Extending the economic theory of regulation to the form of policy*

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Abstract. The mutually beneficial connection between industries and the governments that regulate them is the subject of a large literature led by Stigler (1971). What has not been studied is how firms choose their desired policies from the set including entry barriers, price floors, subsidies, and demand stimulation. We take as given that government and incumbents form the supply and demand for regulation and explore the choice of political product.

1. Introduction

In his seminal 1971 article, George Stigler argued that there is a market for regulation, in which government policymakers provide the supply and industrial producers comprise the demand:

> The state has one basic resource which in pure principle is not shared with even the mightiest of its citizens: the power to coerce. The state can seize money by the only method which is permitted by the laws of a civilized society, by taxation. The state can ordain the physical movements of resources and the economic decisions of households and firms without their consent. These powers provide the possibilities for the utilization of the state by an industry to increase its profitability. (Stigler, 1971: 4)

Stigler points out that among the ways the powers of the state can be used to assist producers are provision of direct subsidies, control over the entry of rivals, price-fixing, and regulation of substitutes and complements. He does not investigate why particular policies would be chosen from this set. We will address that question here: which policies would one expect producers to demand and the government to supply?

Most of the theoretical literature following Stigler has sought to elaborate the economic model of politics—to show why, for example, one might find pro-consumer as well as pro-producer regulation (Becker, 1983; Peltzman, 1976). The empirical literature has largely sought to test versions of Stigler's theory (see Romer and Rosenthal, 1987, for a survey). Precious little attention has been devoted to the issue of which policy instrument is chosen. Consequently, although the literature affords a wealth of insight as to why regulation occurs, it provides only an indirect and partial understanding of why regulation takes particular forms.

Outside the literature that followed Stigler's article, two research veins have touched at least obliquely on the question of how to regulate. In international economics, there is a well-known debate over whether tariffs and quotas have identical

distributional and allocative effects (see, e.g., Bhagwati and Srinivasan, 1983). In environmental economics, the question arises as to whether standards or fees best promote efficiency (Weitzman, 1974). Neither of these research veins, however, addresses the broader issue of policy choice. The debate over the equivalence of tariffs and quotas, for example, does not ask how else the policymakers might help domestic producers who might prefer subsidies to either tariffs or quotas.

Our analysis proceeds in four steps. First, we provide a regulatory typology, a convenient classification scheme for the pro-producer policies in political markets. Second, we posit a simple theoretical model that outlines a central regulatory problem: given the potential for competitive entry into a monopolized industry, how do the various possible regulatory policies affect the incumbent producer, consumers, potential entrants, and taxpayers? Third, we explore the robustness of the conclusions to changes in assumptions on industry demand, technology, and structure. Fourth, we summarize the results and discuss their application.

2. A regulatory typology

The government policies that an industry's producers might seek when threatened by entry can be classified into four general types: subsidies, demand stimulation, price/quality controls, and entry barriers. These four types correspond to four features of any market: costs, demand, the terms of the transaction, and industry structure. Although state assistance may involve a combination of two or more policy types, we will break it down into these four basic building blocks.

2.1. Subsidies (supply)

Subsidies are direct payments by the government to the supplier. Perhaps the most obvious form of government assistance is:

> ... a direct subsidy of money. The domestic airlines received 'air mail' subsidies (even if they did not carry mail) of $1.5 billion through 1968. The merchant marine has received construction and operation subsidies reaching almost $3 billion since World War II. The education industry has long shown a masterful skill in obtaining public funds: for example, universities and colleges have received federal funds exceeding $3 billion annually in recent years, as well as subsidized loans for dormitories and other construction. (Stigler, 1971: 4)

Other examples of subsidies include the investment tax credit and the Price-Anderson Act limiting the liability of nuclear power producers (Tietenberg, 1984). Subsidies can consist of lump-sum transfers to firms or they can depend on the firms' outputs. In either case, the method works by reducing producer costs, and it is costly to the government.

2.2. Demand stimulation (demand)

A second type of regulatory assistance is government promotion of market demand, either directly, by government purchases, or indirectly, by subsidies to consumer purchases and stimulation of demand for complements. Government purchases of farm products is an example of direct demand stimulation, and tuition assistance,

which raises demand for college education, is an example of indirect demand stimulation. This regulatory method works to help suppliers by changing demand, and, like subsidies, it is costly to the government.

2.3. Price/quality controls (the terms of the transaction)

Price/quality controls, which directly affect the terms of the transaction without discrimination between entrant and incumbent, are a third policy. The essence of this kind of regulation is to prevent competition along one margin or another between firms already in the market. In contrast to subsidies and demand stimulation, its only cost to the goverment is administrative. Among the well-known cases of price/quantity controls are the fixed commissions and quality ceilings mandated for brokerage service by the Securities and Exchange Commission prior to 1975 (Stoll, 1981), rate regulation in the property-liability industry (Joskow, 1973), and the Civil Aeronautics Board formulas that controlled domestic interstate air fares before 1977 (Keeler, 1981).

2.4. Entry barriers (industry structure)

An entry barrier is any policy that affects the cost of entry. Stigler puts forth the general hypothesis that:

> ... every industry or occupation that has enough political power to utilize the state will seek to control entry. In addition, the regulatory policy will often be so fashioned as to retard the rate of growth of new firms. (Stigler, 1971: 5)

Entry barriers can be a fixed amount per entrant or proportional to the entrant's output. At the extreme, policies that raise entrants' costs exclude them from the industry entirely. The Civil Aeronautics Board did not allow a single new firm into interstate airline markets from 1938 to 1977 (Keeler, 1981). Local regulation of cable television distribution generally involves the award of an exclusive franchise to the firm that wins a franchise bidding competition (Williamson, 1976).

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Prior to deregulation, the Interstate Commerce Commission ensured that the immense growth in trucking was accompanied by a steady decline in the number of federally licensed carriers (Moore, 1978).

Entry barriers need not imply the absolute exclusion of potential entrants. The policy might encumber entrants and assist the incumbent without entirely eliminating entry. Quotas and tariffs often hinder rivals—the foreign firms—without eliminating them. Although tariffs and quotas do have differences, the principal effect of both restrictions is identical: foreign rivals are penalized relative to domestic suppliers.[1]

Anti-margarine regulation sponsored by the "butter bloc" provides examples of both partial and complete entry barriers. The federal Oleomargarine Act of 1886 levied a heavy tax on colored margarine that continued until 1950. Some states completely prohibited margarine sales. A less drastic form of regulation was to require restaurants using margarine to display signs with letters at least two inches high saying "Oleomargarine used here" or "Imitation butter used" (Stigler, 1988: 171-2).

Various forms of partial entry barriers drive a wedge between the costs of potential entrants and the incumbent in a less apparent manner. Economies of scale in compliance with pollution abatements impose higher costs on small firms than large (Pittman, 1981; Pashigian, 1984). The stringent New-Source Performance Standards in the 1977 Clean Air Act Amendments helped high-sulfur coal mines in the Midwest and East by hampering development of new low-sulfur coal mines in the West (Crandall, 1983). The Brady Report issued in the wake of the October 1987 stock market crash has been interpreted as an attempt by the New York Stock Exchange to hamstring innovation (e.g., program trading) by rival exchanges in Chicago.[2]

If the regulatory cost prevents entry altogether, it has no expense to the government except that of administration. Or, the regulatory cost might be a monetary transfer that would raise revenue for the government if it did not block entry completely; a tariff can exist for revenue and for protection.

2.5 Combinations of Policies

Government help does not necessarily consist of one of the four policies in isolation. It may involve a package of policy types, as in the regulation of agriculture. In addition, pro-producer policies that seem to lie outside our typology can often be interpreted as combinations of the four types. State-supported division of markets among incumbents is often a combination of price/quality controls and entry barriers, as in the case of international air travel. Controlling 73 percent of international traffic, the International Air Transport Association helps 135 airlines to bar entry, fix prices, and share profits.[3] American quotas on imported sugar are another example. The 1985 Farm Bill requires that the protection of domestic producers be accomplished "at no direct cost" to the government. To attain this goal, the government has mandated a support price of 18 cents a pound for raw sugar. Whenever the world-market price falls below that level (as of 1988, approximately seven cents), import quotas are tightened until the domestic price rises to 18 cents a pound.[4]

Selective subsidies to the incumbent firm may be decomposed into entry barriers and an industrywide subsidy. Customized tax loopholes and the Lockheed and Chrysler bailouts are examples. Another example is the entitlements program used by the federal government to assist domestic refiners after the Arab oil embargo of 1973. The entitlement program helped small refiners more than large refiners by granting them easier access to domestic crude oil, whose price was controlled (Kalt, 1981).

Restraint of advertising, formerly common in law, medicine, and optometry, is a combination of price/quality control and entry barriers. It acts as price/quality control by restraining price competition and as an entry barrier by disadvantaging new firms, which have difficulty making their price and quality known to consumers without advertising. The ban on radio and television advertising of cigarettes similarly discourages entry and perhaps price competition (Calfee, 1986).

How to classify government purchases from incumbents (and not from entrants) depends on the price paid. If the government pays the same price as the private market, the policy is similar to nondiscriminatory demand stimulation.

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The private market price is bid down to cost because of competition from entrants, so the incumbents can make no profits from the government purchases. If, on the other hand, the government pays whatever price results from competition among the incumbents, the policy is a combination of demand stimulation and entry barriers. A third possibility is that the government sets the price without reference to any market. This is a combination of three policies: entry barriers, demand stimulation, and price/quality controls.

3. The basic model

To analyze the different effects of the various types of regulation we will use a two-period model with constant costs and linear demand. Consumers of the industry's product are represented by the inverse demand curve $P = \alpha - \beta Q$, where Q is industry output. In the first period, the incumbent producers determine a price and sell what they can to consumers. The incumbents then offer the government a payment for a particular second-period policy. The government decides whether to impose that policy or a different one, accepting the payment if appropriate. If the policy allows entry, potential entrants decide whether to enter. The firms in the market, incumbents and newly-arrived entrants, then determine second-period prices. Finally, the government is re-elected or not, depending on how the policy has affected influential groups.

The model implicitly assumes that the incumbents are concentrated enough to overcome the free-rider problem of paying for regulation and form the only group so concentrated (as we discuss further in Section 3.2). For markets where consumers control regulation, pro-consumer analogs of our four policies could be constructed, but we will exclude that possibility here. In some markets, perhaps most, no interest group is organized enough to demand rent-seeking regulation of the kind we analyze (see Pittman, 1977). The question of the form of regulation is moot for such markets.

We will focus special attention on the following five assumptions:

(A1) In period 1 the industry is monopolized by a single incum-

bent firm.

(A2) A large number n of potential entrants appear in period 2.

(A3) Each firm faces a constant average cost of c.

(A4) The incumbent has the same cost curve as the entrants.

(A5) Consumers divide equally among firms with the same price.

The central question is: What regulatory policy maximizes the gains from trade between the incumbent and the government? Specifying the policies more precisely, the possibilities are:

1. **Laissez faire**. The government does nothing.

2. **Subsidy**. The government offers a subsidy to firm i of $S + sQ_i$.

3. **Demand stimulation**. The government purchases and destroys Q_g units of the product.

4. **Price/quality controls**. The government establishes a price floor of $\underline{P}$.

5. **Barriers to entry**. The government imposes a regulatory cost, possibly infinite, of $R + rQ_i$ on each entrant i but not on the incumbent.

Our analytic approach will be different from that of the typical economics article. The question of policy choice does not require very technical analysis, but with five policies, and five assumptions that affect each policy, it is easy to lose the forest for the trees. Therefore, rather than trying to fully characterize a model with general parameters, we will use a running numerical example to illustrate first the basic model and then its variants as assumptions (A1) to (A5) are relaxed. We will trust to the model's simplicity to convey the degree to which its conclusions are robust. Readers should realize that the variants are as important as the benchmark; a large part of our message is the robustness of the conclusions.

Let us round calculations to one decimal place and use the parameters $\alpha = 10$, $\beta = 2$, $c = 2$, and $n = 10$ for the running example, so that $P = 10 - 2Q$. For

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Figure 1:

the regulatory policies we will use the parameters $s = 1, S = 0, \underline{P} = 6, Q_g = 1$, and $r = R = \infty$. We will assume that if the ten potential entrants do enter, they behave as price-takers.

3.1. The demand for regulation by business

In the first period, the incumbent monopolist maximizes $Q(\alpha - \beta Q - c)$, which yields an output of $Q = \frac{\alpha - c}{2\beta} = 2$ and a price of $P_1 = \frac{\alpha + c}{2} = 6$. Monopoly profits equal $\frac{(\alpha - c)^2}{4\beta} = 8$, area A_1 on Figure 1, and consumer surplus equals $\frac{(\alpha - c)^2}{8\beta} = 4$, area A_3. In the second period, the incumbent's profits depend on the policy chosen by the government:

3.1.1. Laissez faire. Under laissez faire, entry drives down price to cost. The market price is $P^* = c = 2$, the total quantity sold is $Q^* = \frac{\alpha - c}{\beta} = 4$, and sales

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for each firm equal $\frac{Q^*}{n+1} = 4/11$. Profits of the incumbent and entrants are zero, consumer surplus equals $\frac{(\alpha-c)^2}{2\beta} = 16$—the sum of areas A_1, A_3, and A_4 in Figure 1—and taxes are zero.

3.1.2. Subsidy. If there is a variable subsidy per unit of s, the market price is $c-s$ because of competition between the incumbent and the entrants. If the subsidy takes the value $s = 1$, then $P = 1$ and $Q = 4.5$. The incumbent's profit equals the entrants' profit, which is zero. Consumer surplus equals $\frac{(\alpha-c+s)^2}{2\beta} = 20.3$, which is the sum of areas A_1, A_2, A_3, A_4, and A_5 in Figure 1. This is greater than the laissez-faire level. The taxes to pay for the variable subsidy equal $s\left(\frac{\alpha-c+s}{\beta}\right) = 4.5$.

A fixed subsidy of S per firm would have a similar effect, provided that the government required an entrant to produce at least some amount Q_s to be eligible for the subsidy. Entry in the second period drives that price far enough below average cost to exhaust the subsidy. The number of actual entrants would be $\text{Min}(n, n_s)$ (ignoring the integer problem), where n_s is an integer such that

$$[c - (\alpha - \beta(n_s + 1)Q_s)]Q_s = S. \tag{1}$$

If $n_s < n$, the profits of both the incumbent and the entrants equal zero, taxes equal $(n_s + 1)S$, and consumer surplus equals

$$\frac{\beta[(n_s + 1)Q_s]^2}{2}. \tag{2}$$

Suppose, for example, that $S = 0.5$ and $Q_s = 0.5$. Then $n_s = 8$, because the nine firms in the market would produce a total output of $Q = 4.5$, resulting in $P = 1$ and zero profits. This is the same level of price, output, profits, and taxation as in our earlier example of a variable subsidy with $s = 1$.[5]

3.1.3. Demand stimulation. We have assumed that under the policy of demand stimulation the government is committed to buying one unit of output at the market price: $Q_g = 1$. This government-induced shift of the demand curve, illustrated in Figure 2, does not prevent elimination of the incumbent's profits in the second period. Despite the increase in industry demand, entry drives the price down to c. Industry output at price c equals 5, an increase of one unit from the

Figure 2:

laissez-faire level of 4. Profits of entrants and the incumbent equal zero. Consumer surplus equals the laissez-faire value of $\frac{(\alpha-c)^2}{2\beta} = 16$ (area A_6 in Figure 2). Taxes equal $(Q_{stimulation} - Q_{laissez\ faire})c = 2$, which is the sum of areas A_7 and A_8 in Figure 2.

Under our assumption that the government destroys what it buys, area A_9 does not contribute to anyone's welfare (it is, in fact, an infinite area, representing the government's determination to buy Q_g even if the price rises to infinity). If the government transfers its purchases to individuals who would not buy at the equilibrium price (as when it distributes cheese to the poor), then consumer surplus rises by the amount those individuals would have been willing to pay—somewhere between zero and the sum of A_7 and A_8. The rise in consumer surplus can be significant, but the rise in government expenditure is always greater.

We have chosen to model direct demand stimulation through government

purchases. Another form of demand stimulation is indirect—somehow making it more attractive for consumers to buy more. A demand subsidy is an example. The shift out of the demand curve in Figure 2 (except for the vertical portion at the top) could also be produced by a subsidy of 2 per unit to consumers. The cost to the government would be 10, which is much greater than the 4 that direct purchases cost, despite the identical allocative effect, because even inframarginal consumer purchases would be subsidized. The deadweight loss is not correspondingly greater, however, because the extra cost to the government is an extra benefit to consumers.

3.1.4. Price/quality controls

With a price floor of $\underline{P}$, entrants are attracted until the incumbent's sales equal $\frac{Q(\underline{P})}{n+1}$. His profits are $1/(n+1)$ of industry profits. Suppose that the floor price equals the monopoly price, so $\underline{P} = 6$. The incumbent's second-period profits equal

$$\pi = \left(\frac{1}{n+1}\right)(\underline{P} - c)\left(\frac{\alpha - \underline{P}}{\beta}\right) = 0.7. \tag{3}$$

The sum of the entrants' profits equals

$$\sum_{i=2}^{n+1} \pi_i = \left(\frac{n}{n+1}\right)(\underline{P} - c)\left(\frac{\alpha - \underline{P}}{\beta}\right) = 7.3. \tag{4}$$

Taxes equal zero, and consumer surplus is

$$CS = \frac{(\alpha - \underline{P})^2}{2\beta} = 4. \tag{5}$$

3.1.5. Barriers to entry

We have specified barriers to entry to be a cost of $R + rQ_i$ imposed on entrants, a cost with fixed component R and variable component rQ_i. Since the price is bid down to marginal cost after entry, a fixed regulatory cost of any size $R > 0$ deters entry, and the incumbent can continue to charge the monopoly price in the second period (this is special to the present case of constant marginal cost). A variable regulatory cost of size $r > 4$ has the same effect: if r is greater than $\frac{\alpha - c}{2}$, entry is completely deterred. If entry is

thus blocked, the incumbent's profits remain $\frac{(\alpha-c)^2}{4\beta} = 8$ (area A_1 in Figure 1), the entrants' profits equal zero, and consumer surplus remains at the monopoly level $\frac{(\alpha-c)^2}{8\beta} = 4$ (area A_3 in Figure 1).

If $R = 0$ and $r \in [0,4]$, the incumbent can still block entry, but he cannot maintain monopoly profits. He follows a policy of limit pricing, with $P = c + r$ and second-period profits of

$$\pi\left(r\right) = \frac{\alpha - c - r}{\beta}. \tag{6}$$

If the regulatory cost is $r = 1$, then $P = 3$, $Q = 7$, and $\pi = 3.5$. The entrants' profits are zero, as are the extra taxes needed by the government. Consumer surplus equals

$$CS = \frac{(\alpha - r - c)^2}{2\beta}. \tag{7}$$

3.1.6. Summary. Table 1 summarizes the payoffs to different groups associated with the various types of policies: the incumbent's surplus, the sum of the entrants' surplus, consumer surplus, and the taxpayers' burden. The most interesting numbers in this and other tables are boldfaced. Entry barriers are clearly the incumbent's preferred policy. Laissez faire, demand stimulation, and subsidy all reduce the incumbent's profits to zero in period 2. Price/quality controls are somewhat better, but they still drastically reduce his profits. Moreover, as the number of entrants rises to infinity, the price floor leaves the incumbent with zero profits. Only entry barriers, which keep rival firms out of the industry, prevent significant erosion in the incumbent's profits from period 1 to period 2.   Table 1 here

3.2. The supply of regulation by the government

The demand for regulation by the industry is half of the Marshallian scissors. The other half is the supply of regulation by the government. If all the interest groups—incumbent, entrants, consumers, and taxpayers—were identically informed and organized, and if policymakers had no leeway to pursue their own objectives, the government would choose to maximize total welfare rather than

incumbent profits. Entry barriers would not be imposed, since laissez faire, subsidy, and demand stimulation all generate greater total surplus. As can be seen from Table 1, laissez faire generates the greatest total surplus—16 in our example. Moreover, this understates the advantage of laissez faire relative to the policies of demand stimulation and subsidy, since those policies require taxes that add distortions outside of our model.

Since laissez faire is efficient, why do we observe government intervention? Very likely, because the government's objective is not total surplus. The previous section implies that if the objective is simply to maximize incumbent surplus, entry barriers are best. But let us go slightly deeper and ask whether entry barriers remain attractive when the government's objective, while not ideology-based, is still not identical to the incumbent's. We will not investigate ideology and preferences, though we are the last to suppose that political competition is so strong that policymakers care only about support from interest groups (Kalt and Zupan, 1984, suggest they do not). We will examine four questions the government might ask about a policy. First, are the benefits concentrated and the costs diffused? Second, are the effects obvious even to unsophisticated market participants? Third, does the policy further government objectives in other, related markets? Fourth, does anyone's welfare decline over time?

3.2.1. Concentration of benefits and diffusion of costs

Economic stakes do not translate one-for-one into political clout. In particular, because entry barriers concentrate benefits and diffuse costs, government decisionmakers may prefer them to laissez faire. The total cost to consumers can be substantial, but the per capita cost, spread across all consumers, is relatively small, so each consumer's incentive to lobby for laissez faire is insignificant. By contrast, the benefits of entry barriers are tightly concentrated, and the incumbent has a strong incentive to lobby. No other policy concentrates benefits as much as entry barriers.[6] Even under price/quality controls, each firm's surplus is much smaller than the incumbent's surplus from entry barriers (8/11 versus 8), despite the total surplus being as great. And as the number of potential entrants increases to infinity, the benefit per firm shrinks to zero.

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Table 2 outlines the relevant payoffs to government decisionmakers if they are unconcerned about the welfare of consumers and entrants. The government's ranking clearly favors entry barriers over laissez faire, subsidies, and demand stimulation; with subsidies and demand stimulation ranked below laissez faire because they require taxes. Entry barriers also rank above price/quality controls, because the benefits of price/quality controls are shared between all the firms, not just the incumbent.

Table 2 here.

3.2.2. Information problems

A second element in the government's ranking of policies consists of which groups are best informed and which policies are easiest to become informed about. This is related to the concentration of benefits, since informedness is to some extent endogenous. In particular, the incumbent is most likely to be informed, because the concentrated effects of policies on him provide a strong incentive to acquire information.

The individual consumer, with little at stake, is less likely to understand how much a policy helps or hurts him. Do consumers of medical services really understand the effects on their future welfare of licensing requirements for medical doctors? The very fact that producers expend lobbying dollars for the pro-consumer rhetoric that so often accompanies pro-producer regulation suggests that some consumers can be confused about its effects.

The number of logical steps that consumers must take to understand the effect of entry barriers or subsidies is greater than for price floors, a difficulty that helps entry barriers politically and hurts subsidies. The harmful effect of entry barriers on prices is identical to the effect of price/quality controls, but it is indirect; and because the causal link is less visible, consumers may not protest as much. Subsidies have a beneficial effect on prices, but the effect is also indirect, so consumers may not appreciate the benefit.

The cost of information acquisition distinguishes taxpayers from consumers where mere concentration of benefits would not. Although the low per-capita stakes weaken the incentives of taxpayers to become well-informed about compli-

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cated policies, the link between higher government expenditure and higher taxes is simple and direct. Moreover, once taxpayer unhappiness becomes a constraint on total spending, infighting among the more concentrated beneficiaries of general government spending makes expensive regulatory policies unattractive.

3.2.3. Linkage to other government objectives

Different regulatory policies vary in how easily they can be made to serve multiple government objectives. We have been concentrating on the government's desire to please taxpayers and the regulated industry, but regulation might also serve other interest groups. If, for example, the government wishes to promote local programming in a cable television market, politically the easiest way to do so might be by making such programming part of the price paid for barriers to entry. This avoids the alternative of direct government expenditure on air time for local programming. Such practices are common; Schmalensee (1979) notes examples such as airline and mail service to small communities. More generally, the policy of entry barriers allows the protected industry to serve as a government proxy, taking on the unpopular task of redistributing wealth, as Posner (1971) notes in the context of cross-subsidization. This advantage of entry barriers is intrinsically related to its ability to raise industry profits above zero. Only entry barriers and price controls do this, so only those policies provide the funds for cross-subsidization.

3.2.4. Intertemporal welfare changes

A final reason that government decisionmakers might favor entry barriers is that such a policy, unlike the others, does not make anybody's utility lower after regulation than before. Table 3 shows this. While laissez faire makes consumers better off in the second period, it also harms the incumbent. Subsidies and demand stimulation are even less desirable in terms of "not hurting anybody." Not only do they strip the incumbent of his pre-entry profits, they also require higher taxes. Entry barriers, on the other hand, lower nobody's utility: they only prevent consumer surplus from rising. Only entry barriers do not violate the intuition behind the Pareto criterion: they lower nobody's utility relative to the initial state.   Table 3 here.

Intertemporal changes could be important for two reasons: losses might be felt

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more than gains, and actual changes might be felt more than potential changes. Louis XIV of France said that whenever he named someone to a position, he created ninety-nine malcontents and one ingrate.[7] Tullock (1975) discusses this from an economic point of view in the context of regulation. The folk wisdom that losers are more likely than gainers to notice losses and feel aggrieved has also been noted by political scientists (Weaver, 1986) and psychologists (Kahneman and Tversky, 1984), and Kahneman, Knetsch, and Thaler (1986) have found that the status quo is often considered "fair." To the extent that the regulated payoffs acquire normative standing, policymakers may be wary of permitting entry that hurts incumbents. Such entry seems particularly unfair if the incumbents' profits have been capitalized and sold by the original incumbents. A taxidriver may charge outrageous prices but still barely break even after paying for the cost of his medallion.

Even if gains and losses are felt symmetrically, the actual change from period 1 to period 2 might be more important than the potential change from one second-period policy to another. One reason is that vested interests who gain experience in period 1 might be more skilled in influencing policy than opposing groups new to the policymaking arena (Noll and Owen, 1983). Hazlett (1990) suggests that this is why the Radio Act of 1927 gave away the spectrum to established radio stations rather than auctioning it off. Another reason is that market participants can detect and measure actual changes more easily than potential changes. In 1980 and 1984 candidate Ronald Reagan successfully bypassed the usual political appeals to potential changes by simply asking voters whether they were better off than four years ago. The history of public utility regulation also illustrates the point. Prior to the 1970s there was very little regulatory effort to ensure that electricity prices tracked costs, as noted by Stigler and Friedland (1962), although costs were generally falling and a good case could have been made for lowering prices. So long as prices were constant, consumers were happy. But when input costs rose dramatically in the 1970s, attempts to raise rates in parallel with costs brought howls of protest and strict regulation.[8]

3.2.5. The gains from trade between the government and the incumbent

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We have seen that the entry barrier is the most attractive of the five policies to the incumbent producer and that there are reasons why it might also be the government's preferred policy. The market for regulation is often a bilateral monopoly. One incumbent or association of incumbents faces one government, and the two sides play a bargaining game over the gains from trade. In keeping with our emphasis on the type of policy instead of the mechanisms by which government is influenced, we have confined ourselves to determining the size of the gains from trade rather than the bargaining over its division. Many bargaining theories take it as axiomatic that the outcome will be Pareto-optimal from the point of view of the bargaining players. If this is true, the policy chosen will be that which provides the greatest gain from trade, a policy that often turns out to be entry barriers.

4. Relaxing the assumptions

The conclusion emerging from our basic model is that entry barriers are the policy of choice for the incumbent and perhaps also for policymakers. To what extent is this conclusion robust? This section tries to answer the question by relaxing the five key assumptions of the basic model. We will continue to use the illustrative parameters $\alpha = 10, \beta = 2, c = 2, Q_g = 1, r = R = \infty, s = 1, S = 0$, and $n = 10$ unless otherwise noted. When we must calculate duopoly profits, we will assume Cournot competition—in effect, a price somewhere between the monopoly and competitive levels.

4.1. More than one incumbent
Suppose that there are still ten potential entrants, but there are two incumbents, not just one. A free-rider problem naturally arises as to which incumbent pays the government for the policy that benefits both of them, but let us assume that they can make a binding agreement that both will pay via a trade association. In period 1, if the two incumbents compete for consumers, Cournot behavior leads to a price of 4.7 and profits of 3.6 for each firm. The total duopoly profit of 7.2 is lower than the monopoly level of 8. Under Cournot, firm 1 maximizes $Q_1(\alpha - \beta(Q_1 + Q_2) - c)$, which leads to the first-order condition $\alpha - \beta(2Q_1 + Q_2) - c = 0$. Since $Q_1 = Q_2$, each firm produces 1.3 under the assumed parameter values. With more than two

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incumbents, the industry profit and the profit per firm would be smaller.

As shown in Table 4, laissez faire, demand stimulation, and subsidy all eliminate the incumbents' profits in period 2. A price floor at the single-firm monopoly level succeeds in leaving the incumbents with positive profits, but these profits are relatively small because the producer surplus generated by price/quality controls (8) must be shared with all 12 firms operating in period 2. If the number of entrants were infinite, the total incumbent surplus from price/quality controls would be zero in the second period.

Table 4 here.

Only entry barriers prevent a significant erosion in incumbent profits in period 2. The only noteworthy differences from the benchmark model are that (a) the profits whose erosion entry barriers prevent are smaller when there are two incumbents rather than one, and (b) price/quality controls are desirable policy complements to entry barriers, a point stressed by Stigler (1971). The combination of entry barriers and price/quality controls would generate a total profit of 8 to be shared between the incumbents instead of the 7.2 from entry barriers alone. As the number of incumbents becomes larger, the advantage of the combination over either single policy grows. At the extreme, price/quality controls raise the surplus of the incumbents from the 0 of perfect competition to the monopoly level of 8. A similar case results when all of a large number of potential entrants have already entered in period 1.

The foregoing may explain the popularity of price controls in agriculture. A large number of producers initially exist in the market, ensuring a competitive outcome in the absence of government intervention. Price floors therefore increase in attractiveness as a means of raising producer surplus, but, even so, agriculture has not proved an unusually profitable industry.

4.2. Only one potential entrant

Reducing the number of potential entrants to one does not significantly alter the results of the benchmark model. As shown in Table 5, entry barriers remain the policy of choice for the incumbent since they prevent loss of profits in period 2.[9] Demand stimulation, price/quality controls, subsidy, and laissez faire all leave the

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incumbent with positive profits in period 2, but profits under all four policies are lower than under entry barriers.[10]

4.3. Increasing or decreasing marginal cost

4.3.1. Increasing marginal cost

Under increasing marginal costs, there are rents to being a firm so long as the number of producers is less than infinity. Suppose we assume that marginal cost equals $c = 2 + .5Q_i$ in our running example. With 10 entrants and 1 incumbent, each firm earns positive profits in period 2 under a policy of laissez faire. Positive profits also accrue to all period 2 producers under the price floor, demand stimulation, and subsidy, as shown in Table 6. Demand stimulation ranks unusually poorly in terms of efficiency because the extra output is especially costly, but under no policy are incumbent profits as high as under entry barriers.

4.3.2 Decreasing average cost.

The effect of decreasing average cost depends on whether or not the market is contestable. If there is a large sunk cost, or if marginal costs are falling, then the market is a natural monopoly and the incumbent need not fear entry. Subsidy or demand stimulation would be his preferred policies. If there is a large fixed cost, but entry and exit are easy, then the threat of entry would keep the incumbent's profits equal to zero under laissez faire, and entry barriers would be the preferred policy. A price floor might or might not allow entry, depending on whether two firms could both profitably operate in the market, but it could never be superior to an entry barrier.

4.4. Cost differences between the incumbent and potential entrants

The cost curve of a potential entrant is not always the same as that of the incumbent. The incumbent might have either lower costs or higher costs. If the incumbent has lower costs, the results are not much different from the benchmark model. Suppose that the cost is 2 for incumbents and 3 for entrants. As shown in Table 7, entry barriers still leave the incumbent as well off as possible in the

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second period. Demand stimulation, subsidy, and laissez faire still work to erode the incumbent's profits—although not as completely as in the benchmark model, because of the incumbent's cost advantage and limit pricing. Only the price floor falls in relative ranking. A price floor allows entry (the incumbent cannot limit-price) and thereby leaves the incumbent with lower profits than either demand stimulation, subsidy, or laissez faire.[11]

If the entrant possesses a cost advantage over the incumbent, nothing of substance changes compared to the benchmark model. Table 8, calculated under the assumption that the cost is 2 for the incumbent and 1 for entrants, is very similar to Table 1. Entry barriers again allow the incumbent to retain his entire profit. Demand stimulation, laissez faire, and subsidy eliminate the profit, and, in fact, chase the incumbent out of the market altogether due to the entrants' cost advantage. A price floor of 6, the incumbent monopoly price, results in the incumbent retaining $1/(n+1) = 1/11$ of his monopoly profits.[12]

4.5. Switching costs
Assumption (A5) says that firms with equal prices have equal market shares. This rules out switching costs, which would give the incumbent an advantage over entrants. Let us consider what happens with lexicographic brand loyalty: if prices are equal, consumers stick with the incumbent. Table 9 summarizes the relevant payoffs if the benchmark model is thus amended.

Under laissez faire and demand stimulation, the incumbent's profits are eliminated in period 2 as the price falls to cost, but brand loyalty prevents entry. With a subsidy of 1 per unit of output, the incumbent's profits are also eliminated as the price falls to $c - s = 1$, and brand loyalty still prevents entry. But entry barriers allow the incumbent to retain his monopoly profits, as do price/quality controls, since an entrant who tries to sell at the floor price would attract no customers.

4.6. Summary of the Effects of Relaxing Assumptions
The conclusions of the benchmark model are reasonably robust. Under a variety of relaxations of its assumptions, entry barriers remain the incumbent's policy of choice. The three differences that emerge are minor. First, as the number of

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incumbents increases or the number of entrants decreases, a price floor becomes relatively more attractive—particularly if imposed in conjunction with entry barriers. Second, with increasing costs, certain kinds of decreasing costs, or a cost advantage for incumbents (all of which allow rents to the incumbents), there is an increase in the attractiveness of demand stimulation and subsidies, because the rents grow when demand stimulation and subsidy expand the industry's size. Third, if there are switching costs for consumers, a price floor and entry barriers prove equally beneficial to the incumbent, because the price floor prevents entrants from giving the price discount necessary to attract customers.

5. Concluding discussion

In outlining his theory of regulation, Stigler's primary objective was to debunk the views of politics as either an irrational process or as reflecting the naive public-interest theories of high school civics texts. In the pursuit of this objective, he met with enormous success: the article spurred the development of models of political behavior consistent with the rest of microeconomics while leaving room for altruistic goals of rational individuals to affect legislative and regulatory outcomes. As the economic theory of regulation developed, researchers typically focussed on specific cases of policymaking and identified the interest groups that shaped the observed regulatory outcome. In the case of occupational licensing for physicians, for example, the imposition of licensing requirements (i.e., entry barriers) is predicted to be a positive function of the political clout of doctors and a negative function of the political strength of consumers of medical services. Where econometric analysis provides causal support for these predicted relationships, the economic theory of politics is taken to be confirmed.

Missing from previous attempts to flesh out the economic theory of politics has been an explanation of which policies are preferred by participants in regulatory markets. We have explored this question. Employing a simple model in which a monopolist seeks to use state action to protect his position, we have shown why he generally favors entry barriers, and why policymakers also may prefer that policy.

From the incumbent's perspective, nothing works as well to maintain profits as entry barriers. Price/quality controls, demand stimulation, and subsidies all allow entry and require the political boon to be shared between the incumbent and entrants. From the policymaker's perspective, the concentration of benefits and distribution of costs combine with information problems and the timing of welfare changes to favor entry barriers also.

We have not used formal statistical analysis in this paper—and, in fact, we doubt that such analysis could be usefully performed. If, for example, we selected some particular industry and checked which policies the incumbent firms had sought using a cross section of states or countries, we would leave ourselves open to the justifiable criticism that the industry was not randomly selected. We might mention, however, three pieces of empirical evidence that corroborate the predictions of the theoretical model. First, when incumbent domestic producers are threatened by foreign rivals and a spirit of laissez faire does not prevail, the most common regulatory response is the entry barrier. Whether this takes the form of tariffs, quotas, exchange controls, administrative barriers, or government preferences in purchasing, the entry barrier is clearly the policy of choice when it comes to aiding domestic producers. Price/quality controls, when they are employed, are used as a complement to entry barriers constructed against foreign producers. As in the case of the federal government's sugar program, price controls ensure that competition among protected incumbent domestic producers will not dissipate the monopoly rents generated by entry barriers.

Second, the hallmark of "old-style" economic regulation is control over entry by new producers; again, often coupled with price floors to prevent competition among protected incumbents from destroying industry profits. The regulation of industries such as airlines, trucking, rail, electric and gas utilities, ocean shipping, telecommunications, taxi cabs, banking, and securities exemplifies the old-style regulatory approach. Its defense generally rests on the importance of banning entry to avoid "ruinous competition" and "cream-skimming." Demand stimulation and subsidies are policies much less frequently employed (the postal service, agriculture, and the maritime industry being among the exceptions). Where they are employed, moreover, they are concommitant with entry barriers and price/quality controls.

Price/quality controls themselves are seldom to be found in the absence of entry barriers (see, for example, the various policies in the surveys in Weiss and Klass, 1981).

Third, in classic cases where changes in technology have threatened the monopoly power of incumbent producers, the typical regulatory response is to create entry barriers. The telecommunications industry provides a pertinent example. The advent of cable television in the 1950s and 1960s threatened existing broadcasters. To mitigate the threat, they lobbied successfully for tight federal restrictions on cable growth (Owen, 1981). The federal "freeze" limited cable growth, especially in major urban markets, by constraining the number and type of distant signals that cable systems could import, establishing royalties on imported distant signals, placing restrictions on the movies and sports programs, and imposing local origination/public access requirements. More recently the entry barriers in telecommunications have been different. The freeze on cable television was thawed in the mid-1970s, mainly due to growth in the political strength of the cable industry. As the cable industry acquired greater clout in Washington, it in turn sought restraints on new, competing technologies: satellite master antenna television (typically found in hotels and multiple dwelling units) and fiber-optic integrated broadband networks which allow telephone companies to provide both voice and video services.

We close with two caveats. First, while there are good reasons why policymakers might prefer entry barriers to other policies, we do not argue that entry barriers will always be adopted. Absent the information, timing, cross-subsidization, and free-rider problems discussed earlier, one would expect laissez faire to be the policy supplied in the political market because it provides the greatest total surplus. In other situations, consumers might have enough political influence relative to taxpayers that subsidies would be the equilibrium policy. Second, in evaluating individual policies, we do not mean to imply that a single policy is better than a combination. We have mentioned that a price floor may be a desirable complement to entry barriers. Other combinations such as demand stimulation and entry barriers also have attractive interactions, but we have not modelled the government's objective function precisely enough to rank all such combinations. We hope to

have pointed out the importance of policy choice and the interaction of supply and demand that determines it. We offer a set of building blocks, and leave to future research the exploration of policy amalgams for particular industries and political regimes.

ENDNOTES.

1. A quota can be thought of as a nonlinear variable entry barrier. It is equivalent to a tax of zero per unit for the first units of output and an infinite tax per unit past some threshold. Government "Buy American" policies can be thought of as taxes, possibly infinite, on sales by foreign firms.

2. G. Jarrell, "Brady Panel Sold Innovation Short," *Wall Street Journal*, 19 October 1988.

3. E. Chang and M. Zupan, "International Fliers Could Use Takeoff on U.S. Deregulation," *Wall Street Journal*, 8 October 1985.

4. "Sugar Daddy," *Wall Street Journal*, 4 June 1987.

5. If there is no output requirement, a fixed subsidy of S per firm would result in all 10 entrants entering and the same price and quantity as under laissez faire. The fixed subsidy would merely involve a transfer of wealth from taxpayers to producers. The size of the transfer would increase with the number of potential entrants, and if n were endogenous an infinite number would enter, each producing an infinitesimal amount.

6. A selective subsidy to the incumbent represents a combination of a subsidy with an entry barrier and similarly concentrates benefits. It has the disadvantages of blatancy and harm to the taxpayer, who, as discussed below, may be better informed than the consumer.

7. "Louis XIV disait que, quand il nommait quelqu'un à une place, il faisait quâtre-vingt-dix-neuf mécontents et un ingrat," Michel Bracquart, *Le Petit Livre des Grandes Pensées*, Paris: MA Editions, 1987, p. 212.

8. George Stigler has pointed out to us that entry barriers, unlike the other policies, have the additional advantage that their benefits are automatically indexed to rising costs, inflation and market growth.

9. If the subsidy or demand stimulation were large enough, the incumbent would prefer them to entry barriers. Since the government finds tax-using policies unattractive, determining which policy led to the greatest gains from trade would require more structure on the government's objective function than we have imposed.

10. In this case, a subsidy leads to higher total welfare than laissez faire, because it is subsidy of duopolists, who are underproducing under laissez faire.

11. Price/quantity controls are inefficient because they allow the high-cost entrants to operate. The higher total welfare under subsidy than under laissez faire is another second-best result, as in the single entrant case.

12. Entry barriers and price floors are very inefficient because the incumbent has high costs.

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Table 1. Payoffs under different policies

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	0	0	16	0	**16**
Subsidy	0	0	20.3	-4.5	15.8
Demand stimulation	0	0	16	-2	14
Price/quality controls	0.7	7.3	4	0	12
Entry barriers	**8**	0	4	0	**12**

Table 2. Surplus of politically powerful groups

Policy	Incumbent surplus	Taxpayer surplus
Laissez faire	0	0
Subsidy	0	-4.5
Demand stimulation	0	-2
Price/quality controls	0.7	0
Entry barriers	8	0

Table 3. Change in surplus from periods 1 to 2

Policy	Incumbent change	Entrant change	Consumer change	Taxpayer change	Total Change
Laissez faire	-8	0	12	0	4
Subsidy	-8	0	16.3	-4.5	3.8
Demand stimulation	-8	0	12	-2	2
Price/quality controls	-7.3	7.3	0	0	0
Entry barriers	**0**	**0**	**0**	**0**	0

Table 4. Two incumbents

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	0	0	16	0	16
Subsidy	0	0	20.3	−4.5	**15.8**
Demand stimulation	0	0	16	−2	14
Price/quality controls	1.4	6.6	4	0	12
Entry barriers	**7.2**	0	7.0	0	14.2

Table 5. One entrant

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	3.6	3.6	7.0	0	**14.2**
Subsidy	4.5	4.5	9	−3	**15**
Demand stimulation	5.6	5.6	7.7	−5.3	13.6
Price/quality controls	4	4	4	0	12
Entry barriers	**8**	0	4	0	12

Table 6. Increasing marginal cost

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	0.2	2.4	10.2	0	12.8
Subsidy	0.3	2.9	13.0	−3.6	12.6
Demand stimulation	0.4	3.6	9	−4	**9**
Price/quality controls	0.6	6.5	3.2	0	10.3
Entry barriers	**7.1**	0	3.2	0	10.3

Table 7. Incumbent cost advantage

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	3.5	0	12.3	0	15.8
Subsidy	4	0	16	-4	**16**
Demand stimulation	**4.5**	0	12.3	-3	13.8
Price/quality controls	**0.7**	5.5	4	0	**10.2**
Entry barriers	**8**	0	4	0	12
Assumption: $c_{incumbent} = 2, c_{entrant} = 3$					

Table 8. Entrant cost advantage

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	0	0	20.3	0	20.3
Subsidy	0	0	25	−5	20
Demand stimulation	0	0	20.3	−1	19.3
Price/quality controls	0.7	9.1	4	0	**13.8**
Entry barriers	**8**	0	4	0	**12**
Assumption: $c_{incumbent} = 2, c_{entrant} = 1$					

Table 9. Switching costs

Policy	Incumbent surplus	Entrant surplus	Consumer surplus	Taxpayer surplus	Total surplus
Laissez faire	0	0	16	0	16
Subsidy	0	0	20.3	-4.5	15.8
Demand stimulation	0	0	16	-2	14
Price/quality controls	**8**	0	4	0	12
Entry barriers	**8**	0	4	0	12