry. It may or may not produce net benefits to the residents of the city depending on the future demand for air travel. Developing a new high-tech jet fighter benefits firms in the defense industry. Whether it produces net benefits for the citizens depends on the military capabilities of future aggressors. Suppliers of cleanup equipment and services will profit from a publicly funded environmental cleanup. Its benefits to citizens depend on how successful it is at reducing environmental damage. In all these cases, citizens are likely to be relatively uninformed about the likelihood that they will benefit from the project in question. Moreover, since the outcomes of these

projects are uncertain, citizens will be unable to verify ex post whether the projects were in their interests ex ante.

Subsidy or regulatory policies that purport to be in the public interest sometimes have these features. For example, domestic firms are helped by "infant industry" temporary production subsidies that seek to promote learning by doing. These subsidies may or may not benefit citizens depending on the amount of learning by doing they generate. Licensing physicians will benefit those who are currently physicians by restricting entry. Whether it produces net benefits to citizens depends on the proportion of incompetents in the group who are deterred from entering the profession.[19]

Given the large class of public policies that fit the model, the results would seem to lend some credence to the Virginia view.[20] What might be said by way of defense of the Chicago position? One response is to attack the assumption of heterogeneity in politicians' tastes, which, as shown in the previous section, is critical to the inefficiency result. It may be argued that this assumption is ad hoc. The model does not suggest why politicians should be of two different types. Presumably, individuals choose to become politicians, and without modeling this underlying decision process, one cannot convincingly explain why individuals of different types decide to become politicians.

While it would certainly be more satisfying theoretically to model the process by which individuals become politicians, we do not believe that the assumption of politician heterogeneity is unreasonable.[21] What we are really trying to capture here is differences in honesty and integrity. Those politicians lacking in these virtues will be more easily bought by special interests. Casual empiricism suggests that politicians are extremely concerned with the public's perception of their honesty and integrity. Moreover, candidates in elections devote

[19] A certain amount of care is warranted in applying the model to the analysis of subsidies and regulations. Imposing such a policy, unlike undertaking a public project, is not a one-off decision. A decision to impose or withdraw the same policy can be taken in each period. As a consequence, citizens can learn about its effects over time. It would be interesting to analyze how this affected the equilibrium in a multiperiod model. To the extent that citizens' uncertainty persists, our argument will still apply. Nonetheless, because of learning, one would not expect an inefficient subsidy or regulation to persist indefinitely.

[20] The class of policies to which our argument applies does not include two of the most commonly cited examples of inefficient transfers, namely, the farm program and tariffs. These are policies whose explicit purpose is to make transfers and that, if standard economic theory is right, are Pareto dominated by alternative instruments. The explanation for their adoption may rest on the fact that they have "concealed costs." Alternatively, standard economic theory may be missing something, and they really are (constrained) efficient transfer methods.

[21] Besley and Coate (1995) offer a model of representative democracy in which the characteristics of politicians may be analyzed. In their model, citizens make an ex ante decision whether to offer themselves as candidates for political office.

considerable resources to undermining the public image of their competitors. It is hard to believe that such expenditures would be observed if it was common knowledge among voters that all politicians were equally dishonorable.

A second criticism concerns the limited number of policy instruments available to the politician. In reality, there may exist instruments that a good politician could use to separate himself from a bad politician when he introduces a project. For example, a good politician might levy a special tax on the special interest that gains from the project at the same time it is implemented.[22] Alternatively, he might introduce a competitive bidding procedure for the contract to undertake the project that was designed to leave the winning firm with zero rents. In such circumstances, introducing the project without the appropriate tax or bidding procedure would carry the same reputational penalty as using direct cash transfers.

In reality, however, citizens are likely to be highly uncertain (both ex ante and ex post) about the extent to which a special interest gains from a particular public policy. Thus a bad politician might choose to implement a project and impose no taxes, denying that the special interest was gaining significantly. Provided that there is some probability that this action would also be taken by a good politician, the reputational penalty for doing it will be smaller than that for making cash transfers. In such circumstances, introducing inefficient projects will still be a less reputationally costly way of making transfers than using direct cash payments. Thus, while the availability of additional policy instruments may mitigate the abuse of projects, it seems unlikely to eliminate it.

A more fundamental criticism concerns the limited notion of political competition implicit in this type of model. In particular, the role played by the challenger is entirely passive. Wittman (1989), however, stresses the role of politicians in providing information to voters. "The arguments made for the voter's being uninformed implicitly assume that the major cost of information falls on the voter. However, there are returns to an informed political entrepreneur from providing the information to the voters, winning office, and gaining the direct and indirect rewards of holding office" (p. 1400). Thus while individual voters would have no incentive to invest resources to find

[22] In our model, the ability to tax the special interest would eliminate the inefficiency. In the natural equilibrium of the game with taxes, a good incumbent would implement the project with a tax of R_s on the special interest when $\theta = \theta_1$. A bad incumbent would therefore have no incentive to undertake the project when $\theta = \theta_0$ since, unless it was coupled with a tax of R_s, he would be revealed to be bad and voted out of office. He would therefore either employ the same strategy as a good incumbent or act in an unconstrained manner. In either case, his behavior would be efficient.

out whether a particular policy was in the public interest, it would pay the challenger to find out this information and inform the voters. In the context of our model, the challenger would find out the realization of θ and expose the incumbent if he had introduced the project when $\theta = \theta_0$. This would make the reputational penalty for implementing the project identical to that from using cash transfers.

This is an attractive argument. We certainly observe challengers criticizing the policy decisions of incumbents and providing their own assessments of the efficacy of different policies. Unfortunately, however, the possibility of such behavior is unlikely to solve the problem because of the difficulty in credibly conveying information to the voters (see also Rogoff 1990). If the voters believed what the challenger told them, then the challenger would have an incentive to inform the voters that the project was unwarranted whenever the incumbent introduced it. Thus there is no reason why the voters should believe the information provided by the challenger. The challenger may be able to mitigate this problem by hiring experts who have professional reputations to worry about or pointing to studies by (so-called) independent research institutes, but these efforts are unlikely to be completely convincing. Thus the reputational penalty for undertaking the project would still be less than that from direct cash transfers even if the challenger could provide information.

VI. Conclusion

An important question in political economy concerns the form of transfers to special interests. The Chicago view is that political competition will lead politicians to make such transfers efficiently. The Virginia view is that lack of information about the effects of policies on the part of voters will lead politicians to favor inefficient "sneaky" methods of redistribution over more transparent efficient mechanisms. This paper has analyzed the form of transfers in a model of political competition in which politicians have financial incentives to make transfers to a special interest and voters are imperfectly informed.

We find that when there is asymmetric information about both the effects of policy and the predispositions of politicians, inefficient methods of redistribution may be employed. Politicians sometimes prefer to transfer resources to the special interest by implementing public projects, even when making direct cash transfers would be more efficient. The reason is that the reputational penalty for introducing projects is less than that for choosing direct cash transfers. This reflects the fact that even politicians who do not pander to special interests will sometimes introduce projects.

We have argued that the logic underlying our result is quite general and applies to a broad class of public policies. In characterizing the common features of such policies, we have refined and clarified Tullock's notion of a disguised transfer mechanism. However, we have also pointed out that our model suggests that politician uncertainty is necessary to explain the use of such mechanisms. The mere existence of disguised transfer mechanisms does not undermine the Chicago view. While we do not believe that this observation weakens the real-world applicability of our results, it does suggest that the focus of the Virginia view on imperfect information about policies alone may be misplaced. This analysis suggests that the key to understanding the use of disguised transfer mechanisms is to recognize that politicians are concerned with protecting their reputations.

Appendix

Proof of Proposition 2

If a good incumbent behaves efficiently and a bad incumbent always chooses $(P, 0)$, the citizen's beliefs along the equilibrium path are given by

$$\alpha(P, 0, B_H) = \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)\{1 + [(1 - \pi)\theta_0/\pi\theta_1]\}},$$

$$\alpha(P, 0, B_L) = \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)\{1 + [(1 - \pi)(1 - \theta_0)/\pi(1 - \theta_1)]\}},$$

$$\alpha(N, 0, 0) = 1.$$

Now define the function h: $\{\theta_0, \theta_1\} \times [0, 1] \to [0, 1]$ as follows:

$$h(\theta, \lambda) = \theta G\left(\frac{\lambda}{\lambda + (1 - \lambda)\{1 + [(1 - \pi)\theta_0/\pi\theta_1]\}}\right) + (1 - \theta)G\left(\frac{\lambda}{\lambda + (1 - \lambda)\{1 + [(1 - \pi)(1 - \theta_0)/\pi(1 - \theta_1)]\}}\right).$$

Notice that h is continuous and increasing in both its arguments and that $h(\theta, 1) = 1$. Let $\hat{\lambda}$ be the smallest value of λ such that

$$G(h(\theta_0, \lambda)) \geq \max\left\{1 - \frac{v_b(\Delta(\theta_0), R_s) - v_b(0, 0)}{\delta v_b^*(0, 0)}; \frac{v_b^*(0, 0) - v_b(\Delta(\theta_0), R_s)}{\delta v_b^*(0, 0)}\right\}$$

and

$$G(h(\theta_1, \lambda)) \geq \max\left\{1 - \frac{v_g(\Delta(\theta_1)) - v_g(0)}{\delta v_g(0)}; \frac{v_b^*(\Delta(\theta_1), R_s) - v_b(\Delta(\theta_1), R_s)}{\delta v_b^*(0, 0)}\right\}.$$

Observe that assumptions 1, 2, and 3 and the properties of h guarantee that such a value exists and is an element of $(0, 1)$.

We now demonstrate that, for $\lambda_I > \hat{\lambda}$, a bad incumbent's always choosing $(P, 0)$ and a good incumbent's behaving efficiently is an EMB with out-of-equilibrium beliefs given by $\alpha(D, T, 0) = 0$ for all $T > 0$. We first check that a good incumbent behaves efficiently. It is clear that he will choose $(N, 0)$ when $\theta = \theta_0$, since this is his one-period optimum and it gets him reelected with probability one. When $\theta = \theta_1$, the definition of $\hat{\lambda}$ implies that the payoff from $(P, 0)$,

$$v_g(\Delta(\theta_1)) + \delta G(h(\theta_1, \lambda_I))v_g(0),$$

exceeds the payoff from selecting $(N, 0)$, $v_g(0)(1 + \delta)$.

Next we check that a bad incumbent always wants to choose $(P, 0)$. When $\theta = \theta_0$, the payoff from choosing $(P, 0)$ is

$$v_b(\Delta(\theta_0), R_s) + \delta G(h(\theta_0, \lambda_I))v_b^*(0, 0).$$

The definition of $\hat{\lambda}$ guarantees that this exceeds the payoffs from choosing $(N, 0)$ and (N, T_0), which are $v_b(0, 0) + \delta v_b^*(0, 0)$ and $v_b^*(0, 0)$, respectively. When $\theta = \theta_1$, the payoff from choosing $(P, 0)$ is

$$v_b(\Delta(\theta_1), R_s) + \delta G(h(\theta_1, \lambda_I))v_b^*(0, 0).$$

Since h is increasing in θ, this exceeds the payoff from choosing $(P, 0)$ when $\theta = \theta_0$. Thus it must exceed the payoff from choosing $(N, 0)$, which is independent of θ. The definition of $\hat{\lambda}$ guarantees that the payoff from choosing $(P, 0)$ exceeds $v_b^*(\Delta(\theta_1), R_s)$, the payoff from (P, T_1).

To complete the proof, we must show that this is the unique EMB under assumption 4 if $\lambda_I > \hat{\lambda}$. As noted in the text, assumption 4 implies that a good incumbent always behaves efficiently. This implies that the citizen's beliefs must satisfy

$$\alpha(P, 0, B_H) \geq \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)\{1 + [(1 - \pi)\theta_0/\pi\theta_I]\}},$$

$$\alpha(P, 0, B_L) \geq \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)\{1 + [(1 - \pi)(1 - \theta_0)/\pi(1 - \theta_1)]\}},$$

$$\alpha(N, 0, 0) \leq 1.$$

Moreover, if in equilibrium a bad incumbent chooses (N, T_0) or (P, T_1), the citizen's beliefs at these first-period records must be that the incumbent is bad. Since the relative benefit of selecting $(P, 0)$ has not decreased, it follows from our earlier argument that the bad incumbent's choice of $(P, 0)$ is the only possible outcome. Q.E.D.

Proof of Proposition 4

Let $\{(D(\theta_0), T(\theta_0)), (D(\theta_1), T(\theta_1))\}$ be the incumbent's first-period choices induced by the optimal reelection rule. If the incumbent were not behaving efficiently, then there are two possibilities. The first is that $D(\theta_0) = D(\theta_1) = N$, so that the project is underprovided. The second is that $D(\theta_0) = P$, so that the project is overprovided. We shall rule out each of these two possibilities.

Suppose first that $D(\theta_0) = D(\theta_1) = N$. We may assume without loss of generality that $T(\theta_0) = T(\theta_1)$. If $T(\theta_0) \neq T(\theta_1)$, it must be the case that

$$v_b(-T(\theta_0), T(\theta_0)) + \delta\mu(N, T(\theta_0), 0)v_b^*(0, 0)$$

$$= v_b(-T(\theta_1), T(\theta_1)) + \delta\mu(N, T(\theta_1), 0)v_b^*(0, 0).$$

Consequently, if $T(\theta_i) > T(\theta_j)$, the incumbent could be induced to always select $(N, T(\theta_j))$ by setting $\mu(N, T(\theta_i), 0)$ equal to zero. Let T denote the common value of the cash transfer. Assumption 1 and the fact that the incumbent is induced to select (N, T) when $\theta = \theta_1$ imply that

$$v_b(\Delta(\theta_1), R_s) \leq v_b(-T, T) + \delta\mu(N, T, 0)v_b^*(0, 0)$$

$$< v_b(\Delta(\theta_1) - \hat{T}, R_s + \hat{T}) + \delta\mu(N, T, 0)\, v_b^*(0, 0),$$

where $\hat{T} = \max\{0, T - R_s\}$. Now select any $\tilde{\mu} \in [0, 1]$ and $\tilde{T} \in [0, \hat{T}]$ such that

$$v_b(\Delta(\theta_1) - \tilde{T}, R_s + \tilde{T}) + \delta\tilde{\mu}v_b^*(0, 0) = v_b(-T, T) + \delta\mu(N, T, 0)v_b^*(0, 0).$$

The citizen can induce the incumbent to select (N, T) when $\theta = \theta_0$ and $(P, \tilde{T})$ when $\theta = \theta_1$ by promising to reelect him with probability $\mu(N, T, 0)$ if he chooses (N, T), probability $\tilde{\mu}$ if he chooses $(P, \tilde{T})$, and probability zero otherwise. Since $\tilde{T} \leq T$, this dominates the incumbent's choice of (N, T) in both states. We conclude therefore that the optimal reelection rule cannot be such as to induce the incumbent to underprovide the project.

Now suppose that $D(\theta_0) = P$. Note first that assumptions 2 and 3 imply that the citizen can induce the incumbent to select $(P, 0)$ in each state by simply promising not to reelect him if he does anything else. Thus we may assume with no loss of generality that $D(\theta_1) = P$ and that $T(\theta_0) = T(\theta_1) = 0$. For $\epsilon > 0$, let $T(\epsilon) = -\Delta(\theta_0) - \epsilon$. Then, by part ii of assumption 1, for sufficiently small ϵ,

$$v_b(-T(\epsilon), T(\epsilon)) = v_b(\Delta(\theta_0) + \epsilon, -\Delta(\theta_0) - \epsilon)$$

$$\simeq v_b(\Delta(\theta_0), -\Delta(\theta_0)) > v_b(\Delta(\theta_0), R_s).$$

For such an ϵ, the citizen can induce the incumbent to select $(N, T(\epsilon))$ when $\theta = \theta_0$ and $(P, 0)$ when $\theta = \theta_1$ by promising to reelect him with probability one if he chooses $(N, T(\epsilon))$ or $(P, 0)$ and probability zero otherwise. Since $\epsilon > 0$, this dominates the incumbent's choice of $(P, 0)$ in both states. Thus the optimal reelection rule cannot be such as to induce the politician to overprovide the project. Q.E.D.

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