THE PROPER SCOPE OF GOVERNMENT:
THEORY AND AN APPLICATION TO PRISONS*

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When should a government provide a service in-house, and when should it contract out provision? We develop a model in which the provider can invest in improving the quality of service or reducing cost. If contracts are incomplete, the private provider has a stronger incentive to engage in both quality improvement and cost reduction than a government employee has. However, the private contractor's incentive to engage in cost reduction is typically too strong because he ignores the adverse effect on noncontractible quality. The model is applied to understanding the costs and benefits of prison privatization.

I. INTRODUCTION

As a general rule, government employees provide most services paid for with tax revenues, such as the police, the military, operation of prisons, fire departments and schools, collection of garbage, and so on. Yet in some cases, these services are privatized through government contracting out their provision to private suppliers. The choice between in-house provision and contracting out has proved to be controversial. Advocates of government contracting point out that private suppliers deliver public services at a lower cost than public employees do [Savas 1982 1987; Logan 1990]. The critics of government contracting, while quibbling with these figures, stress that the quality of public services that private contractors deliver is inferior to that delivered by public employees [AFSCME 1985; Shichor 1995]. In this paper we develop a theory of government ownership and contracting

that may throw light on the cost and quality of service under alternative provision modes.

The perspective we adopt is that of incomplete contracts [Grossman and Hart 1986; Hart and Moore 1990; Hart 1995]. Suppose that a public-spirited politician chooses between having a service delivered by a public agency and contracting it out. In the first case, the politician hires public employees and gives them employment contracts specifying what they need to do. In the second case, the politician signs a contract with a private supplier who in turn contracts with his (or her) employees. If the politician can sign a complete or comprehensive contract (with either employees or a contractor), he can achieve the same outcome in each case. From the traditional incentive viewpoint, motivating the contractors and the public employees presents the same problem to the politician even in the presence of moral hazard and adverse selection. To understand the costs and benefits of contracting out, we need to consider a situation where contracts are incomplete and where residual rights of control in uncontracted for circumstances are important in determining agents' incentives.

The assumption of contractual incompleteness is not hard to motivate once it is recognized that the quality of service the government wants often cannot be fully specified. Indeed, critics of privatization often argue that private contractors would cut quality in the process of cutting costs because contracts do not adequately guard against this possibility. Critics of private schools fear that such schools, even if paid for by the government (e.g., through vouchers), would find ways to reject expensive-to-educate children, who have learning or behavioral problems, without violating the letter of their contracts. Critics also worry that private schools would replace expensive teachers with cheaper teachers' aides, thereby jeopardizing the quality of education. In the discussion of public versus private health care, the pervasive concern is that private hospitals would find ways to save money by shirking on the quality of care or rejecting the extremely sick and expensive-to-treat patients. In the case of prisons, concern that private providers hire unqualified guards to save costs, thereby undermining safety and security of prisoners, is a key objection to privatization. Our model tries to explain both why private contracting is generally cheaper, and why in some cases it may deliver a higher, while in others a lower, quality level than in-house provision by the government.

Many discussions of privatization lump together the issue of

public or private ownership with the issue of competition. That is, those who advocate privatization often do so on the grounds that private ownership allows the benefits of competition to be reaped. We believe that the identification of privatization with competition is misleading. In principle, it is possible to have several government-owned firms competing to supply the public, or several management teams competing for the right to run a government enterprise (e.g., a prison). It is also possible to have a private firm with no effective competitors (a monopoly). Our analysis is based on the idea that the fundamental difference between private and public ownership concerns the allocation of residual control rights, rather than the degree of competition per se. Competition may strengthen the case for privatization—in fact we show that it does under some conditions—but only because the allocation of residual control rights is different under privatization.

In the next section we present a model of government contracting that focuses on quality issues. The basic idea is that the provider of the service—whether a government employee or a private contractor—can invest his time to improve the quality of the service or to reduce its cost. The cost reduction has an adverse effect on quality. Neither innovation is contractible ex ante. However, both types of innovation, to be implemented, require the approval of the owner of the asset, such as a prison, a hospital, or a school. If the provider is a government employee, he (or she) needs the government's approval to implement either improvement, since the government retains residual control rights over the asset. As a result, the employee receives only a fraction of the returns to either the quality improvement or the cost reduction. Moreover, an additional limit to how well a government employee can be effectively compensated for either improvement arises because the employee is replaceable.

In contrast, if the provider is a private contractor, he has the residual control rights over the asset, and hence does not need to get government approval for a cost reduction. At the same time, if a private contractor wants to improve quality and get a higher price, he needs to negotiate with the government since the government is the buyer of the service. As a consequence, the private contractor generally has a stronger incentive both to improve quality and to reduce costs than the government employee has. But, the private contractor's incentive to engage in cost reduction is typically *too* strong since he ignores the adverse impact on quality.

We analyze this model in Section III and establish several propositions concerning the relative efficiency of in-house provision and government contracting. In general, the bigger the adverse consequences of (noncontractible) cost cutting on (noncontractible) quality, the stronger is the case for in-house provision.The efficiency of in-house provision also turns on the strength of the incentives of government employees, and on the importance to the government of generating quality innovations. The conclusions emerging from the model are generally extremely intuitive, including the result that private provision is generally cheaper, but may generate either higher or lower quality. Section III also briefly addresses a key omission from the model, namely, the possibility of ex post competition between contractors, which typically strengthens the case for privatization. Finally, Section III examines the consequences of moving away from the assumption of benevolent government, and incorporating such elements as corruption and patronage into the model. A fuller treatment of competition and politics is left to future work.

In Section IV we apply our framework to discuss privatization of prisons. Should the government contract out the operations of prisons to private firms, who then have power over incarceration and treatment of convicts? Private prisons have been growing rapidly in the United States, although they still hold only about 3 percent of prisoners. Critics voice a strong concern about the quality of private incarceration, including the quality of prisoner life, the incidence of prison violence by inmates and use of force by guards, escapes, and to a lesser extent rehabilitation. We show that our model can be used to organize, if not resolve, the debate over prison privatization.

Our results may help in thinking about other government services as well. The parameters of the model, namely, the adverse quality effects of cost reduction, the importance of quality innovation, the incentives of government employees, as well as possibilities of competition which we do not model, may shed light on the wisdom of privatization of such activities as defense procurement, garbage collection, police and armed forces, education, and health. In Section VI we discuss these examples and consider some of the new issues they raise.

Ours is not the first normative analysis of government contracting.[1] Some of the issues addressed in our paper are raised in

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1. There is also a considerable literature on positive aspects of contracting; see, e.g., Shleifer and Vishny [1994] and Savas [1982, 1987].

the now-classic book by Wilson [1989]. Economists working in this area have generally focused on traditional adverse selection and moral hazard problems raised by contracting [Laffont and Tirole 1993; Tirole 1994], as well as on competitive and anti-monopoly problems following privatization [Vickers and Yarrow 1988]. Some recent studies have examined contractual incompleteness [Schmidt 1996; Shapiro and Willig 1990; Laffont and Tirole 1993]. Unlike our work, they have emphasized informational losses from contracting or the costs of having multiple bosses. Theoretically, our paper is new primarily in deemphasizing the role of incomplete information in contracting, and emphasizing quality issues. In this regard, our paper is related to the work of Holmstrom and Milgrom [1991, 1994], who, in a comprehensive contracting framework, show that providing an agent with strong incentives to pursue one objective, such as profits, can lead to his shirking on other objectives, such as quality. Our framework is different from theirs, although the issues we are interested in are similar. In addition, the existing literature is primarily theoretical, and does not go into the problems of specific sectors, such as prisons, in much detail.[2]

II. THE MODEL

A. Basic Assumptions

In this section we present a simple model of the choice between the public and private provision of a good, such as prison, hospital, or school services.

Suppose that society, represented by the government, wants a certain good or service to be provided. We assume that consumers cannot buy this good directly in the marketplace, e.g., because it is a public good.[3] One possibility is to contract out the provision of this good, e.g., the government can write a contract with a private company to run a prison for five years.[4] A second possibility is to provide the good "in-house," e.g., the government can ar-

2. There are some exceptions. For example, Vickers and Yarrow [1988] discuss the possible decline in quality at British Telecom following privatization and price cap regulation. Domberger, Hall and Li [1995] examine the consequences for price and quality of contracting out cleaning services.
3. This assumption makes good sense in the case of prisons but is more controversial in the case of schools or hospitals.
4. An alternative interpretation is that the government regulates the private company for five years. In this case the contract simply describes the regulatory policy. We do not deal explicitly with regulation in this paper, but note that any regulatory policy can be interpreted as an (incomplete) contract and vice versa.

range for public employees to run the prison. The model is based on the idea that the crucial distinction between these arrangements concerns who has residual rights of control over the non-human assets used to provide the service—we call these assets the "facility F" (e.g., the prison). If the good is publicly provided, then the government (represented by a bureaucrat), as owner, has residual control rights over the facility. If the good is privately provided, then the private provider, as owner, has residual control rights over the facility. Residual control rights matter because they determine who has the authority to approve changes in procedure or innovations in uncontracted-for contingencies.[5]

We suppose that the facility—public or private—is run by a single manager/worker, M. There is also a single bureaucrat or politician, represented by G. We start by considering the case where the bureaucrat perfectly represents the interests of society; i.e., there is no agency problem between the bureaucrat and society.[6] Later we consider self-interested bureaucrats and politicians.

We assume that G and M are able to write a long-term contract specifying some aspects of the good or service to be provided and the price. In fact, we suppose that a long-term contract is required in the case where F is private in order to support relationship-specific investments.[7] We call the good thus described in the contract the "basic" good and denote its price by P_0. P_0 has different interpretations according to whether the facility F is private or public. If F is private, i.e., M owns F, then P_0 is the price that M as an independent contractor receives for providing the basic good. If F is public, i.e., G owns F, then P_0 is the wage that M receives as an employee. In the latter case provision of the basic good can be regarded as part of M's job description; i.e.,

5. See Grossman and Hart [1986]. What may be more important is not who owns the physical prison, but who has the right to use it (perhaps for a restricted period of time). For example, the government may own the prison, but sell the right to operate it to a private company for n years (a franchising arrangement). In this case, the private company has residual control rights during the n year period. In this paper we do not distinguish between physical ownership and possession of the right to use the prison.

6. To be more precise, we assume that G's utility function is given by the welfare of the rest of society, excluding M. A justification for this is that the political process aligns G's and society's interests (since M has negligible voting power, his interests receive negligible weight). As will become clear, if G placed the same weight on M's utility as on the rest of society, the first-best could be achieved.

7. We do not model these relationship-specific investments explicitly. They might correspond to physical investments, e.g., building the prison. For the idea that a long-term contract is required to support relationship-specific investments, see Klein, Crawford, and Alchian [1978] and Williamson [1985].

M does not get paid unless he provides the good.

Although *G* and *M* can specify some aspects of the good or service in advance, we suppose that there are others that they cannot specify. We have in mind that various contingencies can arise which call for some modification of the basic good. For instance, *M* can suggest a way to modify the prison to increase security. Alternatively, *M* may find a way to reduce costs by hiring cheaper (or fewer) guards. Our assumption is that there are so many possible contingencies ex ante that it is impossible to anticipate them all and contract on how to deal with them in advance.[8] Instead the parties revise the contract ex post once it is clear what the relevant contingencies are. We refer to the basic good modified to allow for relevant contingencies as the "modified good."

The modified good yields a benefit *B* to society and costs the manager *C* to produce. *C* is a cost borne directly by *M*. For example, *B* might be the social benefit from having a prison with few fights between inmates and well-fed and healthy prisoners. Although *B* cannot be measured or verified (it does not show up in any accounts), we suppose that it can be represented by a dollar amount. Similarly, *C* can be represented in dollars.

The manager can manipulate *B* and *C* through prior effort choices. We assume that *M* can devote effort to two types of "innovation" relative to the basic good: a cost innovation and a quality innovation. We suppose that a cost innovation leads to a reduction in costs *C* but is typically accompanied by a reduction in quality (i.e., *B*). Similarly, a quality innovation leads to an increase in quality, but is typically accompanied by an increase in costs. We write

$$B = B_0 - b(e) + \beta(i),$$
$$C = C_0 - c(e),$$

where *e*, *i* denote effort devoted to the cost innovation and quality innovation, respectively, $c(e) \geq 0$ is the reduction in cost corresponding to the cost innovation; $b(e) \geq 0$ is the reduction in quality corresponding to the cost innovation; and $\beta(i) \geq 0$ is the quality increase net of costs from the quality innovation.[9] The function *b* plays a key role in this model: it measures how much

8. For a further discussion see Hart [1995].
9. We need to keep track of the separate cost and quality components of the cost innovation (*c* and *b*), but not of the quality innovation.

(noncontractible) quality falls because of a (noncontractible) cost cut, and hence serves as the variable that critics of privatization focus on.

We make standard assumptions about the convexity, concavity, and monotonicity of b, c, and β: $b(0) = 0$, $b' \geq 0$, $b'' \geq 0$; $c(0) = 0$, $c'(0) = \infty$, $c' > 0$, $c'' < 0$, $c'(\infty) = 0$; $\beta(0) = 0$, $\beta'(0) = \infty$, $\beta' > 0$, $\beta'' < 0$, $\beta'(\infty) = 0$; $c' - b' \geq 0$. Note that the assumptions $c' - b' \geq 0$, $\beta' > 0$ say that the quality reduction from a cost innovation does not offset the cost reduction; and the cost increase from a quality innovation does not offset the quality increase. The former, in particular, is an important substantive assumption, since one can imagine in principle that cost cutting by a contractor (e.g., failing to train prison guards) produces social damage in excess of cost savings. Our assumptions rule out this case, although it can be easily analyzed.

The manager's ex ante effort cost must be added to C to get M's overall costs. We write total effort costs as $e + i$, and assume a zero interest rate (no discounting). Hence M's overall costs are[10]

$$C + e + i = C_0 - c(e) + e + i.$$

One important assumption we make is that both the cost and quality innovations can be introduced without triggering a breach of the contract for the basic good. That is, although each innovation leads to a change in quality (in the case of the cost innovation, a reduction in quality), the initial contract is sufficiently vague or "incomplete" that neither innovation violates it.

We also assume that i, e, b, and c are observable to both G and M, but are not verifiable (to outsiders) and hence cannot be part of an enforceable contract. Similarly, G's benefits and M's costs are observable, but not verifiable or transferable, which means that revenue and cost-sharing arrangements are infeasible.[11]

We suppose that G and M are at least partially locked into each other once their relationship is under way. Specifically, there is no facility available other than F that can supply society, and there is no other potential customer for the service (e.g., a prison)

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10. In an earlier version of this paper, we assumed a more complicated cost-of-effort function in which e and i were substitutes (along the lines of the multi-tasking work of Holmstrom and Milgrom [1991]). The current model generates simpler and easier-to-interpret results.

11. For a more extensive discussion of verifiability, noncontractibility, and revenue and cost-sharing arrangements, see Hart [1995].
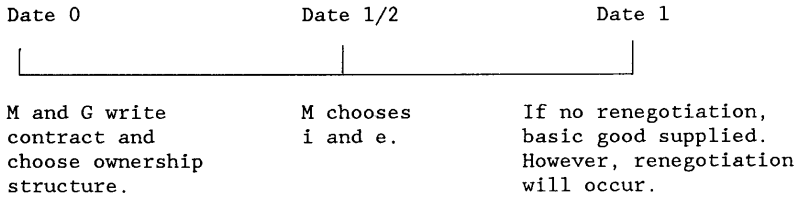
Date 0	Date 1/2	Date 1

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M and G write          M chooses          If no renegotiation,
contract and           i and e.           basic good supplied.
choose ownership                          However, renegotiation
structure.                                will occur.
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FIGURE I

apart from *G*. However, *M*'s labor services may be partially sub-
stitutable (see below). Finally, we assume that *M* and *G* are risk
neutral and that there are no wealth constraints. A time-line is
presented in Figure I.

B. Default Payoffs

As noted, the parties want to renegotiate the contract at date
1 once they learn the nature of potential quality improvements
and cost reductions. We assume that *G* and *M* divide the gains
from renegotiation according to Nash bargaining, i.e., they split
the surplus 50:50. This means that the parties' default payoffs—
that is, what occurs in the absence of renegotiation—influence
final payoffs.

We take the point of view that any cost or quality innovation
requires the agreement of the owner of the facility *F*, since imple-
menting these innovations involves a change in the way *F* is used.
Only the owner (the possessor of the residual control rights) has
the right to approve such a change. Thus, in the case of a public
facility, *G* needs to agree to any cost or quality innovation,
whereas, if the facility is private, *M* can implement these innova-
tions without *G*'s agreement. However, even if the facility is pri-
vate, it is not in *M*'s interest to introduce a quality innovation
without the approval of *G* since no payment will be forthcoming
for an uncontracted-for quality improvement unless *G* agrees to
make it; i.e., unless a new contract is written.

It remains to discuss the extent to which the fruits of *M*'s
efforts *e* and *i* are embodied in *M*'s human capital. Suppose that
if *M* has an idea about how to reduce costs or increase quality
then a fraction of the benefits of this idea requires *M*'s participa-
tion, but the remainder can be realized without *M* because some
aspects of *M*'s ideas become public knowledge (at least within the
organization). In particular, assume that, in the case where *F* is
public, *G* can realize a fraction $0 \leq (1 - \lambda) \leq 1$ of the net social

gains $-b(e) + c(e) + \beta(i)$ from innovation without M by hiring a different manager and paying him at cost. If F is private, G can obtain none of these benefits since M has the residual control rights and can prevent any innovations (and can also avoid being replaced). The parameter λ is very important, since it effectively measures the weakness of the incentives of government employees. In the case $\lambda = 1$, the public employee (warden) is irreplaceable, and hence can command the same share of the total rents in the negotiation with G as a private manager (but, in contrast to a private manager, a public warden will have to get G's permission to implement a cost reduction).

We can sum up the above discussion as follows.

(A) If F is privately owned, then, *in the absence of renegotiation,* the cost innovation is implemented (since it is in M's interest to implement it and M has the residual control rights), but the quality innovation is not (since no payment from G will be forthcoming). That is, G's default payoff is $B_0 - P_0 - b(e)$ and M's default payoff is $P_0 - C_0 + c(e) - e - i$.

(B) If F is publicly owned, then, *in the absence of renegotiation,* both cost and quality innovations are implemented. However, G must replace M and hence gets only a share $(1 - \lambda)$ of the gains from these innovations. That is, G's default payoff is $B_0 - P_0 + (1 - \lambda)[-b(e) + c(e) + \beta(i)]$, and M's default payoff is $P_0 - C_0 - e - i$.

C. The First-Best

Consider as a benchmark the first-best situation where e and i are contractible (or equivalently, where long-term contracts describing the modified good can be written). In this case, G and M would choose e and i to maximize the total net surplus from their trading relationship, and divide the surplus between them using lump-sum transfers. That is, in the first-best, G and M solve

$$(1) \qquad \max_{e,i}\{-b(e) + c(e) + \beta(i) - e - i\}.$$

Given our assumptions, (1) has a unique solution (e^*, i^*), characterized by first-order conditions:

$$(2) \qquad\qquad -b'(e^*) + c'(e^*) = 1,$$

$$(3) \qquad\qquad \beta'(i^*) = 1.$$

At the social optimum, the marginal social benefit of spending extra effort to reduce costs, measured to take account of marginal quality deterioration, must equal the marginal cost of that extra effort, which equals one. Similarly, the marginal social benefit of spending extra effort to improve quality must equal the marginal cost of that extra effort, which again equals one.

D. Equilibrium under Private Ownership

Suppose that M owns F. Then in light of (A), the renegotiation takes place over the quality innovation. The gains from renegotiation are $\beta(i)$, which are split 50:50. (There is symmetric information about i.) The parties' payoffs are

$$(4) \qquad U_G = B_0 - P_0 + 1/2\beta(i) - b(e),$$

$$(5) \qquad U_M = P_0 - C_0 + 1/2\beta(i) + c(e) - e - i.$$

Note that because M can reduce costs without seeking G's approval, G bears the full brunt of quality deterioration resulting from cost reduction.

Since the parties are assumed to have rational expectations, M chooses e and i to maximize U_M, that is, to solve

$$(6) \qquad \max_{e,i}\{1/2\beta(i) + c(e) - e - i\}.$$

Denote the (unique) solution by (e_M, i_M) (where M stands for ownership by M). The first-order conditions for (6) are

$$(7) \qquad c'(e_M) = 1,$$

$$(8) \qquad 1/2\beta'(i_M) = 1.$$

There are two deviations from first-best here. First, M ignores the deterioration of quality resulting from cost reduction, and hence exaggerates the social benefit of cost reduction. Second, because M must get G's approval to implement a quality improvement, on the margin he gets only half the benefits of that improvement, which stunts his incentive to improve quality.

The total surplus S_M under M's ownership is then given by

$$(9) \quad S_M = U_G + U_M = B_0 - C_0 - b(e_M) + c(e_M) + \beta(i_M) - e_M - i_M.$$

The price P_0 is chosen to allocate this surplus between the parties according to their relative bargaining positions at date 0. The formula for S_M reflects the fact that the parties bargain efficiently

ex post, but there is a distortion in relationship-specific invest-
ments e and i.

E. Equilibrium under Public Ownership

Suppose that G owns F. Then in light of (B) the renegotiation
takes place over the fraction λ of both the cost and quality innova-
tions that G cannot appropriate: $\lambda[-b(e) + c(e) + \beta(i)]$. The gains
are split 50:50, and so the parties' payoffs are

$$(10) \qquad U_G = B_0 - P_0 + (1 - \lambda/2)[-b(e) + c(e) + \beta(i)],$$

$$(11) \qquad U_M = P_0 - C_0 + \lambda/2[-b(e) + c(e) + \beta(i)] - e - i.$$

Note that, in the case $\lambda = 1$, when the manager is completely
irreplaceable, the parties split the gains from innovation 50:50.
M chooses e and i to solve

$$(12) \qquad \max_{e,i}\{\lambda/2[-b(e) + c(e) + \beta(i)] - e - i\}.$$

Denote the (unique) solution by (e_G, i_G) (where G stands for owner-
ship by G). The first order conditions for (12) are

$$(13) \qquad \lambda/2\,(-b'(e_G) + c'(e_G)) = 1,$$

$$(14) \qquad \lambda/2\,\beta'(i) = 1.$$

In contrast to the private ownership case, because the publicly
employed M needs to negotiate the cost reduction with G, he
takes account of quality reductions that may result from cost-
cutting innovations. However, there are new distortions in the
case of public ownership. First, for both quality and cost innova-
tion, the public manager needs the approval of G and hence sur-
renders half the gains from trade. Second, if $\lambda < 1$, the public
manager can be replaced, and hence has even weaker incentives
to innovate. Both of these factors stunt a public manager's in-
centives.

The total surplus S_G under G ownership is given by

$$(15) \quad S_G = U_G + U_M = B_0 - C_0 - b(e_G) + c(e_G) + \beta(i_G) - e_G - i_G.$$

Again the price P_0 is chosen to allocate the surplus at time 0 ac-
cording to relative bargaining power.

F. The Choice of Ownership Structure

The optimal ownership structure is the one that produces the
largest total surplus (the division of surplus can always be ad-

justed through P_0). That is, G ownership is superior to M ownership

$$(16) \qquad \Leftrightarrow S_G > S_M$$
$$\Leftrightarrow -b(e_G) + c(e_G) + \beta(i_G) - e_G - i_G > -b(e_M) + c(e_M)$$
$$+ \beta(i_M) - e_M - i_M.$$

Renegotiation under symmetric information ensures that all ownership structures yield an ex post efficient outcome. The only difference between the ownership structures concerns the choice of the ex ante investments e and i.

III. ANALYSIS OF THE OPTIMAL OWNERSHIP STRUCTURE

A. *Main Results*

A comparison of (1) and (6) shows that private ownership leads to two distortions relative to the first-best. First, M ignores the fact that e reduces noncontractible quality $b(e)$; in other words, that he damages G through his effort to reduce costs. Second, M places 50 percent weight on the gains from quality innovation $\beta(i)$ as opposed to 100 percent weight. It follows immediately from the first-order conditions (2), (3), (7), (8), and concavity that e is inefficiently high and i is inefficiently low under private ownership.

PROPOSITION 1. $e_M > e^*, i_M < i^*$.

The private ownership equilibrium is illustrated in Figure II.

Consider next public ownership. A comparison of (1) and (12) shows that under public ownership, M does worry about the damage $b(e)$. The reason is that M cannot implement the cost reduction without G's permission and so they bargain about the net surplus $-b(e) + c(e)$ from the cost-reducing innovation. However, M places weight $\lambda/2$ on the gains from cost innovation $-b(e) + c(e)$ and on the gains from quality innovation $\beta(i)$, as opposed to 100 percent weight in the first best. It follows from the first-order conditions (13)–(14) that e and i are both inefficiently low under public ownership. Moreover, i is lower under public than under private ownership unless $\lambda = 1$; i.e., unless M is irreplaceable.
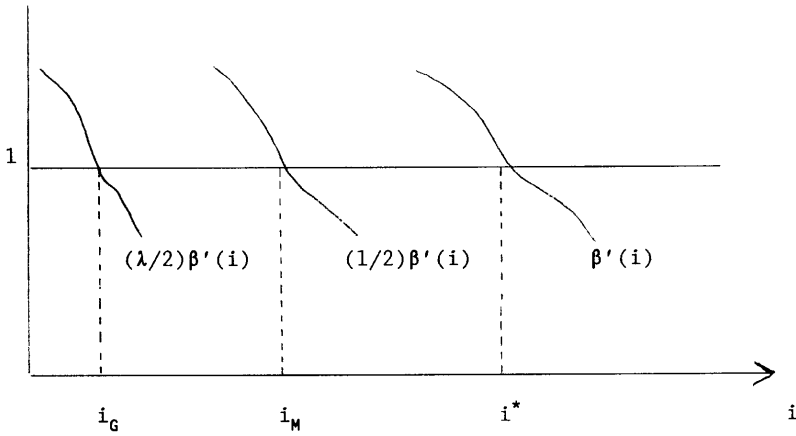
PROPOSITION 2. $e_G < e^*, i_G \leq i_M < i^*$ (with $i_G < i_M$ unless $\lambda = 1$).

The public ownership equilibrium is also illustrated in Figure II.

The trade-off between public and private ownership is now

e_G e^* e_M e

λ/2(-b'(e)+c'(e))   (-b'(e)+c'(e))   c'(e)
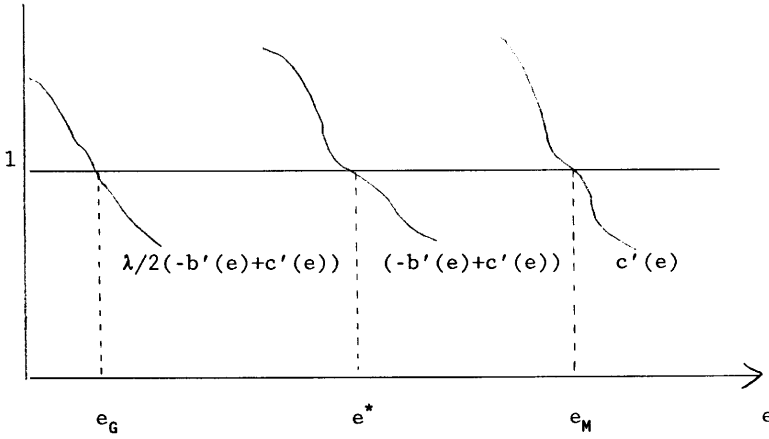
Equilibrium Levels of e under Different

Ownership Structures

i_G i_M i^* i

(λ/2)β'(i)   (1/2)β'(i)   β'(i)

Equilibrium Levels of i under Different

Ownership Structures

FIGURE II

fairly clear. Private ownership leads to an excessively strong incentive to engage in cost reduction ($e_M > e^*$) and to moderate—although still too weak—incentives to engage in quality improvement ($i_M < i^*$). Public ownership removes the excessive tendency to engage in cost reduction but replaces this with a weak incentive to engage in both cost reduction and quality improvement. Which arrangement is superior therefore depends on which distortion is less damaging.

The next two propositions provide conditions under which private ownership and public ownership can be ranked.

PROPOSITION 3.

(1) Suppose that the function $b(e)$ is replaced by $\theta b(e)$, where $\theta > 0$. Then for θ sufficiently small, private ownership is superior to public ownership.

(2) Suppose that the function $b(e)$ is replaced by $\theta b(e)$ and the function $c(e)$ is replaced by $\phi c(e)$, where $\theta, \phi > 0$. Then, for θ, ϕ sufficiently small and $\lambda < 1$, private ownership is superior to public ownership.

Part (1) of Proposition 3 follows from the fact that, as $\theta \to 0$, the damage to quality from cost reduction disappears. Under these conditions, private ownership leads to the efficient choice of e (since $c'(e) \approx -b'(e) + c'(e)$). Since the level of i is always closer to the first-best under private ownership than under public ownership, private ownership dominates public ownership. Part (2) follows from the fact that, as $\theta, \phi \to 0$, e^*, e_M and e_G all converge to zero. Thus, only the choice of i matters; private ownership is better than public ownership because it yields a level of i closer to i^*.

Proposition 3 has a very natural interpretation. There are basically two cases when private ownership is unambiguously superior. The first case is when the deterioration of quality from cost reduction is small. In this case, the stronger incentives that a private contractor has to reduce costs *and* improve quality are both desirable. The second case is when the opportunities for cost reduction (and hence the damage to quality as well) are small and the government employees have relatively weak incentives (λ is small). In this case, the private contractor would not do much of the potentially damaging cost reduction, and his stronger incentive to make quality innovations gives him the

edge over in-house provision. Both of these are extremely intuitive cases.

The cases where in-house provision is superior are given by the following result:

PROPOSITION 4.

(1) Suppose that $b(e) \equiv c(e) - \sigma d(e)$, where $\sigma > 0$. Then for σ sufficiently small and λ sufficiently close to 1, public ownership is superior to private ownership.

(2) Suppose that $b(e) \equiv c(e) - \sigma d(e)$, where $\sigma > 0$. Suppose also that the function $\beta(i)$ is replaced by $\tau\beta(i)$, where $\tau > 0$. Then for σ, τ sufficiently small public ownership is superior to private ownership.

Part (1) follows from the fact that as $\sigma \to 0$ the social gains from cost reduction, $-b(e) + c(e)$, converge to zero: the quality damage fully offsets the cost savings. Thus, the weak incentives for cost reduction under public ownership are socially efficient. In contrast, the incentives for cost reduction under private ownership are inefficient, since the private owner ignores the substantial damage $b(e)$. If λ is close to 1, the incentives for quality innovation under public ownership are similar to those under private ownership, and so public ownership dominates private ownership.

Part (2) replaces the condition λ close to 1 with the condition that τ is small. In this case i^*, i_M and i_G are all approximately zero, and so only the choice of e matters. For σ small, public ownership is superior to private ownership because it delivers a socially more efficient level of e.

Proposition 4 as well has a very natural interpretation. Public ownership is most likely to be better when the adverse effect of cost reduction on quality is large. But that is not enough. For public ownership to be definitely superior, it must also be the case that either quality improvement is unimportant or that government employees do not have weaker incentives in quality improvement (λ is large). If one of the latter conditions holds, then private contractors are not significantly superior at improving quality, and hence public ownership is preferred.[12]

12. We have analyzed private ownership under the assumption that the private owner actually manages the firm. This is not a bad assumption for the case we are most interested in—prisons. In situations where ownership is separated from control, some of the trade-offs that we have identified are still likely to be relevant. In particular, the owners and managers of a private firm will still have an excessive tendency to reduce costs, since they can collectively divide the gains

Finally, we consider the cost/quality comparison between private and public ownership:

PROPOSITION 5. Costs $(C_0 - c(e))$ are always lower under private ownership. Quality $(B_0 - b(e) + \beta(i))$ may be higher or lower under private ownership.

We know that e is higher under private ownership than under public ownership $(e_M > e^* > e_G)$ and hence costs are always lower under private ownership. Quality may be higher or lower, since although e is higher, so is i. One case where quality is higher under private ownership is when $b'(e)$ is small (more precisely, we replace $b(e)$ by $\theta b(e)$ and let $\theta \to 0$); then quality is determined by differences in i and not differences in e. On the other hand, if $\beta'(i)$ is small, quality is higher under public ownership; in this case quality is determined by differences in e rather than differences in i.

Proposition 5 explains what we believe to be the basic stylized facts, namely that private contracting typically yields greater cost efficiency, but there is ambiguity about quality. We could not get ambiguity if we had a simpler model, in which there was no investment in quality improvement. In that model, there would be a straight trade-off between quality and cost, with public provision delivering more quality at a higher cost. That model (i.e., one without β) would resemble the comprehensive contracting treatment of Laffont and Tirole [1993, Chapter 4], who argue that higher powered incentives (which might be associated with private ownership) lead to both lower costs *and* quality. Our model, in contrast, explains why in some—arguably most—cases private provision leads to both lower costs and higher quality.

B. Competition

Perhaps the single most important issue that our model does not deal with is ex post competition between the suppliers of the good. To take the simplest case, suppose that consumers buy the

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from cost reduction among themselves, ignoring the adverse quality impact on society. The implications for quality innovation are more complicated. To the extent that the manager of a private firm is less replaceable than the manager of a public firm (because the private company's shareholders are dispersed, say), the private company manager's incentives to innovate will be greater than the public manager's. However, to the extent that the manager of a private firm must share the fruits of his innovation with both the owner(s) and the government, as opposed to just the government, the private manager's incentives to innovate will be smaller (on the latter effect, see Laffont and Tirole [1993] and Hart and Moore [1990]).

good, or service, directly from a contractor, without any government intervention, even in financing. Suppose also that consumers can assess the quality on their own (a good assumption with most goods, a plausible assumption for education, and probably the wrong assumption for health). Suppose finally that the suppliers are perfectly competitive at every quality level. In this case, a private contractor would face exactly socially optimal incentives, since, on the margin, he gets a lower price for any quality shortfall resulting from a cost reduction, and a higher price for any quality improvement through innovation (that is, he receives $-b(e) + c(e) + \beta(i)$). Private supply in this case delivers the first-best. On the other hand, a public manager needs to negotiate any innovation with the government, and might be replaceable, so his incentives to innovate are stunted. In this extreme case—where there is no need for the government at all—the private sector delivers the first-best, and public provision is inefficient.

Of course, in most interesting cases, the situation is more complicated, and some government role is needed, at least in financing. For example, in education most arrangements would allow for the government to pay for the service of at least some consumers (e.g., through vouchers). The idea is that the government needs to participate in the financing of these services to reduce the inequality of consumption across consumers. As long as consumers can assess quality and have a choice among competitive suppliers, however, private suppliers would still pay for deterioration in quality resulting from cost reduction because the consumers can go elsewhere. Even in the case of government financing, competition strengthens the case for contracting out.

The objections to private, competitive supply typically focus on more subtle distributional issues, related to inefficient sorting of consumers. We discuss these objections in Section V in the context of health care and education.[13]

C. Alternative Views of Government: Corruption and Patronage

In this subsection we relax the assumption that the bureaucrat/politician acts on behalf of society and allow for him to be self-interested. This self-interest can express itself in a number

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13. Another kind of competition may also be important. Suppose that consumers cannot buy from contractors directly, i.e., the government must buy on their behalf, but there are many (similar) contractors. Then, if one contractor does a bad job, the government can always switch to another. Such switching is possible whether contractors are private or public. Thus, it is not immediately clear that competition of this sort makes private provision more attractive.

of ways. First, the politician may be corrupt, in the sense of being willing to use his control rights to extract money (or campaign contributions) for himself from the contractor. Second, the politician may use his control rights to pursue political objectives other than the public interest, such as catering to interest groups that might support him in the election. These alternative characterizations of political behavior matter for the choice of the optimal delivery mode.

To illustrate these issues, we describe two simple—but possibly important—cases. In one of them, corruption leads to an excessive tendency to privatize. In the other, patronage leads to excessive in-house provision.

Suppose that the privatization decision is made by a higher level politician at some date $-\frac{1}{2}$ before date 0 (see Figure I). Suppose also that the politician is not involved in F's operations after the privatization decision; that is, contracting decisions pass to a bureaucrat who is assumed to be honest. In contrast, the politician takes monetary bribes.

Under these conditions the politician has a simple choice. He can privatize F (a prison)—in which case he arranges to sell it to a private company owned by M (the future owner-manager of F). Suppose that the politician can set the price artificially low and extract a bribe from M; i.e., the politician can avoid selling F through competitive bidding. Alternatively, the politician can keep F public and appoint M as the future manager (the warden). In this situation we suppose that the politician can extract a bribe from M in return for M's future benefits as manager.

Under reasonable assumptions the politician can extract a higher bribe if he privatizes F than if he does not. If the politician privatizes F, then at date 0, M is in a bilateral bargaining position with the bureaucrat G concerning the terms of the contract. The total surplus to be divided is given from (9) by S_M. Under the assumption of Nash bargaining, M receives $\frac{1}{2}S_M$ through the price P_0. Now move back to date $-\frac{1}{2}$. At this date, as long as there are many potential (identical) firms and managers who can run the prison, the politician can offer to sell F to whoever pays the highest bribe: the highest bribe is of course $\frac{1}{2}S_M$ and so this is the politician's payoff.

Now consider the case where the politician keeps F public. How much would M pay for the privilege of being the warden? The problem M faces is that, prior to a contract with G being written, he has no job security; i.e., if the prison is public, there is nothing to stop the bureaucrat from replacing M with another

manager at date 0 (no relationship-specific investments have yet been made). Hence M's future payoff is zero, which means that this is also the politician's bribe! The conclusion is that the corrupt politician always wants to privatize F even if this is socially inefficient.

An equally important consideration ignored by assuming that politicians act in the public interest is that politicians often cater to special interest groups, such as labor unions, to win elections [Stigler 1971; Becker 1983]. Politicians may choose to use public money to provide jobs for the workers who then favor them in the elections, or to pay such workers wages above market levels. If spending public resources to transfer wealth to such interest groups is easier with in-house provision than with contracting, then politicians would have a bias toward too little privatization [Shleifer and Vishny 1994]. Patronage thus has the opposite effect to corruption: it leads to an excessive bias toward in-house provision. Interestingly, excessive employment in public firms may lead to excessively high quality (if having more people increases quality). For example, the quality of service in some European state airlines, such as Air France and Lufthansa, may be excessively high, and a possibly lower quality at private airlines is no evidence of lower efficiency.

Avoiding excessive public spending on politically powerful interest groups is indeed one of the principal goals of privatization throughout the world. In the United States, public sector unions are a powerful special interest group that has delivered some of the most vocal opposition to government contracting, including privatization of prisons [AFSCME 1985]. Some evidence suggests that the presence of strong public sector unions, as well as soft budget constraints of the government, are important obstacles to privatization of local government services in the United States [Lopez-de-Silanes, Shleifer, and Vishny 1997].

Positive considerations thus suggest an important trade-off between privatization and in-house provision. To the extent that corruption is a serious problem, the case for privatization is weaker than it is under benevolent government.[14] But to the ex-

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14. A similar set of issues arises when the politician is lazy or unmotivated. Such a politician, like his corrupt counterpart, may write bad contracts that fail to protect the public, award contracts to inefficient suppliers, pay excessive prices, fail to supervise contractors, fail to enforce important contractual provisions, etc. Because privatization locks the government into these bad arrangements, laziness of politicians, like corruption, tends to point against privatization.

tent that political patronage is a severe problem, the case for privatization is stronger. A reformer considering privatization must have a clear idea as to whether corruption or patronage is a bigger problem in his polity.

IV. PRIVATIZATION OF PRISONS

A. Overview

Privatization of prisons refers to the contracting out by the government of the operations of prisons to private companies. In the middle ages, prisons were typically private, but by the twentieth century, governments in most countries had taken over their operation. In the United States today, while private companies by law are restricted from meting out punishment, and public employees are usually present even in private prisons to make decisions on issues that can be interpreted as changes in the severity of prisoners' punishment, almost all the other activities related to incarceration can in principle be privatized. Private prisons have grown rapidly in the United States in the last decade from a capacity of about 1200 prisoners in 1985 to almost 50,000 prisoners at the end of 1994 [Thomas 1995]. Still, private prisons house only about 3 percent of the total prison population. Despite their quantitative insignificance, private prisons have stimulated an extensive debate on the cost and quality aspects of private incarceration (e.g., AFSCME [1985]; Donahue [1988, 1989]; Logan [1990, 1992]; Shichor [1995]; and others). Although there are no large sample studies of either cost or quality comparisons of public and private prisons, the available literature is informative enough for us to assess the relevance of the incomplete contracting approach to the study of prison privatization.

Private prisons are perhaps 10 percent cheaper, per prisoner, than public prisons.[15] The major reason for the lower costs appears to be the roughly 15 percent wage premium for public guards over private guards [Donahue 1988]. Part of the labor cost difference is that private contractors do not pay the public union wage premium; another part is that they hire lower quality work-

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15. The comparisons are often disputed by critics of prison privatization, since private prisons apparently get somewhat less violent prisoners [Donahue 1988; Shichor 1995], and since some of the costs of private incarceration—such as the continued need for public oversight—are often ignored in the comparison. On the other hand, some of the costs of public prisons, such as forgone tax revenues and often even capital costs, are also often ignored in the comparisons.

ers. Since labor accounts for two-thirds of the incarceration costs, the differences in labor costs can roughly account for the 10 percent cost saving from private prisons.

The most controversial and interesting issues raised by private prisons concern the quality of service. Quality covers order in the prisons (security of prisoners, escapes, staff conduct toward prisoners, violence by guards and between prisoners, disciplinary procedures, etc.), amenities that prisoners receive (quality of food, health care, dental care, mental care, clothes, quality of facilities, prison work, entertainment, access to legal help, etc.), and rehabilitation (vocational training, other education, parole procedures, etc.). Objections to prison privatization typically focus on quality. To quote DiIulio [1987], "The history of private sector involvement in corrections is unrelievedly bleak, a well-documented tale of inmate abuse and political corruption. In many instances, private contractors worked inmates to death, beat or killed them for minor rule infractions, or failed to provide inmates with the quantity and quality of life's necessities (food, clothing, shelter, etc.) specified in their often meticulously-drafted contracts." This account is not extreme among those by critics of private prisons, such as Webb and Webb [1963] and Shichor [1995, Chapter 2]. On the other hand, Logan [1992] reports the results of a survey of three women's prisons in New Mexico that point to superior quality of the private prison. The central question of prison privatization is whether the poor history is a good guide to the present and the future.

Our theoretical analysis helps organize some of the thinking about prison privatization around the questions of what contracts can and do accomplish. Accordingly, we show first that many of the quality problems in incarceration can actually be addressed through contracts. Nonetheless, we also show that serious and unavoidable incompleteness remains even in the "best practice" existing contracts. Moreover, the incompleteness takes the form described in the model: contractors have an opportunity to reduce costs in ways that may lead to a substantial deterioration of quality. We also address the highly pertinent problems of corruption and poor enforcement of contracts. We conclude by applying the model to the choice of prison privatization.

B. What Contracts Can Accomplish

To assess the possibilities of contracting, we examine modern "best practice" in the United States. One measure of best practice

is accreditation by the American Correctional Association, a pseudo-public body that issues standards for good prisons (e.g., ACA [1990]) and accredits prisons that meet them. The ACA proposes 463 standards for adult correctional institutions covering such matters as administration and management of prisons (including personnel policies, staff training and development, bookkeeping, fiscal management, etc.), physical plant (including building and safety codes, security, inmate housing, prison size, etc.), operations (including rules and discipline, security procedures, inmate rights, special confinement, etc.), services (including inmate classification, food, hygiene, health care, social services, etc.), and inmate programs (work, education, recreation, mail, visiting, library, religion, etc.). Of these standards, 38 are mandatory and cover training and staff development, building and safety codes, security and control, safety and emergency procedures, inmate rights, classification, food service, sanitation and hygiene, health care, and work in correctional industries. To get ACA accreditation, which is renewed every three years, an institution must meet all 38 mandatory standards and 90 percent of the nonmandatory standards. In general, only a small percentage of either public or private prisons get ACA accreditation. However, even if a private prison does not get ACA accreditation, a prison contract can use some or many ACA standards as contract provisions.

ACA standards tend to be process rather than outcome oriented. They typically insist that a facility have a written set of rules or a policy manual dealing with specific matters, as well as staff to attend to these matters. ACA standards usually do not specify the content of these rules. Presumably, a manual helps train prison staff, as well as enabling inmates to complain (or sue) if the written rules are violated—something they could not do without a manual to point to. On some matters, such as food and health, ACA actually does specify minimum quality standards that would be relatively difficult to get around. On food, ACA specifies the number of meals that must be served, caloric intake, time between meals, conditions for preparation and keeping of food, as well as palatability. It also refers to the standards of the American Dietetic Association on food quality. A 1990 contract between the Corrections Corporation of America (CCA) and the Metropolitan Government of Nashville and Davidson County, Tennessee, illustrates the role that ACA standards can play in contracting. This contract covers the construction and three years

of operation of a prison by CCA, to be compensated by a fixed construction fee plus a per-diem rate for prisoners. The contract specifies that CCA must achieve accreditation of the prison by the ACA within two years of the service commencement day, and more generally relies on ACA standards, particularly in the matters of amenities and service. The contract also specifies that three government employees must be permanently present at the premises, including the Contract Monitor, in order to monitor contract performance as well as review disciplinary and appeals reports. A reading of this contract suggests that, if best practice is followed, many aspects of the quality of incarceration can be addressed through contracting.

C. Contractual Incompleteness

Although contracts can address some quality issues, in several important areas incompleteness is evident, and could in principle compromise the quality of service delivered by a private contractor. The two crucial areas we consider are use of force and quality of personnel. These areas have been the focus of much of the criticisms of private prisons (e.g., Shichor [1995]).

The mandatory ACA standard on the use of force is not especially detailed: "Written policy, procedure, and practice restrict the use of physical force to instances of justifiable self-defense, protection of others, protection of property, and prevention of escapes, and then only as a last resort and in accordance with appropriate statutory authority. In no event is physical force justifiable as punishment. A written report is prepared following all uses of force and is submitted to administrative staff for review." A separate, but equally vague, mandatory standard governs the use of firearms. The Tennessee contract allows the use of deadly force to prevent escapes, and of nondeadly force to enforce institutional regulations and orders, which is a weak restriction indeed.

In the area of the quality of personnel, the ACA (nonmandatory) standards require that a procedure be used to determine staffing needs, and that the vacancy rate be kept under 10 percent for any eighteen-month period. Correctional officers are also required to receive 120 hours of training in their first year, and 40 hours in subsequent years. Little is said about the quality of the training (except for topics covered) or the quality of the officers. The Tennessee contract follows the ACA on training, but

also specifies that "at the time the facility opens and during the first year of the contract, a minimum of 25 percent of contractor's security employees will have at least one year of corrections security experience. Davidson County residents will be given a hiring preference in staffing the facility." What is most interesting about these standards is how few there are, and how much discretion the contractor has in saving costs on personnel.

Does contractual incompleteness lead to the deterioration of quality? Unfortunately, no systematic evidence is available on this matter. We can get a glimpse of the issues by looking at two (very small sample) reports. The first is a comparative evaluation of two public prisons and one private (CCA-managed) prison in Tennessee, done by that state's government [State of Tennessee 1995]. Although this evaluation has concluded that all three prisons are overall of extremely high quality, with the implication that a cheaper private prison is a good deal for the state (see also *The New York Times* [September 19, 1995]), it is clear from the body of the report that the level of violence is higher in the private prison: "The number of injuries to staff and prisoners is a measure of the security and safety of the facility. During the fifteen month period, the private prison reported significantly more (214) injuries to prisoners and staff, compared to 21 and 51 for the two state prisons, respectively. The private prison also reported 30 incidents of the use of force, compared to 4 and 6, respectively, for the state prisons." The Tennessee report minimizes this evidence because of the possible differences in reporting practices, but it is suggestive nonetheless.

While CCA private prisons in Tennessee are widely regarded as a success of private prison management, ESMOR's detention facility in Elizabeth, New Jersey, operated for the Immigration and Naturalization Service (INS), is widely regarded as a failure, in part because a riot broke out at that facility on June 18, 1995. The ESMOR facility housed foreign nationals who were caught attempting to enter the United States illegally through Kennedy and Newark airports, and who were awaiting deportation—not exactly a hard core criminal crowd. ESMOR won the INS contract by significantly underbidding another private competitor, in part because it assumed in its bid lower wage rates for prison staff. The contract actually specified the types of workers that ESMOR was supposed to hire, but it turned out to be possible within the contract to hire as guards individuals who previously guarded

goods in warehouses. With respect to training, ESMOR evidently just violated the contract: the INS reports that ESMOR "did not meet requirements of the contract" in this area.

Overall, the ESMOR facility was seriously understaffed, guards did not receive enough training, guards were implicated in incidents of physical abuse of prisoners, and supervision of staff by management was lacking. When the riot broke out, the guards immediately ran away, and called the police from a pay phone. INS attributed many of the problems at the facility to ESMOR's cutting corners, principally on labor. The evidence in the report points to the possibility of cost savings by private contractors at the expense of quality, as well as to the government's failure to respond to explicit contract violations by the contractor (see footnote 14).

In sum, while systematic evidence on the quality of incarceration by private and public prisons is not available, the existing shreds of evidence suggest that in important dimensions, such as prison violence and the quality of personnel, prison contracts are seriously incomplete. This incompleteness can, and sometimes does, give rise to quality shortfalls in private contracting.

D. What Does Our Model Say about Prison Privatization?

Prisons seem to fit reasonably well into our framework. Although in some respects prison contracts are very detailed, they are still seriously incomplete. There are significant opportunities for cost reduction that do not violate the contracts, but that, at least in principle, can substantially reduce quality. Moreover, from the available evidence we have the impression that the world may not be far from the assumptions of Proposition 4. First, the welfare consequences of quality deterioration might be of the same magnitude as those of cost reduction ($b(e)$ and $c(e)$ are comparable). Second, the opportunities for quality innovation are limited ($\beta(i)$ is small). Under these conditions, Proposition 4 suggests that public ownership is superior.

Would ex post competition between prisons for inmates strengthen the case for privatization? One possibility is that convicts themselves choose the prison in which to serve their sentences, but this is probably a bad idea, since prisoner choice would encourage contractors to attract customers by allowing gangs, drugs, and perhaps even easy escapes. A more plausible alternative is to have judges choose a private prison to send a convict to,

with the idea that judges would send more inmates to higher quality prisons and fewer to lower quality prisons. Private contractors would then have the appropriate incentives to invest in quality improvements, and to avoid excessive cost reductions, to bring in more business. At the moment, such schemes have not been tried, in part because there is a shortage of prison capacity in the United States, but it is possible that they could be tried in the future. One potential disadvantage of such judge choice is that some judges might actually choose lower quality prisons because they want the inmates to get a stiffer penalty, whereas other judges might choose prisons that are soft on inmates. Contractors would then cater to the preferences of the judges, which need not coincide with social welfare.

Finally, the choice of whether to privatize prisons depends on the importance of corruption and patronage. Patronage does not appear to be a huge problem in prison employment in the United States, since the union premium as of this writing is not large. Corruption appears to be a greater concern, at least judging from the available anecdotal evidence. To begin, private prison companies are very active politically. For instance, ESMOR evidently lobbies politicians and makes political contributions to receive contracts [*The New York Times,* July 23, 1995]. The wife of Tennessee governor Lamar Alexander invested early and profitably in the stock of Corrections Corporation of America, which subsequently got involved very deeply in the privatization of Tennessee prisons with the governor's endorsement [*The New Republic,* March 4, 1996, p. 9].

A related problem is that contract enforcement cannot be taken for granted. The INS report concludes that ESMOR's changes in policies "hindered INS ability to effectively perform its oversight functions." The report also notes that ESMOR told its guards not to share information with the INS officials working on the premises, and in one instance encouraged the INS to reassign an officer who complained about the performance of the Elizabeth, New Jersey, facility several months prior to the riot. The report indicates that ESMOR violated the contract in some instances, and also pursued policies preventing the INS from enforcing the contract. But it is also clear from the report that the INS did not do what it could to enforce this contract. The INS report vividly illustrates how a government bureaucracy with relatively weak incentives has trouble enforcing a contract with a pri-

vate supplier determined to reduce its costs, even if this involves violations of the contract and not just the issues on which the contract is silent.

In sum, our model suggests that a plausible theoretical case can be made against prison privatization. This case is weakened if competition for inmates can be made effective, but strengthened by the relevance of political activism by private contractors. One instance in which the case against prison privatization is stronger is maximum security prisons, where the prevention of violence by prisoners against guards and other prisoners is a crucial goal [*The New York Times Magazine* 1995]. In many cases, the principal strategy for preventing such violence is the threat of the use of force by the guards. We have shown that it is difficult to delineate contractually the permissible circumstances for the use of such force. Moreover, hiring less educated guards and undertraining them—which private prisons have a strong incentive to do—can encourage the unwarranted use of force by the guards. As a result, our arguments suggest that maximum security prisons should not be privatized so long as limiting the use of force against prisoners is an important public objective. Consistent with this view, only 4 of the 88 private prisons in Thomas's [1995] census of private adult correctional institutions in the United States are maximum security. In contrast, private halfway houses and youth correctional facilities, where violence problems are less serious, are common [Shichor 1995].

V. OTHER ACTIVITIES

In some ways, our model was constructed to fit prisons. However, it can help analyze other activities as well, as we show in this section. We also examine some of the model's limitations.

A. *Straightforward Cases: Garbage Collection and Weapons Procurement*

In the case of garbage collection, the damage to quality resulting from the private contractor hiring inferior employees or failing to maintain the equipment is probably trivial ($b(e)$ is low). Our analysis then implies that private provision is superior. This result obtains even though in garbage collection ex post competition is extremely expensive, since it is essential that the same company pick up garbage from neighboring houses [Donahue

1989].The superiority of private provision in garbage collection is documented by several empirical studies [Donahue 1989].

Weapons procurement is another case where our model points to the superiority of private provision. Although the damage to quality from cost reduction might be significant, to a large extent this problem can be dealt with contractually through the requirement that weapons meet well-specified performance requirements. Moreover, quality innovation is enormously important in weapons design, and the incentives of private suppliers are probably stronger than those of public employees. As a consequence, if $b(e)$ can be limited through contracts, Proposition 3 points to the superiority of private ownership.

B. Foreign Policy

In many situations the nature of the service that the government wants to be performed is extremely complex and unpredictable, so any contract is inherently extremely incomplete. Most actual decisions of the contractor have to be renegotiated at the government's initiative, which exposes the government to the high costs of paying up to the contractor who has a lot of power. For example, as Wilson [1989] shows, it is virtually impossible to describe in advance what services need to be performed to carry out American foreign policy, a task now assigned to the State Department. Suppose that the State Department were to be privatized, and a set of policies toward different countries specified in the contract. In this case, when the government wants to change its policy toward a country (say because Russia renounces communism), it would have to persuade the private contractor to change what it does. In this renegotiation the government presumably would have to pay the private contractor more than it would pay an employee, who is totally replaceable when few ex ante investments are involved. In-house provision in this case of few investments and enormous ex post holdup opportunities seems clearly superior.

A skeptic can respond to this analysis by suggesting that perhaps, ex ante, the government should auction off the foreign policy contract for a vast amount of money with an understanding that it is going to be regularly held up ex post. What is wrong with this arrangement? In our theory we have assumed that M is wealthy enough to pay up front for the right to own F when private ownership is optimal. However, in some cases, such as

the conduct of foreign policy, M may not be wealthy enough. This creates a further argument for public ownership when M's ex post hold-up power vastly exceeds the amount he can raise ex ante for the contract. If M cannot compensate G in advance for all the future holdups when G changes the contract, then the extraction of surplus from G by M is socially wasteful. Hence the government may wish to own F simply to avoid having to compensate M when it changes its mind at date 1.[16] This logic confirms the conclusion that foreign policy should be conducted by government bureaucrats.

C. Schools

An important example that goes outside of our basic model is the provision of schooling. For schools, the damage to quality from cost cutting, $b(e)$, may be large, but innovation is probably important, and the incentives of publicly employed teachers, especially when they are protected by unions, are weak. Our propositions, therefore, do not give a clear answer as to which arrangement is superior. The key aspect of schools, however, is the potential for ex post competition. In voucher arrangements combined with school choice, the government pays for each child's education, but children and parents select schools. We conjecture that the case for such private arrangements is extremely strong. School choice would force private schools to compete for students by providing higher quality, since schools cannot compete in price when students pay with vouchers. This competition should significantly reduce the incentive to cut quality while cutting costs, as well as increase the incentive to innovate quality. Indeed, the available evidence suggests that competition between schools is associated with a higher quality of education [Hoxby 1994].

Critics of vouchers and school choice often point to a particular aspect of quality that they believe would fall as a result of privatization, namely reduction of access of some students to good education. Specifically, critics fear that sorting of students by ability would increase as a result of such arrangements, which they regard as socially undesirable. Such sorting can take two

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16. This argument is developed further in Trinh [1996]. One may ask why M could not borrow against the receipts from his future hold-up opportunities. The answer is that a bank may be unwilling to lend to M, since there is nothing to stop M from "holding up" the bank by refusing to hold up the government. That is, having received his loan, M can threaten not to hold up the government at date 1 and use this threat to renegotiate downward his repayment to the bank [Hart and Moore 1994]. Anticipating this, the bank will refuse to lend to M.

forms. First, good private schools paid with vouchers would select the best students, leaving the not-as-good students to not-as-good schools. Second, private schools would avoid expensive-to-educate children altogether, who would then get stuck in residual government programs. Critics charge that such outcomes are less socially desirable than those involving less sorting. Some school districts have tried to solve these sorting problems contractually by, for example, using courts to allocate students to private schools that wish to be paid with vouchers [Moe 1995]. Whether contracts can successfully address the concerns of the critics of school choice, and whether these concerns are actually justified from the social welfare viewpoint, are questions requiring further inquiry.

D. Health Care

In the case of health care, as with education, the government wants to pay for the services of at least some consumers, and needs to design a good arrangement for doing so. One aspect of this design is whether hospitals should be private or public. In the analysis of optimal ownership, there are some similarities between schools and hospitals, as well as some differences. To begin, in health care, as in education, gains from innovation are enormous, but so is the damage to quality from cost cutting. Moreover, the distributional aspect of quality is extremely important in both services, namely, the danger that expensive-to-treat consumers would be denied care if the government pays less than it costs to treat them.

One further similarity is that ex post competition between hospitals—letting patients choose their hospital—can play a role in health care. Such competition generally strengthens the case for privatization. However, a crucial difference is the limited ability of consumers to assess the quality of health care they receive. Consumers often cannot tell whether hospitals have failed to provide care to save costs, and hence would not so readily change suppliers in response to poor quality. For this reason, the combination of private ownership and competition would not be nearly so effective in health care as in education, making the case for some government ownership stronger.

Perhaps because of all these concerns about private provision, most countries have responded to the need to provide health care to all their people through government provision. The United States has been different in relying on both private and

public hospitals, with the latter taking care primarily of indigent patients. Historically, private hospitals have been paid on a cost-plus basis—an approach that our model does not accommodate (since we assume that costs are nonverifiable) but which, unsurprisingly, has proved extremely expensive. More recently, the form of compensating providers has shifted to fixed fees for services, a contract very similar to that analyzed in our model. Not surprisingly, these contracts have increased concerns about quality deterioration, particularly in the so-called Health Maintenance Organizations. An analysis of health care would require a significant generalization of our model, especially since verification of costs and cost-plus contracts have played an essential role in paying for this service.

E. Police and Armed Forces

Consider finally some basic services provided by the government that nobody seriously thinks of privatizing: the police and the armed forces. Our framework helps to explain why these services should not be privatized.

If the police or armed forces were privatized, the owners of the resulting private companies would have enormous power. Part of this power would stem from the direct ownership of weapons that are currently in public hands. The owners could use this power to hold up the government and society. For example, suppose as an extreme case that nuclear weapons were sold off to a private company and an (incomplete) contract was written with the company as to how these weapons should be used in the event that the country is threatened with attack. The concern is obviously that the private company would wriggle out of the incomplete contract and either threaten to withhold the weapons in the event of an emergency to extract a huge side-payment from the government, or even threaten to use the weapons against the country itself unless it receives such a side-payment.

We stress that keeping the nuclear stockpiles—or armed forces—public does not eliminate the possibility of attempted holdup. A general who is a state employee could use his access to nuclear weapons to attempt to hold up society. After all, coups and rebellions by the armed forces do sometimes occur. However, there is a difference between the private and public cases. If nuclear weapons or the armed forces are publicly controlled, the government can take early action to prevent a potential holdup. If it suspects that an errant general is engaged in treason, it can

fire the general. In contrast, in the private case, the government would have to wait until a clear breach of contract occurred; this might be too late.

VI. CONCLUSION

We have examined the conditions that determine the relative efficiency of in-house provision versus outside contracting of government services. Our theoretical arguments suggest that the case for in-house provision is generally stronger when non-contractible cost reductions have large deleterious effects on quality, when quality innovations are unimportant, and when corruption in government procurement is a severe problem. In contrast, the case for privatization is stronger when quality-reducing cost reductions can be controlled through contract or competition, when quality innovations are important, and when patronage and powerful unions are a severe problem inside the government.

We then applied this analysis to several government activities using the available evidence on the importance of various factors. We concluded that the case for in-house provision is very strong in such services as the conduct of foreign policy and maintenance of police and armed forces, but can also be made reasonably persuasively for prisons. In contrast, the case for privatization is strong in such activities as garbage collection and weapons production, but can also be made reasonably persuasively for schools. In some other services, such as provision of health care, an analysis of the efficiency of alternative arrangements is a great deal more complicated and requires a much more detailed model of competition, contracts, and regulation than we could provide in this paper. We defer such analysis to future work.

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