

# Policy Persistence

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Conventional wisdom in political economy warns that once an economic policy is introduced, it is likely to persist. Even when its original rationale is no longer applicable or has been proven invalid, a policy will prove hard to remove. Empirical support for this position abounds. In both developed and developing countries, many policies appear remarkably resilient. In the United States, farm programs designed to provide support for impoverished farmers remain long after their beneficiaries have become far wealthier than the taxpayers who support them (Gordon C. Rausser, 1992). In developing countries, tariff programs to help import-substituting industries remain in place long after such a development strategy has been discredited (Anne Krueger, 1993). Worldwide, preferential policies designed to provide "temporary" assistance to ethnic groups persist well beyond their intended time limit (Thomas Sowell, 1990).

Why do policies tend to persist in this way? The standard explanation is that interest groups representing net beneficiaries form to defend policies, so that even when their public-interest justification disappears, there is political pressure to maintain them. In this way, the introduction of a policy sets up a system of interest-group politics which then dominates political decision-taking. Support for this position is garnered from the obvious historical importance of interest groups in the maintenance of many resilient policies.

Unfortunately, this "explanation" is seriously incomplete. In any political system, interest groups will form in response to economic and political incentives. If, say, the agricultural sector has the capacity and incentives to organize

an interest group to successfully lobby to *maintain* farm subsidies, then it would presumably have the capacity and incentives to *introduce* such subsidies were they not already in place. This being the case, the subsidies would be operative irrespective of whether they were introduced in the past. The prior introduction of the subsidies cannot then be held responsible for their current presence. The standard explanation simply fails to answer the key question: what is the mechanism by which the introduction of the policy alters incentives in the political process in favor of the new status quo?

In this paper, we consider one such mechanism. When an economic policy is introduced, agents will often respond by undertaking actions in order to benefit from it. These actions increase their willingness to pay for the policy in the future. This extra willingness to pay will be translated into political pressure to retain the policy and this means it is more likely to be operative in the future. We present a simple dynamic model which illustrates this phenomenon. The model combines an agency style model of political competition of the type pioneered by Robert Barro (1973) and John Ferejohn (1986), with a lobbying model of the form made popular by the recent work of Gene M. Grossman and Elhanan Helpman (1994). We use the model to point out that policy persistence may give rise to *political failure*, in the sense that the policy sequence emerging in political equilibrium can be Pareto dominated. Political failure arises because voters forgo support for policies which provide temporary efficiency benefits, anticipating that they will persist once they have been implemented.

S. Lael Brainard and Thierry Verdier (1994) explore this mechanism as an explanation of the persistence of protection to declining industries.<sup>1</sup> They argue that if protection is granted in

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<sup>1</sup> This mechanism is also discussed in Dani Rodrik (1991). He argues that the probability that a policy reform is kept in place in the future will depend positively on the responsiveness of private investment to the reform when it

the current period, less adjustment will be undertaken, increasing the demand for protection in future periods. Accordingly, future protection can be expected to be an increasing function of current protection. They develop a model of the interaction between a declining industry and a policy maker susceptible to lobbying to illustrate this comparative static result. Our paper emphasizes the generality of this mechanism in explaining policy persistence. By incorporating elections and voting, our model provides a more complete account of how increased willingness to pay for a policy may influence policy outcomes. This allows us, in particular, to develop the link between policy persistence and political failure. Finally, our analysis incorporates a sharp definition of what it means for a political equilibrium to exhibit policy persistence.

Our theory of policy persistence should be contrasted with other explanations propounded in the literature. In a model in which decisions are made by majority rule, Raquel Fernandez and Rodrik (1991) show that uncertainty about the distribution of gains and losses from a policy reform can lead to the reform not being undertaken, even if it would be supported once introduced. In such circumstances, the reform would be in place in the future if and only if it were introduced in the present. In their argument, uncertainty alters voters' preferences over policies in ways which, under majority rule, favor the status quo policy. Alberto Alesina and Allan Drazen (1991) consider a different form of incomplete information. If conflicting interest groups must agree both whether to implement policy reform and how to distribute its uncertain benefits, then implementation of a Pareto-improving policy may be delayed as the groups engage in a war of attrition concerning the distribution of the net benefits. This explanation relies on the existence of an inherent institutional bias in favor of the status quo: agreement is required to *change* a policy, but no agreement is required to *sustain* it. Others have cited noneconomic reasons for policy persistence [see, for example, Gordon Tullock (1975) or Robert E. Baldwin (1989)]. Even in the ab-

sence of any sunk cost, interest groups may perceive the removal of a policy to be a "loss" of an entitlement and fight harder against its removal than they would have been prepared to fight for its original implementation. This assumes asymmetric attitudes to gains and losses relative to the interest group's perception of the status quo.

At a more general level, our paper can also be related to the recent literature on the political economy of growth. A key feature of our theory is that current and future policies are linked through private investment decisions. This linkage also arises in growth models with endogenous policy. In the overlapping-generations model of Gerhard Glomm and B. Ravikumar (1992), for example, current expenditures on public education affect the young's human capital investments. These investments determine the distribution (and level) of income when they are old, which affects the public-education level they choose for their offspring. In Per Krusell and José-Víctor Ríos-Rull (1996), current technology policy determines the type of skills workers choose to invest in. These investments influence the distributional implications of policies towards future technologies and hence future political outcomes. In contrast to the lobbying model of this paper, this literature assumes that policies are chosen solely via majority rule. Thus, it is the effect of citizens' private investment decisions on the *distributional implications* of the policy rather than the *willingness to pay* for the policy which is key.

The organization of the remainder of the paper is as follows. The basic model is presented in Section I and the policy-persistence result is derived in Section II. In Section III, the possibility of political failure is demonstrated. Some concluding remarks are offered in Section IV.

## I. The Model

We aim here to provide the simplest model in which to illustrate our argument. The model features a firm, politicians, and a representative citizen who interact over an infinite number of periods. In each period, the firm must decide in which of two sectors to operate. The firm can switch back and forth between sectors, but switching is costly. There is a public policy, such as a subsidy or price control, which favors

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is initially introduced. "The greater the investment response, the more likely entrenched interests will be created in favor of the continuation of the reform" (p. 237).

one sector but is costly to citizens at large. This policy is chosen by the incumbent politician in each period. At the end of the period, the incumbent faces an election against another politician. The winner then becomes the incumbent in the next period. The outcome of the election is determined by the voting decision of the representative citizen. Holding office is valued by politicians and hence by promising not to reelect the incumbent if he introduces the policy, the citizen has some influence on the policy decision. However, the firm can lobby the incumbent politician. Following Grossman and Helpman (1994), this lobbying takes the form of the firm offering the incumbent politician "political contributions" (bribes) to influence his choice. Thus, in deciding whether to introduce the policy, the incumbent must trade off the short-run benefits of the contribution with the long-run costs of losing office.

The two sectors in which the firm can operate are denoted by  $A$  and  $B$ . At the beginning of period 1, the firm is *located* in one of the two sectors. The cost of switching sectors in any period is  $s$ . If the firm operates in sector  $A$  in any period, it earns profits  $\pi_A$ . Its profits from sector  $B$  operation depend upon government policy. The policy decision in period  $\tau \in \{1, 2, \dots\}$  is denoted by  $p_\tau \in \{0, 1\}$ , with  $p_\tau = 1$  meaning the policy is enacted. The firm's profits from sector  $B$  operation in period  $\tau$  are  $\pi_B(p_\tau)$ , where  $\pi_B(1) > \pi_B(0)$ .

In each period, the firm must decide first, how much to offer the incumbent politician as a bribe for enacting the policy and, second, in which sector to operate. We let  $b_\tau$  denote the firm's contribution in period  $\tau$  and  $L_\tau \in \{A, B\}$  denote the firm's location at the end of period  $\tau$ . We make the following assumption about the relative profitability of the two sectors.

**ASSUMPTION 1:**  $\pi_B(1) - 2s > \pi_A$  and  $\pi_A - 2s > \pi_B(0)$ .

This assumption implies that if the firm were located in sector  $A$  and knew that the policy would be in place for just one period, it would be worth its while to switch to sector  $B$  for that period. Conversely, if the firm were located in sector  $B$  and knew that the policy would not be in place for just one period, it would be worth its while to switch to sector  $A$  for that period.

We also assume that the firm discounts future profits at a rate  $\delta_F$ .

Politicians are all identical. When in office they derive utility from "ego rents" and from the bribes paid by the firm. The amount of ego rent is  $r$  per period and will be treated as an exogenous variable. Thus, a politician in office receiving bribe  $b$  obtains a utility level  $r + b$ . When not in office, politicians receive a utility level of 0. The ego rent therefore provides some incentive to hold onto office. Politicians discount future utility at rate  $\delta_P$ . Once ousted from office, a politician cannot run again.

If the firm operates in sector  $B$  in period  $\tau$  and the policy is enacted, the representative citizen incurs cost  $c > 0$ . The citizen discounts future costs at rate  $\delta_C$ . In each period, his sole decision is to decide whether to reelect the incumbent. If all politicians follow identical strategies, at the time of the election, he will be indifferent as to which politician wins. Thus, any specification of voting behavior is consistent with optimizing behavior on the part of the citizen. Nevertheless, the presence of ego rents mean that the voting rule employed can affect the politician's policy decision. Following standard procedure in the political agency literature, we assume that at the beginning of each period the citizen commits to a voting rule and chooses it so as to maximize his expected future utility. We assume that the citizen will observe the policy decision of the politician and the location decision of the firm before voting. He does not observe the bribe offered to the politician.<sup>2</sup> Thus a period  $\tau$  voting rule  $\mathbf{m}_\tau$  is a vector  $(m_\tau(0, A), m_\tau(0, B), m_\tau(1, A), m_\tau(1, B))$ , where  $m_\tau(p, L)$  is the probability the citizen reelects the period  $\tau$  incumbent if  $p_\tau = p$  and  $L_\tau = L$ .

Formally, the interaction described above defines a dynamic game between the firm, the politicians, and the representative citizen. At the beginning of period  $\tau$ , the firm's initial location,  $L_{\tau-1}$ , is given. In particular,  $L_0$  is exogenous. The sequence of events is then as follows. First, the citizen announces his voting rule,  $\mathbf{m}_\tau \in [0, 1]^4$ . Next, the firm offers the incumbent a

<sup>2</sup> Allowing him to do so would not give him any incentive to deviate from his optimal strategy in the equilibria we will study. However, it would lead to some technical problems with the existence of best responses off the equilibrium path.

bribe,  $b_\tau \in \mathfrak{N}_+$ , for choosing to implement the policy. Then, the incumbent politician makes a policy decision,  $p_\tau \in \{0, 1\}$ . Finally, the firm makes its location decision,  $L_\tau \in \{A, B\}$ .

Since we have already described payoffs, we have a complete description of the game. The standard solution concept for such an infinite-horizon perfect information game is subgame-perfect equilibrium. Strategies in a subgame-perfect equilibrium might depend in complex ways on history. However, the location of the firm in the previous period is the only payoff-relevant state variable in the model. Thus we will focus on Markov-perfect equilibria, where actions depend only on within-period histories and the initial location of the firm. We also assume that there is a single strategy for politicians.

Under these assumptions, the citizen's voting strategy is a function  $\mu: \{A, B\} \rightarrow [0, 1]^4$ , so that in any period  $\tau$ , the incumbent faces the reelection probabilities  $\mathbf{m}_\tau = \mu(L_{\tau-1})$ . A bribing strategy for the firm is a function  $\beta: \{A, B\} \times [0, 1]^4 \rightarrow \mathfrak{N}_+$ , implying that in any period  $\tau$ , the bribe offered to the politician is  $b_\tau = \beta(L_{\tau-1}, \mathbf{m}_\tau)$ . A strategy for the politician is a function  $\rho: \{A, B\} \times [0, 1]^4 \times \mathfrak{N}_+ \rightarrow \{0, 1\}$ , implying that the policy's period  $\tau$  policy decision is  $p_\tau = \rho(L_{\tau-1}, \mathbf{m}_\tau, b_\tau)$ . A location strategy for the firm is a function  $\lambda: \{A, B\} \times [0, 1]^4 \times \mathfrak{N}_+ \times \{0, 1\} \rightarrow \{A, B\}$ , implying that the firm's period  $\tau$  location decision is  $L_\tau = \lambda(L_{\tau-1}, \mathbf{m}_\tau, b_\tau, p_\tau)$ . A strategy profile  $(\mu, \beta, \rho, \lambda)$  is a (Markov-perfect) equilibrium if, after *any* history, each player's strategy under the profile is optimal, given that he expects all other players to use their equilibrium strategies.

## II. Policy Persistence

This section has two parts. First, we identify an equilibrium of the game. While describing equilibrium strategies requires a certain amount of additional notation, the underlying logic is straightforward. The citizen, because he always loses if the policy is introduced, provides the maximum incentive for the politician not to introduce the policy by promising to reelect him if and only if he does not implement the policy. The politician, in deciding whether to introduce the policy in any period, trades off the gain from

accepting the bribe with the future gain from not implementing the policy. The firm compares its willingness to pay for the policy with the minimum bribe it has to pay to get the policy enacted. Whether the policy is implemented in equilibrium depends on whether the firm's equilibrium willingness to pay for the policy exceeds the minimum bribe necessary to get it enacted.

We then demonstrate that, under certain conditions, this equilibrium exhibits policy persistence in the sense that equilibrium play dictates that the policy will be implemented in every future period if and only if it is introduced in the first period. Thus, the introduction of the policy in period one can be seen as *causing* the policy to be in place in the future. The explanation is that the firm is only willing to compensate the incumbent for the long-run costs of losing office if it is currently located in the favored sector and, moreover, it will only locate in the favored sector if the policy is in place in period one.

### A. Description of Equilibrium

We begin by introducing the machinery necessary to describe equilibrium strategies. The maximum reward that the citizen can offer an incumbent politician is to reelect him forever. Given that he is already in power, this reward has utility value  $(\delta_P + \delta_P^2 + \dots)r = [\delta_P r / (1 - \delta_P)]$ . If the firm had to pay the incumbent politician this amount as a bribe in each time period to get the policy implemented, the lifetime value to the firm of getting the policy implemented in each period (ignoring switching costs) would be

$$\Delta = \frac{1}{1 - \delta_F} \left[ \pi_B(1) - \pi_A - \frac{\delta_P r}{1 - \delta_P} \right].$$

This expression recognizes that, if the policy were not implemented, the firm would operate in sector *A*.

If  $\delta_P r / (1 - \delta_P)$  were indeed the bribe necessary to get the policy implemented in equilibrium, we would expect the policy to always be implemented if  $\Delta$  exceeded the switching cost *s*. This is so, because even if the firm were initially located in sector *A*, it would find it

worthwhile to move to sector  $B$  and pay what it takes to get the policy implemented. Similarly, we would expect that the policy would never be implemented if  $\Delta < -s$ . In this case, even if the firm were initially located in  $B$  it would be better off moving to  $A$  and avoiding paying for the policy. Finally, we would expect the policy to be implemented if and only if the firm were initially in sector  $B$  when  $\Delta \in [-s, s]$ .

Assuming all this to be true, the gain to the firm of being located in sector  $B$  (rather than sector  $A$ ) at the beginning of some period, denoted  $\Psi$ , would be:

$$\Psi = \begin{cases} s, & \text{if } \Delta \geq s \\ \Delta, & \text{if } \Delta \in [-s, s] \\ -s, & \text{if } \Delta < -s. \end{cases}$$

In the first case (i.e.,  $\Delta \geq s$ ), being in  $B$  saves a switching cost. In the last case, a switching cost is lost. In the intermediate case, there are no switching costs involved but there is a net change in utility from the different outcome path. Using this notation, the gain to the firm from the policy being implemented in the current period (assuming that it always locates in sector  $B$  to take advantage of the policy) when its initial location is  $L$ , denoted  $g(L)$ , is given by

$$g(A) = \pi_B(1) - \pi_A - s + \delta_F \Psi$$

$$g(B) = \pi_B(1) - \pi_A + s + \delta_F \Psi.$$

The expression  $g(L)$  can be thought of as the firm's equilibrium *willingness to pay* to have the policy implemented in the current period. Notice that  $g(B) = g(A) + 2s$ , so that the presence of switching costs means that this willingness to pay is always higher if the firm is initially located in sector  $B$ .

Our final piece of notation describes the gain to an incumbent politician of resisting implementing the policy. Specifically, we let

$$b^*(\mathbf{m}) = \max \left\{ 0, \frac{\delta_P(m(0, A) - m(1, B))r}{1 - \delta_P} \right\}.$$

This term denotes the future gain (if positive) to

the politician of *not* implementing the policy if the citizen's reelection rule is  $\mathbf{m}$ , the firm locates in sector  $B$  if and only if the policy is implemented, and the politician expects no bribes but to remain in office forever, if currently reelected.

We now have:<sup>3</sup>

**PROPOSITION 1:** *Suppose that Assumption 1 is satisfied. Then the following strategies constitute a Markov-perfect equilibrium. The citizen reelects the incumbent if and only if he does not introduce the policy. The politician introduces the policy if and only if he is offered a bribe greater than or equal to  $b^*(\mathbf{m})$ . The firm offers the politician a bribe equal to the lower of  $b^*(\mathbf{m})$  and  $g(L)$  and operates in sector  $B$  if and only if the policy is implemented.<sup>4</sup>*

Whether the policy is implemented in equilibrium depends on the relationship between  $\Delta$  and  $s$ . If  $\Delta \geq s$ , then  $g(A)$  exceeds  $b^*(1, 1, 0, 0)$ , while if  $\Delta < -s$ , then  $g(B)$  is less than  $b^*(1, 1, 0, 0)$ . If  $\Delta \in [-s, s]$ ,  $g(A)$  is less than  $b^*(1, 1, 0, 0)$  but  $g(B)$  exceeds it.<sup>5</sup> Thus we have:

**COROLLARY 1:** *Suppose that Assumption 1 is satisfied and that the players follow the equilibrium strategies of Proposition 1. Then if  $\Delta \geq s$ , the policy is implemented in every period; if  $\Delta < -s$  the policy is never implemented; and if  $\Delta \in [-s, s]$  the policy is implemented in every period if the firm is initially located in sector  $B$  and never implemented otherwise.*

## B. Conditions for Persistence

The equilibrium described above has the property that either the policy is implemented in every period or it is never implemented.<sup>6</sup> Thus

<sup>3</sup> The proof of Proposition 1 is contained in the Appendix.

<sup>4</sup> Formally, the equilibrium strategies are  $\mu(L) = (1, 1, 0, 0)$ ;  $\beta(L, \mathbf{m}) = \min\{b^*(\mathbf{m}), g(L)\}$ ;  $\rho(L, \mathbf{m}, b) = 1$  if  $b \geq b^*(\mathbf{m})$  and  $\rho(L, \mathbf{m}, b) = 0$  if  $b < b^*(\mathbf{m})$ ; and  $\lambda(L, \mathbf{m}, b, p) = A$ , if  $p = 0$  and  $\lambda(L, \mathbf{m}, b, p) = B$ , if  $p = 1$ .

<sup>5</sup> These results are established in the proof of Proposition 1.

<sup>6</sup> When the policy is implemented in each period, the incumbent politician is always thrown out of office which

there is strong *hysteresis* in the policy decision. In what sense is there policy persistence? Consider the case in which  $\Delta \in [-s, s]$ . In this case, *equilibrium play dictates that the policy is implemented in all future periods if and only if it is implemented in period one*. To see this, note first that the policy will be implemented in period two and all future periods if and only if the firm is located in sector  $B$  at the beginning of period two. This is because the firm's willingness to pay for the policy exceeds the minimal bribe in this case only when it is located in sector  $B$ . But the firm's equilibrium location strategy is such that it will locate in sector  $B$  in period one if and only if the policy is implemented in period one. Hence the result.<sup>7</sup>

The logic here is both straightforward and general. The introduction of the policy in period one causes the firm to undertake certain actions in order to benefit from it. Specifically, it either

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may appear rather counterfactual. However, what is key to our argument is that there exists a trade-off between accepting the firm's contribution and the probability of getting reelected. This is what allows the level of the firm's willingness to pay to matter. For the type of contributions considered here (which are consumed by the politician rather than used to finance future campaigns) this negative relationship seems plausible. The fact that incumbents are rarely voted out of office is not evidence that such a negative relationship does not exist.

<sup>7</sup> There exist other equilibria that do not exhibit policy persistence when  $\Delta(r) \in [-s, s]$ . For example, suppose that the citizen never reelected the incumbent (even if he declined a bribe to implement the policy). This strategy is weakly optimal for the citizen as long as the value of a single extra period in power is not enough to change the incumbent's behavior. In this case, the policy is always implemented in equilibrium. But a natural assumption is that the citizen provides maximal incentives to the incumbent to carry out the policy decision that the citizen strictly prefers (even if he does not expect those incentives to have the desired effect). Under this tie-breaking rule, any sub-game-perfect equilibrium of a long finite truncation of our game (i.e., the game ends after  $T$  periods where  $T$  is large) produces policy sequences which exhibit policy persistence. To be more precise, in equilibrium, there exists some sequence of periods  $1, \dots, t^*$  in which the policy is implemented if and only if the firm starts the period located in sector  $B$ . (After period  $t^*$ , the number of remaining periods of ego rent is too small for the reelection incentive to be effective and the policy is always implemented.) Since the firm locates in sector  $B$  if and only if the policy is in place, equilibrium play dictates that the policy is implemented in all future periods if and only if it is implemented in period one. A proof of this assertion is available from the authors on request.

remains in the subsidized sector  $B$  or moves to it if initially located in sector  $A$ . This action increases the firm's willingness to pay for the policy in subsequent periods [since  $g(B) > g(A)$ ]. This extra willingness to pay for the policy causes it to be implemented in the future [since  $g(B) > b^*(1, 1, 0, 0) > g(A)$ ]. The particular political mechanism by which we have made policy outcomes sensitive to the firm's willingness to pay has politicians trading off the benefits from remaining in office against the bribes offered by the firm. While this seems a natural story, other possible mechanisms are possible. For example, Brainard and Verdier's (1994) related analysis assumes the existence of a dictator who trades off bribes and the aggregate welfare of the citizens.

Notice that the equilibrium only exhibits policy persistence when  $\Delta \in [-s, s]$ . If  $\Delta \geq s$ , not introducing the policy in period one would not prevent the policy from being implemented in the future. This is because the firm's willingness to pay for the policy exceeds the minimum bribe in either location. Similarly, if  $\Delta < -s$ , introducing the policy in period one would not cause the policy to be implemented in the future since the firm's willingness to pay is always less than the minimum bribe. Thus, since the interval  $[-s, s]$  is empty when  $s = 0$ , it is clear that the phenomena of persistence is driven by the existence of switching costs which drive a wedge between the firm's willingness to pay for the policy in the two sectors.<sup>8</sup>

### III. Policy Persistence and Political Failure

By analogy with market failure, a *political failure* can be said to arise when there exist feasible policy choices which Pareto dominate

<sup>8</sup> It follows from the definition of  $\Delta$ , that the interval of values of the ego-rent term,  $r$ , for which the equilibrium exhibits persistence is

$$\left( \frac{(\pi_B(1) - \pi_A - (1 - \delta_F)s)(1 - \delta_P)}{\delta_P}, \frac{(\pi_B(1) - \pi_A + (1 - \delta_F)s)(1 - \delta_P)}{\delta_P} \right].$$

The length of this interval is  $[2(1 - \delta_F)s(1 - \delta_P)]/\delta_P$ , which is increasing in  $s$  and decreasing in  $\delta_F$  and  $\delta_P$ .

the policy choices produced in political equilibrium (Timothy Besley and Coate, 1998). In the model presented thus far, implementation of the policy has favored the firm and hurt the representative citizen, unambiguously. Thus all the policy sequences arising in equilibrium have been Pareto efficient. In this section, we consider what happens when the policy provides a short-term benefit for the citizen.

Assume therefore that if the firm operates in sector  $B$  in period one, the representative citizen receives external benefits  $E$ . When  $E \geq c$ , therefore, there is an efficiency rationale for the policy in period one. We will analyze this situation by taking the Markov-perfect equilibrium strategies of the infinite-horizon game identified in the previous section, and assuming that all players follow these strategies after the first-period choice of reelection rule by the citizen. We then have:

**PROPOSITION 2:** *Suppose that Assumption 1 is satisfied and players follow the equilibrium strategies of Proposition 1 after the first-period voting decision. Then if  $\Delta \geq s$  the policy is implemented in every period; if  $\Delta < -s$  the policy is never implemented if  $E < c$ , and is implemented in period one if  $E \geq c$ ; if  $\Delta \in [-s, s]$  and the firm is initially located in sector  $B$  the policy is implemented in every period; and if  $\Delta \in [-s, s]$  and the firm is initially located in sector  $A$  the policy is implemented in every period if  $E \geq [c/(1 - \delta_C)]$  and never implemented otherwise.*

To understand this result, recall that if  $\Delta \geq s$ , then the citizen's reelection rule has no effect on policy (given the strategies of other players): even if the citizen selects the first-period reelection rule  $(1, 1, 0, 0)$ , the firm will offer a bribe sufficient to get the policy implemented. The same is true if  $\Delta \in [-s, s]$  and the firm is initially located in sector  $B$ . If  $\Delta < -s$ , then the policy will not be implemented in future periods even if the policy is implemented in the first period. Future policy is independent of current policy. In this case, the citizen is able to obtain his most preferred policy sequence. In particular, he wants the policy implemented in period one if  $E \geq c$  and not implemented otherwise. One strategy ensuring this outcome is to select the first-period reelection rule  $(0, 0, 1, 1)$  if  $E \geq c$  and  $(1, 1, 0, 0)$  otherwise. In the

intermediate situation when  $\Delta \in [-s, s]$  and the firm is initially located in sector  $A$ , the citizen's reelection rule determines whether the policy is in place in the first period, but the policy will be implemented in all future periods if it is implemented in the first period. In this case, if  $E \geq [c/(1 - \delta_C)]$ , the citizen wants the policy implemented, otherwise he does not.

Political failure arises in this intermediate situation when  $c \leq E < [c/(1 - \delta_C)]$ , so that the policy is never implemented. In this case, the equilibrium policy sequence is Pareto dominated by a sequence in which the policy is introduced in period one and removed thereafter. The source of political failure lies in voters' partial ability to control politicians through reelection incentives. For as long as the firm is in sector  $A$ , voters retain the ability to determine whether or not the policy is implemented. However, once the policy is implemented and the firm switches to sector  $B$  they lose this control. The move to sector  $B$  increases the firm's willingness to pay for the policy sufficiently to swamp the politicians' reelection incentives. If the voters either have complete control over politicians or have no control, this type of political failure does not emerge.<sup>9</sup>

#### IV. Conclusion

This paper has developed a fully articulated model of why policies might persist; that is, why implementation of a policy in one period might increase the likelihood of that policy being implemented in the next period. It formalizes a conventional explanation that implementation of policies increases the political effectiveness of beneficiaries in lobbying; in particular, it explains how it might be *economic* decisions which bring about the *political* change. This theory implies that voters may discipline politicians for introducing protectionist policies even if they are Pareto improving in the short run, because their introduction will cause their persistence (something which is not in the interests of the current policy maker). This gives rise to political failure, in the sense

<sup>9</sup> In the sense that inefficiency stems from the desire of one group not to lose control, the political failure here resembles one of the three forms identified in Besley and Coate (1998).

that equilibrium policy sequences can be Pareto dominated.

## APPENDIX

### PROOF OF PROPOSITION 1:

We will show that the strategies described in the proposition ( $\mu(L) = (1, 1, 0, 0)$ ;  $\beta(L, \mathbf{m}) = \min\{b^*(\mathbf{m}), g(L)\}$ ;  $\rho(L, \mathbf{m}, b) = 1$  if  $b \geq b^*(\mathbf{m})$  and  $\rho(L, \mathbf{m}, b) = 0$  if  $b < b^*(\mathbf{m})$ ; and  $\lambda(L, \mathbf{m}, b, p) = A$ , if  $p = 0$  and  $\lambda(L, \mathbf{m}, b, p) = B$ , if  $p = 1$ ) constitute a Markov-perfect equilibrium of the game. To do this, we need to show that, after *any* history, each player's strategy is optimal, given that he expects all players to use their equilibrium strategies in the future. The proof is divided into three steps. In Step 1, we derive the equilibrium path implied by the proposed strategies; in Step 2, we calculate the players' equilibrium continuation utilities; and in Step 3 we check that each player's strategy is optimal using the continuation utilities derived in Step 2.

*Step 1—The Equilibrium Path:* By way of preliminaries, first observe that when the citizen uses the voting strategy  $\mu(L) = (1, 1, 0, 0)$ , the minimum bribe necessary to get the policy implemented is

$$(A1) \quad b^*(1, 1, 0, 0) = \frac{\delta_P r}{1 - \delta_P}.$$

This follows directly from the definition of  $b^*(\mathbf{m})$ . Next, note that

$$(A2) \quad g(A) \geq \frac{\delta_P r}{1 - \delta_P} \quad \text{if and only if } \Delta \geq s.$$

To see this, observe that if  $\Delta \geq s$ , then  $g(A) = \pi_B(1) - \pi_A - s + \delta_F \Psi = \pi_B(1) - \pi_A - s + \delta_F s = (1 - \delta_F)(\Delta - s) + [\delta_P r / (1 - \delta_P)] \geq [\delta_P r / (1 - \delta_P)]$ . Conversely, if  $\Delta < s$ , then  $g(A) = \pi_B(1) - \pi_A - s + \delta_F \Psi < \pi_B(1) - \pi_A - s + \delta_F s = (1 - \delta_F)(\Delta - s) + [\delta_P r / (1 - \delta_P)] < [\delta_P r / (1 - \delta_P)]$ . Finally, note that

$$(A3) \quad g(B) \geq \frac{\delta_P r}{1 - \delta_P} \quad \text{if and only if } \Delta \geq -s.$$

This follows directly from (A2) and the fact that  $g(B) = g(A) + 2s$ .

We can now identify the equilibrium path. We distinguish six cases: (i)  $\Delta \geq s$  and the firm starts out in  $A$ ; (ii)  $\Delta \geq s$  and the firm starts out in  $B$ ; (iii)  $\Delta \in [-s, s]$  and the firm starts out in  $A$ ; (iv)  $\Delta \in [-s, s]$  and the firm starts out in  $B$ ; (v)  $\Delta < -s$  and the firm starts out in  $A$ ; (vi)  $\Delta < -s$  and the firm starts out in  $B$ .

Cases (i), (ii), and (iv) yield the same equilibrium path. The citizen chooses reelection rule  $\mathbf{m} = (1, 1, 0, 0)$ . By (A1), (A2), and (A3),  $g(L) \geq b^*(\mathbf{m}) = [\delta_P r / (1 - \delta_P)]$ , so the firm offers bribe  $\delta_P r / (1 - \delta_P)$ , the politician chooses  $p = 1$ , and the firm locates in sector  $B$ . The cycle of actions,  $[(1, 1, 0, 0), \delta_P r / (1 - \delta_P), 1, B]$ , then repeats forever.

Cases (iii), (v), and (vi) also yield the same equilibrium path. The citizen chooses reelection rule  $\mathbf{m} = (1, 1, 0, 0)$ . By (A1), (A2), and (A3),  $g(L) < b^*(\mathbf{m}) = [\delta_P r / (1 - \delta_P)]$ , so the firm offers bribe  $g(L)$ , the politician chooses  $p = 0$ , and the firm locates in sector  $A$ . The cycle of actions,  $[(1, 1, 0, 0), g(A), 0, A]$ , then repeats forever.

*Step 2—Continuation Utilities:* The continuation utilities of the citizen and politicians are straightforward to compute. It follows from our analysis of the equilibrium path that in cases (i), (ii), and (iv) the citizen's lifetime utility will be  $-[c/(1 - \delta_C)]$ . Each incumbent politician receives ego-rent  $r$ , bribe  $\delta_P r / (1 - \delta_P)$ , and is then thrown out of office with probability 1. This gives lifetime utility  $r + [\delta_P r / (1 - \delta_P)] = [r / (1 - \delta_P)]$ . In cases (iii), (v), and (vi) the citizen's lifetime utility will be 0. The lone incumbent politician receives ego-rent  $r$ , no bribe, and is then reelected with probability 1. This again gives lifetime utility  $r / (1 - \delta_P)$ .

The firm's lifetime profits are a little more complicated. Whenever the firm is always going to be in sector  $B$ , it receives lifetime profits  $\{\pi_B(1) - [\delta_P r / (1 - \delta_P)]\} / (1 - \delta_F)$ , i.e., the discounted value of the profits of operating in sector  $B$  under the policy minus the equilibrium cost of bribing. The firm must also pay a one-off cost of switching  $s$  if it starts in sector  $A$  and

TABLE A1—CONTINUATION UTILITIES

Case	Equilibrium actions	Citizen	Firm	Politician
(i) $\Delta \geq s, L_0 = A$	$\left[ (1, 1, 0, 0), \frac{\delta_P r}{1 - \delta_P}, 1, B \right]$	$\frac{-c}{1 - \delta_C}$	$\pi_B(1) - \frac{\delta_P r}{1 - \delta_P} - s + \frac{\delta_P r}{1 - \delta_F}$	$\frac{r}{1 - \delta_P}$
(ii) $\Delta \geq s, L_0 = B$	$\left[ (1, 1, 0, 0), \frac{\delta_P r}{1 - \delta_P}, 1, B \right]$	$\frac{-c}{1 - \delta_C}$	$\pi_B(1) - \frac{\delta_P r}{1 - \delta_P}$	$\frac{r}{1 - \delta_P}$
(iii) $\Delta \in [-s, s], L_0 = A$	$[(1, 1, 0, 0), g(A), 0, A]$	0	$\frac{\pi_A}{1 - \delta_F}$	$\frac{r}{1 - \delta_P}$
(iv) $\Delta \in [-s, s], L_0 = B$	$\left[ (1, 1, 0, 0), \frac{\delta_P r}{1 - \delta_P}, 1, B \right]$	$\frac{-c}{1 - \delta_C}$	$\pi_B(1) - \frac{\delta_P r}{1 - \delta_P}$	$\frac{r}{1 - \delta_P}$
(v) $\Delta < -s, L_0 = A$	$[(1, 1, 0, 0), g(A), 0, A]$	0	$\frac{\pi_A}{1 - \delta_F}$	$\frac{r}{1 - \delta_P}$
(vi) $\Delta < -s, L_0 = B$	$[(1, 1, 0, 0), g(B), 0, A]$	0	$-s + \frac{\pi_A}{1 - \delta_F}$	$\frac{r}{1 - \delta_P}$

switches to  $B$  [i.e., in case (i)]. Similarly, when the firm is always going to be in sector  $A$ , it receives lifetime profits  $\pi_A/(1 - \delta_F)$ , i.e., the discounted value of the profits of operating in sector  $A$  under the policy. The firm must also pay a one-off cost of switching  $s$  if it starts in sector  $B$  and switches to  $A$  [i.e., in case (vi)]. This yields the entries in Table A1, which summarizes each player's continuation utility in the six cases.

*Step 3—Optimality of Proposed Strategies:* We begin with politicians. After any history, the incumbent politician's utility from choosing 1 (assuming future players follow equilibrium strategies) is  $r + b + \delta_P m(1, B)[r/(1 - \delta_P)]$ . His utility from choosing 0 (assuming future players follow equilibrium strategies) is  $r + \delta_P m(0, A)[r/(1 - \delta_P)]$ . Thus his gain from choosing 1 is  $b - b^*(\mathbf{m})$ , and so the proposed strategy is optimal.

Next we turn to the firm's location decision. First observe that [in any of cases (i)–(vi)], we have  $|v_A - v_B| \leq s$ , where  $v_J$  is the continuation value of being in sector  $J$ . Suppose the policy maker implements the policy. We must show that the firm will optimally locate in sector  $B$ . After any history, the payoff to locating in  $B$  is at least  $\pi_B(1) - s + \delta_F(v_A - s)$ , while the payoff to locating in  $A$  is at most  $\pi_A + \delta_F v_A$ .

The gain from choosing to locate in  $B$  is thus at least  $\pi_B(1) - \pi_A - s - \delta_F s$  which, since it exceeds  $\pi_B(1) - \pi_A - 2s$ , is positive by Assumption 1.

Suppose the policy maker does not implement the policy. We must show that the firm will optimally locate in sector  $A$ . After any history, the payoff to locating in  $A$  is at least  $\pi_A - s + \delta_F(v_B - s)$ , while the payoff to locating in  $B$  is at most  $\pi_B(0) + \delta_F v_B$ . The gain to choosing to locate  $A$  is thus at least  $\pi_A - \pi_B(0) - s - \delta_F s$  which, since it exceeds  $\pi_A - \pi_B(0) - 2s$ , is positive by Assumption 1.

Now we turn to the firm's bribing strategy. Recall that  $\Psi$  is the net current value to the firm of being located in sector  $B$  at the beginning of next period, rather than sector  $A$ , given the equilibrium strategies above. Thus assuming that the firm follows its location strategy,  $g(L)$  is the gain to the firm if the policy maker sets  $p = 1$ , rather than  $p = 0$ . Thus if we write  $\bar{u}$  for the firm's utility if it offers a bribe  $b < b^*(\mathbf{m})$ , its utility from offering  $b \geq b^*(\mathbf{m})$  is  $\bar{u} + g(L) - b$ . Thus a bribing strategy  $\beta: \{A, B\} \times [0, 1]^4 \rightarrow \Re_+$  is optimal if and only if, for all  $(L, \mathbf{m}) \in \{A, B\} \times [0, 1]^4$ ,  $\beta(L, \mathbf{m}) = b^*(\mathbf{m})$  if  $g(L) > b^*(\mathbf{m})$ , and  $\beta(L, \mathbf{m}) < b^*(\mathbf{m})$  if  $g(L) < b^*(\mathbf{m})$ . The proposed equilibrium strategy,  $\beta(L, \mathbf{m}) = \min\{b^*(\mathbf{m}), g(L)\}$  obviously satisfies this property.

Finally, we turn to the citizen's reelection rule. The citizen always weakly prefers to enter the next period with the firm in sector *A*; and within the current period, the firm strictly prefers to have the policy not implemented. What are the possible equilibrium effects of the citizen deviating from (1, 1, 0, 0) to an alternative voting rule  $\mathbf{m}$ ? First observe that  $b^*(\mathbf{m}) \leq b^*(1, 1, 0, 0)$ . Given the equilibrium bribing strategy of the firm, switching from (1, 1, 0, 0) to  $\mathbf{m}$  must weakly decrease the bribe. Given the equilibrium policy strategy of the politician, weakly decreasing the bribe must weakly increase the policy (i.e., either it stays the same, or it switches from 0 to 1). This in turn either leaves the firm in the same place, or switches it from *A* to *B*. The citizen is made worse off.

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