

Incentives and Organizations in the Public Sector: An Interpretative Review

by
Avinash Dixit
Princeton University

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Abstract

The paper begins with a brief overview of the theory of incentives, with special attention to issues that are important in the public sector. It then reviews some case studies and empirical studies of incentives in the public sector, and examines how they relate to the theory. Some implications for reform and design of organizations are drawn.

Address of author:

Avinash Dixit, Department of Economics, Princeton University, Princeton, NJ 08544, USA.

Phone 609-258-4013. Fax 609-258-6419. Internet dixitak@princeton.edu

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1 Introduction

In this paper I consider some issues of incentives for workers and managers in public sector agencies and enterprises, and some implications for the evolution, design, and reform of such organizations. I do not examine questions of incentives for the citizens who deal with these agencies, for example saving incentives in social security or work incentives for welfare recipients or truth-telling incentives for income tax filers; recent discussions of these issues include Lindbeck (1998).

I begin with a brief review of the general theory of incentives. This theory is now well established in economics; Gibbons (1997) and Prendergast (1999) offer excellent recent surveys. Therefore I can be quite brief and selective, focusing on aspects that are of particular relevance here.

Then I consider some special features of government agencies that make various particular models and results from the theory relevant or inapplicable in this context. Finally, I examine some cases and empirical studies in the light of the theory. This is merely the beginning of what promises to be a fruitful area for study, and my findings are few and tentative. For readers who like to know the bottom line in advance, here is a very brief statement.

Public sector agencies have some special features, most notably multiplicity of dimensions – of tasks, of the stakeholders and their often conflicting interests about the ends and the means, and of the tiers of management and front-line workers. Sometimes these special characteristics explain why these agencies are in the public sector in the first place. They also make inappropriate the naive application of magic bullet solutions like competition or performance-based incentives. Such incentives do have important roles, but need selective application to specific agencies or tasks, namely those whose performance can be defined, quantified, and measured with some clarity, and where political conflicts about different aspects of the performance are relatively minor. In other agencies or tasks, other forms of incentives like career concerns, idealism and professionalism have a role, informative but vague measures must be used, and solutions short of the ideal must be accepted.

There are also some lessons for researchers. The good news is that recent theory of incentives is beginning to make good contact with the realities. But both empirical and theoretical research need to be better focused. Empirical research on past reforms should not look for blanket verdicts on their success or failure, but should relate the probability of success to specific characteristics of the agencies or organizations, and theoretical research on the design of new reforms should likewise pay attention to these specifics.

2 The Elementary Theory of Incentives

Economic relationships in which one party (the principal) wishes to affect the actions of another (the agent) by means of incentives are ubiquitous. In the public sector, these can arise within a government agency, with upper tiers of management as the principals and lower tiers as agents, or between an agency and its political supervisors at one end and its suppliers or clients at the other end. Such relationships can be classified into three conceptual categories according to the nature of information flows between the parties; of course in practice two or all three problems may arise simultaneously.

In the first, often labeled moral hazard (MH), the agent's action affects the principal's payoff, but the action is not directly observable to the principal. Some consequence of the action, an outcome, is observable, but the outcome depends both on the action and on some other random variable, so the action cannot be perfectly inferred from the outcome. We must distinguish two senses of observability. In the stronger, called verifiability or contractibility, the outcome can be proved to third parties, so contracts contingent on it can be written and enforced. In the weaker sense, the parties to the relationship observe the outcome, and can use it to draw inferences and take future actions that they are free to choose, but the outcome cannot be proved to outsiders and so cannot be the basis of an enforceable contingent contract. When the distinction is not important I will just say *observable*; when it matters I will distinguish between *verifiable* and (privately) observable.

In the second form of information asymmetry, often labeled adverse selection (AS), the agent has some private information at the time the contract with the principal is being considered. The contract must offer the agent a suitable reward – share the economic surplus (rent) that exists in the relationship – to induce him to reveal this information truthfully to the principal.

In the third, the agent can observe some outcome better than the principal can, and the principal has to devise a reward scheme and a costly outcome verification scheme (CV) such as an audit. The three create different kinds of tradeoffs, are handled by different mathematical techniques, and give rise to different kinds of optimal incentive schemes.

2.1 Incentives for Effort (MH)

The general structure of these problems is as follows. The agent takes an action a that is not verifiable. This results in a verifiable random outcome x ; the action affects the probability distribution of the outcome. The principal's problem is to devise the payment schedule $y(x)$ to maximize his expected utility of the profit $x - y(x)$. This is subject to two constraints: [1]

the knowledge that the agent will choose a to maximize his expected utility which depends on $y(x)$ and the cost of action $C(a)$ (the incentive constraint), and [2] the agent must get enough expected utility out of this relationship to match his opportunity elsewhere (the participation constraint).

If the action a were directly verifiable, then y and a could be jointly chosen to achieve a Pareto optimal or first-best outcome. But since a is not verifiable, given the first-best y the agent will in general not find it optimal to choose the first-best a . This creates the moral hazard for the agent.

Without specifying more about the various functions, very little can be said about the solution; see Grossman and Hart (1983). In practice, attention has focused on two types of payments schemes:

Linear: This gives the agent a base salary k and a marginal reward or bonus m per unit of x produced, for a total of

$$y(x) = k + m x .$$

The conditions for such a scheme to be truly optimal are quite stringent; see Holmström and Milgrom (1987). But even when the rigorous conditions are not met, such schemes are often used in practice for their simplicity and relative robustness against manipulation, and in theoretical models because they illustrate risk-return tradeoffs in a simple way.

If [1] x equals a plus a normally distributed error with variance v , [2] the agent's cost of action is quadratic, $C(a) = \frac{1}{2} c a^2$, and [3] both parties have constant absolute risk aversion, R for the principal and r for the agent, then assuming a linear scheme and choosing its coefficients optimally, we find the marginal bonus coefficient to be

$$m = \frac{1 + R c v}{1 + (r + R) c v} .$$

Then the base salary k is chosen to satisfy the agent's participation constraint. This formula offers much useful intuition.

First, $0 < m < 1$; the agent gets only a fraction of the output of his action (or bears only this fraction of the loss of output his inaction causes) at the margin. This fraction is smaller (the incentive to action is weaker), the larger is the variance of the error with which the observable output indicates the underlying effort. Even in the private sector, the firms' bottom line or its stock price is affected by so many other random influences that it is a poor measure of the top management's efforts, and therefore their incentives are quite weak; see Garen (1994). In the public sector output is often even more vaguely measured, so the problem is worse. I will consider the consequences of this, and some ways of getting around it.

Incentives can be sharper when the agent is less risk-averse: a low r implies a high m . In the extreme case of a risk-neutral agent ($r = 0$), we get $m = 1$; this is as if the principal sells the activity to the agent for a fixed fee. More generally, this formulation emphasizes the tradeoff between the agent’s risk and incentive.

The bonus coefficient is higher when the principal’s risk aversion R is larger. This may be of little importance in the private sector, because many risks to a private firm’s bottom line can be diversified away using the capital market. In fact it is usual to assume $R = 0$ and write the formula as

$$m = \frac{1}{1 + r c v} \tag{1}$$

But politicians and managers cannot so easily diversify the risks of bad outcomes of public policies and agencies. In fact, there are critical threshold levels of public tolerance, and politicians are very risk-averse at these outcomes. Therefore they may have to use incentive schemes that are very steep there, like the step function (2) below.

Step Functions: These incentive schemes consist of a threshold or quota level of output x_0 , a higher or reward level y_h of payment to the agent for meeting or exceeding the quota, and a lower or punishment level y_l for falling below it. Thus

$$y(x) = \begin{cases} y_l & \text{if } x < x_0 \\ y_h & \text{if } x \geq x_0 \end{cases} \tag{2}$$

Such a scheme can be very useful in implementing an action a^* the principal desires if the probability of x exceeding x_0 is very sensitive to a in the neighborhood of a^* . The intuition is that the agent can be given a sufficiently large expected utility to meet his participation constraint if he takes the desired action, but has a sufficiently large fear of suffering the drastic penalty if he slackens his effort even marginally. Under certain conditions, such a scheme can approximate the first-best; see Mirrlees (1975) and Holmström (1979). However, in more complex environments such schemes are more vulnerable to gaming by the agent; we shall see some examples of this below.

2.2 Incentives for Information (AS)

If the agent has advance private information that affects the principal’s payoff, the principal can design the contract to cope with this. The general theory of such mechanism design is governed by the *revelation principle*, which can be traced back to Mirrlees (1971), but is most clearly stated and proved in Myerson (1982). A mechanism that simply asks the agent to reveal his information is called “direct”; if truthful revelation is optimal for the agent, the

mechanism is called “incentive compatible.” Then the revelation principle says that all feasible allocations of any mechanism in this situation of asymmetric information are the same as those of a direct and incentive-compatible mechanism. This has the technical advantage that the problem can be formulated as a constrained optimization by the principal. The constraint that truth-telling should be in the agent’s best interest is the *incentive-compatibility constraint*; if the agent’s participation is voluntary, there is also the *participation constraint* stipulating that he gets enough payoff under this contract to match his outside opportunity.

In practice, direct mechanisms are rarely used. Instead, the agent is offered a suitably designed menu of contracts, and his choice of contract indirectly reveals his information. But such menus, for example a scheme of nonlinear pricing, can be derived from the solution to the constrained optimization of the revelation principle.

The principle can be illustrated, and its most important practical consequences pinpointed, using the example of government procurement contracting. The firm knows its cost better than does the government. Under cost-plus contracting the firm has the incentive to pretend to have high cost, or to inflate costs by adding activities that benefit the firm but not the government. Under a fixed-price contract, the firm has the correct incentive to produce efficiently at minimum cost, but if the true cost is low the government may be giving away too much of socially valuable revenue to the firm.

Suppose the unit cost can have one of two values, low (c_l) and high (c_h). The probability of the former is θ . The government’s total gross benefit is $S(q)$, an increasing concave function of the output quantity q ; it does not include the firm’s profit.¹ Then the optimal direct mechanism can be shown to be the following. The government asks the firm to report its cost. If the answer is c_h , the government buys an amount q_h defined by

$$S'(q_h) = c_h + \frac{\theta}{1 - \theta} (c_h - c_l), \quad (3)$$

and gives the firm a total payment

$$R_h = c_h q_h. \quad (4)$$

If the answer is c_l , the government buys an amount q_l defined by

$$S'(q_l) = c_l, \quad (5)$$

and gives the firm a total payment

$$R_l = c_l q_l + (c_h - c_l) q_h. \quad (6)$$

¹Qualitatively similar results arise if the profit is included but a dollar of government revenue is worth $\lambda > 1$ of profit because the revenue is raised by distortionary taxation.

To interpret these, begin with (6). This says that a firm that admits to having low cost gets paid more than its cost. The extra $(c_h - c_l) q_h$ is exactly the profit the firm could have made if it had pretended to have high cost; the mechanism gives it just enough to eliminate this temptation and induce truthful revelation. Thus the principal must share with the agent some of the rent or surplus in the relationship to induce truthful revelation of the agent's private information. Of course this entails a budgetary cost for our principal (the government). To keep this cost down, it lowers q_h below the point where marginal benefit equals the cost of production; the optimal adjustment is shown in (3). The truly high-cost firm has cannot further inflate its cost, so it need not be given any profit, as (4) shows. And there is no reason to buy an inefficiently low amount from a firm that has admitted to having low cost, so the marginal benefit is equated to the marginal cost, as (5) shows.

Instead of the direct mechanism that asks the firm to report its cost, the government can offer the firm a choice between two contracts: [1] supply q_h and get paid R_h , and [2] supply q_l and get paid R_l . If these satisfy the incentive-compatibility constraints

$$R_1 \geq R_2 - q_2 c_1, \quad R_2 \geq R_1 - q_1 c_2, \quad (7)$$

the firm's choice would be equivalent to truthful direct revelation.

More generally, instead of just two conceivable levels of cost, there can be several, $c_l = c_1 < c_2 \dots < c_n = c_h$, or even a continuum over the interval $[c_l, c_h]$. The general direct mechanism is a list of quantity and revenue pairs (q_i, R_i) intended for the firm whose true unit cost is c_i . There are $n(n-1)$ incentive constraints like (7) which ensure that each type of firm will report truthfully, or alternatively, pick the intended pair from the whole menu, which can be thought of as a nonlinear pricing schedule.

The natural generalization of (3)–(6) gives a firm of type c_i just enough revenue to offset its temptation to pretend to have the next higher cost c_{i+1} , and successively distort the quantities purchased from higher cost types downward to reduce the budgetary cost of this rent-sharing. This is optimal if some technical conditions are met. I will not go into these here, except to bring out an important tradeoff. Reducing the distortion of the quantity purchased from type k requires an offsetting increase in the payment to type $(k-1)$, which then entails an increase in the transfer to type $(k-2)$, and so on. The expected benefit from reducing the distortion for type k is proportional to the probability $f(k)$ that the firm is of type k ; the cost is proportional to the cumulative probability $F(k)$ of all types below k . Therefore the distortion depends on the hazard rate $f(k)/F(k)$. (In the two-type case this appears as the term $\theta/(1-\theta)$ in (3).) If the hazard rate is low over some range, then it

may be too costly to try to differentiate types in this range; instead they should be bunched using a contract (q, R) that will be selected by all of them.

With moral hazard, we could measure the power of an incentive scheme by the magnitude of the marginal payment coefficient m . With adverse selection, we can similarly measure the strength of an incentive scheme by how far it departs from cost-plus. Equation (3) shows that incentives are stronger the larger the magnitude of the information asymmetry $(c_h - c_l)$, and the higher the probability of good versus bad information $(\theta/(1 - \theta))$, or the hazard rate in the more general case).

This analysis, which originated with Baron and Myerson (1982), can be generalized greatly, and Laffont and Tirole (1993) provide a comprehensive treatment. These also provide the many technical details I have omitted. But the brief statement above gives adequate intuition on which I will build in the sections to follow.

2.3 Costly Verification (CV)

Here the agent gets to know some outcome, and can benefit by misrepresenting it to the principal: an insured can exaggerate his loss or a taxpayer can understate his income. On receiving the agent's report, the principal may either accept it, or find out the truth using a costly audit. The difference between AS and CV situations is that in AS the agent has the information advantage even before the two parties enter into the contract, whereas in CV he gets the information post-contract. But the revelation principle applies, and the principal can optimize his objective subject to the agent's incentive compatibility and participation constraints.

Some general features of the optimal scheme, found by Townsend (1979) and Mookherjee and Png (1989), are as follows. If the agent reports the outcome that is worst for him, he is not audited. If he reports any other state, he is audited with a prespecified probability; the better the state for the agent, the higher the probability of the audit. If the audit reveals that the agent told the truth, he is given a reward; if it reveals a lie, the agent is fined. The probability as a function of the reported state, and the reward and fine as functions of the report and the truth, are all calculated to achieve truthful revelation at least cost to the principal.

The CV problem has been less studied in the context of public sector incentives than the MH or AS problems, but investigations and audits are often carried out for public policies and agencies, so it deserves more attention in future research.

3 Some Extensions of the Theory

The basic information asymmetries, and the incentive schemes to cope with them that were sketched in section 2, present themselves in practice in more complex ways. In this section I briefly state some of these, in conceptual categories taken one at a time. In practice they arise in combinations, for example multiple dimensions of objectives and tasks, and multiple principals, are often present simultaneously. In subsequent sections I will consider applications of this kind ad hoc, combining insights from the separate theoretical analyses as necessary.

3.1 Intertemporal Aspects

In practice, most principal-agent relationships extend over a period of time, during which the agent takes actions several times and the principal observes output several times. This opens up new possibilities for incentive schemes. Here are some.

Smoothing Over Time: In repeated MH problems, the principal can arrange a stream of payments to the agent that smooths the agent's consumption. Conversely it makes the principal's profit more volatile, but a risk-neutral principal does not mind this. A risk-averse agent benefits from the smoothing; in fact if the discount rate is very low the smoothing effectively brings the agent close to risk-neutrality and the outcome close to the first-best; see Radner (1985) and Fudenberg, Milgrom and Holmström (1990). In CV problems, the agent's persistent assertion that poor outcomes arose by bad luck becomes less credible over time and justifies an audit; knowing this the agent will desist from making such false claims.

Aggregation over Time: Holmström and Milgrom (1987) consider a situation lasting over several periods. The agent takes an action each period, resulting in an outcome with a random component. The principal cares only about the outcome aggregated over all the periods. If the incentive scheme rewards the agent differently for outcomes in different periods, either directly or indirectly, this gives the agent an opportunity to game the system to the disadvantage of the principal. For example, with a step-function scheme for the aggregate outcome, an agent who has good luck in the early periods may relax in the later periods, and one who has very bad luck in the early periods (making it unlikely that he would meet the quota for the aggregate period) may give up. If the outcome is multidimensional and the threshold in the incentive scheme covers only one easily verifiable dimension, this opens up further opportunities for gaming. Courty and Marschke (1997) find several such effects in the operation of the Job Training and Partnership Act.

Holmström and Milgrom find that linear schemes that reward outcomes in all periods alike perform well by reducing such gaming. In the limit, when time is continuous and increments to outcome are independent, so aggregate outcome is a Brownian motion whose trend is controlled by the agent's action, the optimal scheme is linear. In many applications, for example Holmström and Milgrom (1988, 1990, 1991) and Dixit (1996, 1997), linearity is used with such a justification in the background.

Rewards, Punishments, Reputation: If action is observable with a delay, then repeated relationships allow incentive schemes with appropriately designed time-varying payments. If the agent can be punished for past actions, the threat of such punishments may be enough. But if the agent can quit, then it may be necessary to devise a cost of slackening in the form of the loss of a reward. A particularly interesting example is the *efficiency wage* scheme, for example Shapiro and Stiglitz (1984). Consider an agent who provides a good or service whose quality is observed with a lag. Producing higher quality is more costly for the agent, so he can make more profit in the short run by degrading quality. A solution is to give him some rent each period, that is pay him more than the extra cost of the high quality, so long as he is not detected cheating. To eliminate his temptation to cheat, the rent should just equal the interest on the one-time profit he can make by cheating.

Repetition also helps mitigate a moral hazard on the principal's side, namely the temptation to renege on a promised payment to the agent. To counter this, it is not necessary that the particular relationship be repeated; if the principal is in business for a long time or in many activities, and reputation for misbehavior on one occasion can affect his ability to attract agents to work for him later or elsewhere, that may suffice. Therefore this MH problem may not matter for most public sector agencies.

In AS problems, repetition creates scope for building a reputation about one's type. This can be especially important in matters like the ability of a worker or the quality of a product or service.

Career concerns: In repeated relationships, it may be unnecessary to provide explicit incentives to induce effort in the early stages; the prospect of indirect incentives in the form of a better prospect of future rewards can suffice. The basic intuition comes from Holmström (1982 b), in the context of a combination of MH and AS. A worker has a two-period career. Output is $x = t + a$, where the innate productivity type t is known to the worker and unchanged from one period to the next, but unobservable to the supervisor. The action a is taken by the worker but not observed by the supervisor. Output is observable but not verifiable. Therefore there are no explicit incentives; the worker is paid a flat wage each period. But the supervisor, and other potential employers, can use their observation of

first-period output in deciding the second-period wage they will offer. Competition among employers will ensure that the second-period wage equals the rational expectation of second-period output conditioned on the observed first-period output. Since the second period is the last, the worker will not take any costly action then, so

$$w_2 = \mathbf{E}[t|x_1] = x_1 - a_1^* = t + a_1 - a_1^*,$$

where a_1^* is the equilibrium first-period action. Even though the supervisor can correctly calculate a_1^* , the worker can affect w_2 at the margin by choosing a higher a_1 . The first-order condition for the optimum choice of a_1 is

$$C'(a_1) = \delta$$

where δ is the worker's discount factor between the two periods. Equilibrium a^* is then defined by the solution to this. Then the worker is optimizing, and simultaneously the supervisor has correct expectations. Further developments and extensions of this include Gibbons and Murphy (1992), and Dewatripont, Jewitt and Tirole (1999 a, b). These consider many periods, allow the speed of learning about type to depend on the action, and so on. But many general intuitions of the simple model are robust. Workers at early stages of their careers will exert effort without explicit contractual incentives (or with weak ones) to influence perceptions of their abilities. Such efforts will gradually decline as the information is revealed, so senior workers late in their careers will cash in on their reputations, and sharper explicit incentives at that stage will be needed to keep them exerting effort.

Implicit incentives are important in all organizations; they are likely to be especially important in the public sector where explicit incentives are often weak or constrained for reasons we will see.

If "career" is interpreted to mean not just tenure in a particular agency relationship but an individual's lifetime, then managers may be motivated by the possibility of rewards in the form of future employment by someone else. This has obvious implications for the possibility of collusion in regulation, which I consider later.

Ratchet effects: In a two-period AS problem, if the principal cannot bind himself to a contract for both periods, the agent will be more reluctant to reveal his information in the first period for fear that the principal will exploit this to his own advantage in the second-period contract. The principal can offer a sufficiently high rent in the first period to induce revelation, but the cost of this may be so high that he finds it better not to try to separate the types in the first period, offering instead a common or pooling contract to several types. See Laffont and Tirole (1993, Chapter 9) for a full analysis.

If an additional element of MH is present, then the ratchet effect can run counter to the career concern effect for younger workers, because greater effort when young can lead the principal to infer greater ability and therefore offer less rent in the future; see Meyer and Vickers (1997). Conversely, career concerns can reverse a presumption of the MH model that greater uncertainty means weaker incentives: greater uncertainty about type, that is, a higher variance in the distribution of t above, leads to a greater uncertainty about the outcome for the principal, but it can cause him to offer sharper incentives because it elicits larger effort from the young in an attempt to prove their ability. See Dewatripont, Jewitt and Tirole (1999 b).

3.2 Multiple Dimensions

The basic theory outlined in sections 2.1 and 2.2 considered only one-dimensional effort and information respectively. In reality such problems have multiple dimensions, which interact in complex ways. The theory of many-dimensional adverse selection problems is not well developed; see Wilson (1993, Part IV) for some analysis of nonlinear pricing and Laffont and Tirole (1993, pp. 184–186, 217–222) for examples in regulation. But in the moral hazard case Holmström and Milgrom (1990, 1991) have provided useful general insights.

The effect of interaction among multiple actions and outcomes on the power of incentives depends on whether the actions are substitutes or complements in the agent's cost function. In the substitutes case, more effort in one dimension increases the marginal cost of effort in the other dimension, therefore increasing the marginal incentive payment for greater output of one task draws effort away from the other. The errors associated with the two will generally have different variances. If each outcome could be rewarded in isolation, the principal would offer more powerful incentives for the output that was a more accurate indicator of the underlying effort. But since the two must be considered together, the prospect of the agent diverting effort away from the less accurately measured task makes the principal weaken the incentives for the more accurately measured task.

Even if the two tasks are symmetric in their costs and errors, the interaction affects the incentives. Suppose the agent's cost function for the two tasks a_1 and a_2 is

$$C(a_1, a_2) = c [(a_1)^2 + 2k a_1 a_2 + (a_2)^2],$$

where $-1 < k < 1$. The tasks are substitutes if $k > 0$ and complements if $k < 0$. The outputs are

$$x_i = a_i + \epsilon_i \quad \text{for } i = 1, 2,$$

and we look for an optimal scheme of the form

$$y(x_1, x_2) = k + m_1 x_1 + m_2 x_2 .$$

The solution, a special case of formula (5) in Holmström and Milgrom (1991), is

$$m_1 = m_2 = \frac{1}{1 + (1 + k) r c v} . \quad (8)$$

Comparing this to (1), we see that the interaction weakens incentives in the substitutes case ($k > 0$) and strengthens them in the complements case ($k < 0$). This has useful implications when we consider a question of organizational design – How should the numerous tasks to be performed be grouped into different agencies? The paper presented at this conference by Marx and McDonald (1999) has some related aspects.

The dimensions of effort and observables can differ. If an action has several consequences with different degrees of observability, they can all be useful in compensation schemes. The following analysis builds on Baker (1992). Suppose the effort a produces two observations,

$$x_i = a + \epsilon_i \quad \text{for } i = 1, 2, \dots, n ,$$

where the errors ϵ_i are independent and have variances v_i . Suppose each unit of x_2 is worth p to the principal. (Each unit of x_1 is worth 1.) Then the optimal linear scheme, a special case of formula (4) in Dixit (1997), is

$$y(x_1, x_2) = k + m_1 x_1 + m_2 x_2$$

where

$$m_1 = \frac{v_2 (1 + p)}{v_1 + v_2 + r c v_1 v_2} \quad m_2 = \frac{v_1 (1 + p)}{v_1 + v_2 + r c v_1 v_2} .$$

Most interestingly, even if $p = 0$, we have $m_2 > 0$ – the observable second dimension of outcome is used for its information value even if it is intrinsically useless to the principal. This is particularly important if the first dimension is observed with a lot of error – if v_1 goes to ∞ , then m_1 goes to zero while m_2 goes to $(1 + p)/(1 + r c v_2)$, as if the second outcome were the only one but valued at the full $(1 + p)$ of both.

The usefulness of the auxiliary performance measure persists even if the agent is risk-neutral (and the enterprise cannot be sold to him for a fixed fee, perhaps because he is liquidity constrained). Thus, even if $p = 0$ and $r = 0$, we have

$$m_1 = v_2/(v_1 + v_2), \quad m_2 = v_1/(v_1 + v_2) .$$

The cases of multiple actions and multiple outcomes can be combined. The agent may exert two types of effort, one producing an output that is valuable to the firm, and the other affecting an intrinsically worthless but potentially informative outcome, for example an *influence activity* that raises a supervisor's subjective evaluation of the employee. In terms of the above model, one should think of x_2 is the middle-manager's subjective report on an employee, and the employee can affect this by actions that are dysfunctional for the firm's profit x_1 . The firm's optimal incentive scheme may still include a component that depends on such a corruptible subjective evaluation for sake of the additional information it conveys. This is particularly important if the intrinsically valuable or objective performance has many complex dimensions, and the principal can take into account only a subset of these, so the rest are as if measured with infinite error variance. Then an incentive scheme that focuses on observable objective indicators will cause the agent to game the system and ignore effort in the unobservable dimensions. A subjective evaluation that can take some account of the whole picture, even if corruptible, is useful in the optimal incentive scheme.

In his paper presented at this conference, Baker (1999) considers the case with numerous unobservable actions and two outcomes. The principal cares about one, say x_1 , and the other x_2 serves as the verifiable performance measure on which the agent's compensation can be based, say

$$x_1 = \sum_{j=1}^n f_{1j} a_j + \epsilon_1, \quad x_2 = \sum_{j=1}^n f_{2j} a_j + \epsilon_2.$$

He shows that the usefulness of the performance measure depends on the size of the correlation between the vectors of marginal effects of the actions on the outcomes, (f_{1j}) and (f_{2j}) . This promises to be a very fruitful formulation in applications.

An agent's multiple actions for a principal may be substitutes not only for one another, but also for other actions that are of no benefit to the principal, these may include a personal business on the side or even leisure. Call the actions that benefit the principal type A actions and the others type B. The principal wants the agent to focus on type A actions, but the agent can gain by diverting some of his effort to type B. If the type A outcomes are quite accurately measurable and so can be rewarded using powerful incentive schemes, that naturally limits the agent's efforts on type B. But if some of type A outcomes have large errors of observation, then as we saw above, this forces a reduction in the power of incentives on all of type A. Then the principal may resort to even crude methods to constrain the agent, for example limit the amount of company time he can devote to personal matters. The optimal constraint is found by balancing the effort substitution effect against the agent's utility from the permitted type B actions, which affect his participation constraint. See Holmström and Milgrom (1991) for the analysis of this.

If the principal cares only about the aggregate outcome, and the valuation and costs are symmetric across tasks, then the agent's substitution of effort to focus on the subset of observable tasks does not matter. In the multitask career concern model of Dewatripont, Jewitt and Tirole (1999 b), it can even be a positive advantage, because the young agent's focus on fewer tasks allows the principal to draw more accurate inference about the agent's ability, which raises the agent's second-period wage, and in turn induces him to make more effort in the first period. But if the principal's objective is strictly concave in the different dimensions of output, or if there are several principals some of whom care only about the tasks that are outside the focus, then this may generate a countervailing effect against focus.

Perhaps the most common way in which giving an agent high-powered incentives based on to an easily observable outcome can lead to the neglect of a desirable but less easily observable good is the neglect of quality in order to reduce costs or increase profits. Glaeser and Shleifer (1998) suggest an interesting way of getting around this problem. The owner or residual claimant of a profit-making firm can appropriate the benefit of quality-cutting in the form of a larger money payment, whereas the manager of a not-for-profit enterprise must take it in the form of perquisites. Since these do not generally come in a form the manager would have chosen for himself, a dollar of perquisites is worth less to the manager than a dollar of money. Therefore the manager will be less tempted to cut a dollar's worth of quality than the owner of a for-profit enterprise. In other words, setting up such an activity in a not-for-profit organization is a credible commitment to maintain higher quality.² Consumers will rationally figure this out, and if they value quality highly enough, will patronize the not-for-profit firm, so it can compete successfully in the market with a for-profit firm providing a similar good or service. Ways of appropriating cost-savings are even more constrained and riskier in public-sector agencies than in private-sector non-profit enterprises, so some activities with especially severe problems of observing and rewarding quality may be usefully located in the public sector. Hart, Shleifer and Vishny (1997) develop a related theoretical argument and apply it to the case of prisons.

3.3 Teams and Competition

Here one principal controls several agents. If the total outcome the principal cares about is simply the sum of the separate agents' actions, each with an independent error component,

²There are further implications of this. If the manager's valuation of perquisites is publicly observable, then the principal can do even better by appointing an austere manager who disdains the perquisites. But if that is private information, then the selection of managers will suffer from adverse selection and much of the benefit claimed by Glaeser and Shleifer can be lost.

then each agent can be considered separately and the above theory applies. Otherwise, the incentive schemes for all agents must be designed together.

In many situations, the outcome is a nonlinear function of the actions of several agents, and may also have a random component:

$$x = F(a_1, a_2, \dots, a_n, \epsilon).$$

Often the different actions are strategic complements, that is, a higher level of one action raises the marginal product of other actions. This means an extra benefit from giving a more powerful incentive to each agent in the team.

If the team as a whole is rewarded, then each member of it has the temptation to ride free on others' efforts. The team may be able to devise its own reward or punishment mechanism such as a social norm to overcome this. If the principal designs an incentive scheme for individual members, and there is no random component, he can achieve the first-best x^* using a step function scheme where everyone is rewarded if the outcome is at least x^* and penalized otherwise; this makes everyone pivotal in providing the first-best action vector a^* . If there is a random component, the first-best can be approximated under conditions similar to those for the case of a single agent. See Holmström (1982) for details. If the choice of schemes is restricted, for example to linear schemes, then giving one team member of the team a sharper incentive makes him take a higher action, which increases the marginal product of another member's if the actions are strategic complements in the production process, that is, if the cross partial derivatives $\partial^2 F / \partial a_i \partial a_j$ are positive.

Even without nonlinearity in the production process, one agent's performance may convey useful information about another agent's action. In particular, *yardstick competition*, or comparing one agent's performance with that of other agents of the same principal, or even total outsiders performing related tasks, can be useful.

In MH situations, if the errors of observation in two agents' outcomes are perfectly correlated, then the first-best action is easily achieved by rewarding the agent who produces the higher output and penalizing the one who produces the lower output. Of course the constant terms in the payment schemes are adjusted to fulfill the participation constraints. If there is positive but imperfect correlation in the errors, more complicated schemes are needed. In their paper presented at this conference, Courty and Marschke (1999) show how a limited total compensation pot can be optimally allocated among multiple agents (actually multiple branches of a large agency) to sharpen their incentives.

In AS, if two firms' cost functions have a common component, then the principal can devise a scheme that gives up rents only for revealing truthfully the remaining or firm-specific

component. The essential idea is to ask the two firms to report their costs C_1 , C_2 , and make the payment to firm 1 depend on $C_2 - C_1$ and vice versa. Thus each firm is rewarded when the other reports a high cost and penalized for reporting a high cost of its own. If collusion among the firms is not a problem, this enables the regulator to learn the common component of cost without giving up any rent; see Laffont and Tirole (1993, pp. 84–86) for details. In practice, this purpose is served by putting procurement contracts for competitive bidding, or exposing a public service provider to actual or potential outside private competition.

3.4 Multiple Tiers

Many principal-agent relationships are hierarchical, the agent at a higher tier being the principal at a lower tier. This is particularly important in the public sector; for example, a regulator serves as the agent of the legislature or the executive, but acts as the principal in dealing with the firms that are being regulated. The advantage of setting up such a hierarchical organization is that the intermediate tier can acquire expertise and thereby get some information, which should enable him to control the lower-level agent while giving up less information rent than would be the case with direct supervision by the top-level principal. But it raises the possibility of collusion between the two lower tiers. If the regulator finds out that the firm is truly low-cost and need not be given a high price, he may offer to keep silent in exchange for a bribe, or more likely the promise of a well-paid sinecure after early retirement from the public sector – a “post-career concern”. The legislature can eliminate this temptation by giving the regulator just enough of the rent as a reward for reporting truthfully when he gets the signal that the firm has low cost. This in turn affects the incentive schemes used in the regulation at the lower tier. Laffont and Tirole (1993, Chapters 11, 12) and Laffont (1999) develop some general theory and several examples of such regulatory politics. One general insight they offer is that collusion-proof schemes will have weaker incentives at the lower tier, that is, they will be closer to cost-plus, because powerful incentives at the lower tier would mean higher rents for firms, creating greater temptation for collusion between the firm and the regulator, and in turn raising the legislature’s cost of eliminating this temptation by rewarding the regulator.

3.5 Multiple Principals

This is the obverse of the team; many principals are simultaneously attempting to influence the actions of one agent. The principals would fare better if they got together in advance to offer a scheme that best furthered their joint interest, and bargained to split the gains among

themselves according to an agreed formula. But if they are unable to do this, either because they do not share a common basis of information or because they cannot make credible commitments to share, then they may act independently. Thus we have a non-cooperative game among the principals, and look for its subgame perfect Nash equilibrium where each looks ahead and takes into account the agent's rational response to the collection of schemes offered by all the principals.

In the private sector, we often think of a firm as a top-down hierarchy, where the CEO is the principal with the team of top management as his agents, each of these managers has his own lower-tier agents, and so on. Even in this case the picture is not quite accurate – other stakeholders such as labor unions and consumer groups may intervene as separate principals at various stages. In the public sector, where outcomes of any one activity affect several people or groups, and their political differences are not fully resolved in advance, *multiprincipal* or *common agency* is the rule rather than the exception.

Bernheim and Whinston (1986) developed the general theory of common agency in the MH case. Holmström and Milgrom (1988) obtained the equilibrium of linear payment schemes with two principals, and Dixit (1996, 1997) extended this to several principals and more general cost functions and observation errors. Consider the symmetric situation where (i) the agent's efforts a_i yield outcomes $x_i = a_i + \epsilon_i$, for $i = 1, 2, \dots, n$, (ii) the principals are risk-neutral and principal i benefits only from x_i , but each principal can observe all outcomes and can make his payment schedule to the agent a function of all outcomes, not just his own x_i , (iii) the errors ϵ_i are independent with variance v , and (iv) the agent's cost function is

$$C(a_1, a_2, \dots, a_n) = (a_1)^2 + (a_2)^2 + \dots + (a_n)^2.$$

Then in the Nash equilibrium the sum of the marginal payment coefficients of all principal's incentive schemes for each type of outcome turns out to be

$$m = \frac{1}{1 + nrcv}. \tag{9}$$

Comparing this with the single-principal result (1), we see that the existence of several principals makes the overall incentives for the agent much weaker. This weakening can be dramatic if n is large.

If instead the agent's cost function is

$$C(a_1, a_2, \dots, a_n) = \sum_i (a_i)^2 + k \sum_{i \neq j} a_{ij},$$

so that the agent's efforts for the different principals are substitutes if $k > 0$ and complements if $k < 0$, then the aggregate marginal incentive coefficient for each outcome type becomes³

$$m = \frac{1}{1 + nrcv[1 + (n - 1)k]}.$$

Thus we get a further weakening of incentives in the substitutes case, but an offsetting strengthening effect in the complements case. This suggests a principle for organizational design: when possible, agencies should be organized to group together complementary activities, and grouping of substitute activities should be avoided.

The reason for weakness of the overall incentives facing an agent of multiple principals is that each principal offers a positive coefficient on the dimension of output that concerns him and negative coefficients on the other dimensions; the result when all principals' schemes are added together is a weak positive coefficient on each dimension. This happens for two reasons: [1] Each principal wants to divert the agent's effort to his dimension and away from the other dimensions; that is why the weakening is most severe when the efforts are substitutes. [2] A negative coefficient on one kind of outcome means that the agent has some insurance against bad luck in that dimension; each principal willingly provides such insurance for the dimensions that don't concern him (even though this hurts the other principals), thereby relaxing the agent's participation constraint, and then restoring it to equality by reducing the constant term in his own payment schedule. This exerts a negative externality on the other principals; that is why in a non-cooperative (Nash) equilibrium each principal carries this too far to be jointly optimal.

Once we understand the reason, we see a way to eliminate the effect. The information can be compartmentalized so that each principal sees only his outcome, or a legal stipulation requires that the payment schedule of each principal can be a function only of his own x_i . Then each must use strong incentives to attract the agent's effort. This leads to stronger incentives; for example, if the agent's cost does not have any cross-terms in efforts, the n disappears from the denominator in (9), so the marginal bonus coefficient in the Nash equilibrium is the same as that with unified principals. However, such a separation may be impracticable in a political context where the principals are top-level players such as the legislature or the executive, whose actions cannot be restrained by an outside force.

Multiprincipal agencies with AS were first studied by Martimort (1992) and Stole (1991). These situations also involve externalities among the principals, because one principal's rent-sharing scheme affects the agent's incentives to reveal the truth to the other and therefore the rent-sharing scheme the other must use.

³We have $1 + (n - 1)k > 0$ for the cost function to be convex.

Consider the regulation example of section 2.2, and now suppose the firm produces two outputs q_1 and q_2 , with a cost function $C(q_1, q_2, i)$; the index i is privately known to the firm, and its successively higher values correspond to higher total and marginal cost functions. Consider the case where the two types of outputs are substitutes, that is, an increase in one type of output raises the marginal cost of the other: $\partial^2 C / \partial q_1 \partial q_2 > 0$. Each type of regulator has to give some rent for revelation of a firm's low cost-type, and distorts the outputs of higher cost-types downward to reduce the cost of this rent-sharing. When the regulator concerned with type 1 output lowers the quantity q_1 he will purchase from firm type 1, this lowers the marginal cost of q_2 , which works to the advantage of the other regulator. This is a positive externality between the principals; therefore in a non-cooperative Nash equilibrium each principal does less of this (distorts outputs downward by a smaller amount) than in the equilibrium where the principals collude and offer a joint payment schedule to the agent. The smaller distortion is accompanied by less rent-sharing, so the price schedules are closer to cost-plus, or the incentives are weaker, in the non-cooperative equilibrium than with cooperation between the principals when the agent's actions are substitutes (and stronger when they are complements). Thus the overall effect for AS is similar to that for MH. There are several additional technical issues, including validity of the revelation principle, for which the reader is referred to Martimort and Stole (1997) and Peters (1999).

4 Special Features of the Public Sector

To see how the general theory of incentives sketched in the previous sections relates to the practice in the public sector, it is useful to start with some broad features of government agencies and bureaucracies, and observe how they differ from firms and other organizations in the private sector of the economy for which the theory was initially developed. Some of these features and differences were alluded to in the course of the statement of the theory, but here I collect them into a somewhat more systematic whole. Of course many differences between public and private sector organizations are ones of degree, not kind. Also, the public sector is large, complex, and diverse; most of the points below apply only partially to any one agency and not at all to some. But each feature has relevance for many of them, and it is worthwhile to list the features explicitly.

With the same provisos, we can divide government agencies into two types depending on their functions: agencies that provide services to the public – garbage collection, mail delivery, some forms of transportation, education, health care etc. – and those that coerce resources or actions from the public – taxation, regulation, law enforcement, conscription

etc. Again in reality we have mixtures; for example, driving licenses are both a service and an instrument of enforcement, and health inspection of restaurants provides a service to potential customers by carrying out enforcement on the restaurateurs.

4.1 Multiple Principals

The actions of any one government bureaucracy or service agency usually affect several people who are in a position to influence it as principals. Many government services have features of public goods – jointness and non-excludability – to some degree. Even without publicness, there are externalities: aspects of the services provided to one person give utility or disutility to others. For example, better care of people suffering from infectious diseases benefits even those who are not currently sick; and people get utility from high-quality health care not merely because they may themselves need it one day, but because of their ethical concern for others or because they take civic pride in belonging to such a country. Finally, many public services do not charge the direct users for the full cost, but are subsidized partly or wholly from tax revenues. Then all taxpayers are affected by choices that affect the costs of these services.

People care not only about the outcomes of government agencies, but also about some of the inputs and the methods of production, most notably about employment, and incomes in particular regions or communities. Thus there is no clear separation between ends and means.⁴ Labor unions are an important stakeholder or principal in many government agencies, and they care about various aspects of the inputs or means such as working conditions, and even about the incentive schemes themselves as they affect the incomes of their median members. And many citizens feel strongly about the methods used by law-enforcement agencies in combating crime.

More generally, some of the agents whose behavior the policy or the bureaucracy is trying to influence are themselves principals in the prior political game that set the rules of the subsequent policy implementation or regulation game. They are selectively interested in specific dimensions of the outcomes and inputs.

Outcomes of private firms' actions also affect many people, but in principle the owners' interest is paramount, and can be reduced to a single or scalar bottom line like quarterly profit or share price. Similarly, all the interests affected by a public agency's actions and

⁴The theory of incentives was developed, and was presented above, making a distinction between actions and outcomes, but in the multidimensional version there is no reason why the actions themselves, possibly with some error of observation, should not be components of the outcome vector, so this case is covered by the theory.

outcomes could engage in advance political bargaining and collapse all the dimensions into a single evaluation function (which does not have to be linear, unlike the profit of a private firm). This could then be the basis for presenting a jointly agreed incentive scheme to the agency. Sometimes that is done; for example questions like what age and how many years of contribution makes one eligible to receive social security benefits, what should be the amount of the benefits and how should it be indexed to inflation, are intensely political questions, but they are resolved in Congress, and the Social Security Administration's job is merely to apply the criteria and send out the checks in correct amounts and on time. However, at least in the United States this is an exception; most often all affected interests retain and use the freedom to exercise their influence directly on the agency. As Wilson (1989, pp. 299–300) puts it, “Policy making in Europe is like a prizefight: ... when one fighter knocks the other one out, he is declared the winner and the fight is over. Policy making in the United States is more like a barroom brawl: Anybody can join in, the combatants fight all comers and sometimes change sides, no referee is in charge, and the fight lasts not for a fixed number of rounds but indefinitely. ... To repeat former Secretary of State George Shultz's remark, it's never over.” In other words, government agencies in the United States are common agencies with several principals who are engaged in a non-cooperative game to influence their actions. As the European Union admits new and heterogeneous countries, its politics and policymaking may become more like that in the United States.

In principle, all citizens have an interest in the making and administration of public policy. If they were all active participants, then under certain conditions the political process would produce an optimal outcome (subject to the usual constraints of resource availability, technology, and information). The idea that participation by all factions in the political process would lead to socially optimal outcomes can be traced back to Madison's famous tenth Federalist Paper. More recent statements include Wittman (1995) and Grossman and Helpman (1994). But quite apart from the difficulty of meeting the requisite conditions, in practice not all people or groups have equal resources or information or ability to participate. The educated and the informed vote more often; the wealthy and the small groups who can solve free rider problems for concentrated benefits lobby more often. This results in biases that then create broad public dissatisfaction with the outcomes of government agencies and activities.

4.2 Multiple Tasks

Most government agencies perform several tasks. Even seemingly clear matters like mail delivery have many dimensions – the prices of various services (and costs if there is a subsidy),

average and extremes of the distribution of delivery time, cleanliness of post offices, courtesy and efficiency of the postal clerks, and so forth. And, as mentioned above, the tradeoffs among these dimensions are not clarified in advance. In many other agencies matters are even more complicated.

Sometimes the Congress or the Executive simply assign a new task to a plausible existing agency without much thought about the interaction. For example, Wilson (1989, p. 100) describes the problems that arose when the Social Security Administration was asked to handle the Disability Insurance and Supplemental Security Income programs, where the agency had to make difficult decisions about eligibility.

Many dimensions of goals are left so vague that the agency and its political superiors alike would find it difficult to say what constitutes their fulfillment, whether before or after the fact. For example, the U.S. Department of State is expected to “[P]romote the long-range security and well-being of the United States”; Wilson (1989, pp. 32–33) offers other examples. Ambiguity exists even in economic agencies. For example, patent examiners are paid in part through bonuses for “disposal” of patent cases. Issuing a patent always disposes the case as far as the patent office is concerned (although the matter may resurface in courts), but denying a patent may keep the case alive as the applicant amends or appeals the decision. This can result in too many patents being issued; see *The Economist* (2000 b).

The theory of incentives generally assumes that actions are unverifiable but outcomes are. In practice sometimes exactly the opposite is the case. It is very difficult and controversial for the Occupational Safety and Health Administration’s managers or the outside public to judge whether the vague ultimate goals of safety and health were furthered; it is easier to verify that regulations requiring labels on ladders were promulgated. Wilson (1989, p. 163) calls such agencies *procedural organizations*, and points out that they will function using standard operating procedures that pertain to the observable actions, instead of the performance-based incentives that are familiar in economic theory. He contrasts them with *craft organizations* where outcomes are observable but actions are not.⁵ These are the primary loci for applicability of incentive theory, although even there some principals may care about some of the inputs directly and attempt to influence their choice. The same organization may have different characteristics in different situations; an army is procedural during peacetime preparations but becomes a craft organization when war starts and its “fog” descends.

⁵Confusingly, he uses the term “output” for what economists would call “action” or “effort”; thus he says “Outputs consist of the work the agency does. . . . Outcomes can be thought of as the results of agency work.” (1989, p. 158)

The toughest case in Wilson’s classification is the one where neither outcomes nor actions are at all accurately observable; he calls these *coping organizations*. The theory says that in such agencies the explicit incentives must be very weak. If outcomes are observable to the principal but not verifiable and contractible, there can be implicit incentives like career concerns. Several agencies in the public sector belong to, or are close to, this category. Wilson argues that in coping agencies there will be much conflict between management and lower-tier “operators.” The management will focus on the more easily observable dimensions and deny the operators much freedom of action; the operators will engage in the immediate tasks they regard as essential while keeping the management satisfied about its focus. If such an organization is answerable to multiple external principals, this conflict is replicated at a higher level of agency.

4.3 Lack of Competition

In the private sector, each profit-seeking firm gets powerful external incentives from its competition with other firms. However, most public or quasi-public (regulated) service agencies used to be monopolies. Many perceived ills of these agencies, most notably high cost, poor quality of products, and lack of attention to consumer preferences, were thought to be due to the lack of competition and consequent weakness of incentives. In recent years many of these activities – postal and telecommunication services and rail and air transport in many countries, and health-care and schools in several – either have been privatized, or have mixed arrangements where public agencies providing them coexist and compete with private firms. Experience of these privatizations has been mixed. Cost savings have been achieved in some instances and not in others; in some cases there has been deterioration of quality. I will look at a few examples in the next section. Most enforcement agencies remain monopolies in the public sector, but private security forces exist, public police forces in one locality provide services to neighboring ones, and there are instances of prisons run by private firms under contract to the government.

More generally, even if the users of a service obtain it from the government and do not pay for its use in full or at all, the question of whether it should be *produced* by an agency owned and operated by the government, or produced privately and merely *procured* by the government, is a distinct one, and should be answered by considering and balancing the costs and benefits. Market competition can provide sharper incentives. But exposing a public agency to competition, or privatizing the activity completely, does not always work. In a service with multiple dimensions of which only some are observable and subject to the discipline of consumer choice, profit-making firms may focus on the marketable dimensions

and ignore others such as safety and some aspects of quality. Of course a public agency has its own problems with multiple dimensions. Also, the multiple principals who are not direct payers but are concerned about various aspects of the service may find private firms unresponsive. They will then exert political pressure to regulate or constrain the firms, which may find it difficult to operate under these constraints. Their costs may increase, some may drop out, reducing competition, and the industry may end up looking just like public agencies that happen to be privately owned. And, since most public agencies provide services that require contact with their clients, there is almost no import competition of the kind that can play an important part in disciplining even large private firms that produce goods and internationally tradable services like banking.

4.4 Motivated Agents

The general theory of incentives assumes that an agent gets utility solely from the money income the principal pays him, and disutility from the effort he exerts on behalf of the principal. In reality, agents may get utility from some aspects of the task itself. If they get utility from the mere fact of working in this organization, the principal can pay them a lower salary and still meet their participation constraint. If they get utility from the actions they take in this job, then the principal can offer smaller marginal bonus payments and still secure the same level of effort. Both these effects are more likely to arise in public sector agencies than in private firms, and may be of particular advantage in government agencies that are budget-constrained.

An important reason why agents in a public sector agency get utility from working there or from their actions is that they share some idealistic or ethical purpose served by the agency. This can result in mutually beneficial endogenous matching of workers and agencies, especially in the formative period of a new agency. That in turn can define the organizational culture of the agency for a long time; see Wilson (1989, pp. 64–68) for examples and a discussion. However, in some agencies the idealistic motive of its frontline workers can conflict with the objectives of its middle management; for example, Heckman, Smith and Taber (1996) found that case workers in JTPA training centers were motivated to help the least well-off, even though this gave their center a worse placement record, and reduced the performance payments it received.

Another non-monetary factor motivating agents is professionalism. Wilson (1989, p. 60) defines a professional as “someone who receives important occupational rewards from a reference group whose membership is limited to people who have undergone specialized formal education and have accepted the group-defined code of proper conduct.” This definition is

quite broad and can encompass “company spirit” in private firms; Japanese firms actively cultivate it, and U.S. firms used to. But I suspect that a “group-defined code of proper conduct” is more likely to attract adherence and yield occupational rewards if the ultimate purpose of the group is idealistic than if it is purely materialistic.

Professionalism goes naturally together with career concerns, and therefore can be fostered by implicit incentives of the kind a public agency lacking the ability to offer powerful direct ones must rely on. Dewatripont, Jewitt and Tirole (1999 b) construct a formal model of this, and show that career concerns work best in eliciting effort if the agency has a mission focused on a narrow and clear set of tasks. Professionals in such situations can be given more autonomy, which also gives them a sense of control or stake in their work; this can further improve their motivation and therefore elicit even better effort. However, given the earlier observations about the multiplicity and vagueness of tasks and outcomes in many public agencies, and the need of multiple principals to impose constraints, recourse to autonomous professionals may be limited in its scope.

4.5 Consequences

The extension of the theory of agency to multiple dimensions and multiple principals has revealed important interactions among the outcomes, actions, and principals. We saw that incentives will be generally weaker in these situations than in the simple case of one outcome and one principal. The weakening is most dramatic if the various tasks are substitutes in the agent’s cost function, and if the number of principals is large. Many effects of the interactions and the weak incentives can be found in practice; now we can better relate them to the theory.

First, in their day-to-day operations, agencies will think not in terms of the multiple and vague ultimate goals, but a smaller number of immediate and measurable tasks which, while they may be essential for an ultimate achievement of the goals, seem quite disconnected. Wilson (1989, Chapter 3) emphasizes and illustrates this distinction in practice. If an organization that has an internally agreed and clear critical task, he says that it has a sense of *mission*. It combines with professionalism in giving the workers a feeling of special worth; see Wilson (1989, pp. 26, 95). This may in turn ameliorate the problem of weak overt incentives, and also reduce the budgetary costs of agency. But there is a tradeoff: focus on a narrow set of tasks means neglect of others that matter to some principals. It will also cause the agency to resist the assignment of new tasks if they do not fit into its self-defined mission; see Wilson (1989, p. 222). This is not general conservatism; agencies are receptive to new

and better ways of performing their mission, or new tasks that support or complement the mission.

When they think in terms of the ultimate goals, agencies will tend to focus on the better-observable dimensions. One particular effect of this can be an emphasis on equity as compared to efficiency, because the former is often more accurately observable. For example, it is easy to demonstrate that all pupils in a school are being treated equally, but whether they are all being educated well is much vaguer, harder, and controversial to prove; see Wilson (1989, p. 132).

Of course the principals who care about outcomes in the less accurately observable dimensions do not passively accept the neglect of their concerns. The model of Holmström and Milgrom (1991) suggests that since they cannot offer powerful outcome-based incentives at the margin, they have to resort to cruder constraints that require the agent to limit the diversion of effort to other dimensions, or what amounts to the same thing, ensure that the agent devotes a stipulated minimum amount of time to their concerns. When this is being done in several dimensions by several principals, the result is micromanagement of the agency. Wilson (1989, Chapter 7 and pp. 241-244, 366-367 and elsewhere) demonstrates and discusses this phenomenon. Constraints can also arise as a way of coping with the problem of costly influence activities in hierarchical agencies. When there is risk of collusion among the lower tiers, limiting the discretion of the middle-level principal-cum-agent may be a good way eliminate the lower-level agent's temptation to engage in influence activities instead of productive ones; see Milgrom (1988), Milgrom and Roberts (1988).

Agencies and observers alike complain about micromanagement, but we have seen how it may be an unavoidable consequence of, or a less costly way of coping with, the asymmetric observability of multiple outcomes affecting multiple principals. To quote Wilson (1995, p. xx) again: "Back in the late 1940s . . . we were told that America had a pluralist system in which almost everybody was represented. It wasn't true. Today it is. So now we say we have gridlock."

I have argued that public sector agencies are answerable to several principals, and perform multiple (usually substitute) tasks. The theory of section 3 showed that these features cause weakness of incentives, both in MH and AS situations. That in turn has implications for the workforce of these agencies in equilibrium. If the alternative to public sector employment is employment or entrepreneurship in the private sector, where marginal incentives are more powerful, then those people who are less averse to effort or risk, or have higher ability, will get higher rents in the private sector and prefer to work there (so long as any specific components of ability in the two sectors are not strongly negatively correlated). This

conforms to the popular impression that public-sector bureaucrats are mediocre, and choose safety over creativity or venture. A way around this problem may be to create a spirit of idealism or professionalism that will attract a more able and venturesome pool of people; the civil services in France and Britain do this to some extent, perhaps aided by post-career concerns. However, the social optimality of moving top talent from the private to the public sector is not self-evident.

Whether an activity is carried out in the public sector or the private sector is itself endogenous, responding to the differences of technologies of transacting, namely coping with information asymmetries, making credible commitments, and enforcing contracts, in these two loci. The idea that “[t]ransactions, which differ in their attributes, are aligned with governance structures, which differ in their cost and competence” was developed by Williamson (1996, pp. 12, 46–47), who labeled it the *discriminating alignment hypothesis*. He has recently (1998) extended this idea to examine when transaction costs are lower for a public sector agency than for a private sector enterprise attempting to provide an identical service. The division of agencies we actually observe between the two sectors need not always be optimal in this sense, but when we observe and criticize an apparent inefficiency in a public-sector agency, we should at least pause to examine whether a private-sector firm could do a better job, given its attendant difficulties of multiple outcomes many of which are poorly measured and whose relative valuations have not been agreed among competing interests. I will consider some illustrative cases in the next section.

5 Cases and Empirical Studies

In this section I will examine some specific public policy issues and organizations from the perspectives developed in the previous sections. My purpose is to interpret some existing case studies and empirical research in the light of the theory, and thereby suggest some further research and occasionally some policy conclusions. I have selected a variety of situations that illustrate different points but also have some common themes that follow from the general discussion of public sector agencies in section 4. I have chosen one sector (education) and one agency (the administration of job training programs under the Job Training Partnership Act) that are central to the subject of this conference, and also one general program (the National Performance Review) and a grab-bag of efforts to introduce more competition into the public sector, including privatization. I have omitted health care, because any adequate discussion would require a long article or even a book.

5.1 Education

The general issue of public policy toward education, and specific questions of how to reorganize teaching and administration in public schools to improve the quality of education, are perennial items on the political agenda, and have generated a huge amount of academic research and writing. I will base my analysis on just one recent book, Hanushek and Jorgenson (eds) (1996), but the papers in this book contain surveys and discussions of much previous work. I begin with a few prominent characteristics of the public school education which I have culled from the papers in this book. All those listed in section 4 are present.

Multiple Goals: Several national commissions and policy analysts have listed numerous goals for public education. Organized somewhat differently and in no necessary order of importance, these include: (1) imparting basic skills of literacy, mathematics and science for communication, reasoning, and calculation, (2) fostering the emotional and physical growth of children, (3) preparing students for work, by teaching them vocational skills and attitudes suitable for employment, (4) preparing them for life, by teaching them skills of health and financial management, (5) preparing them for society, by instilling ideals of citizenship and responsibility, (6) helping them overcome disadvantageous circumstances at home, including in many cases poor nutrition and poor study environments, and (7) providing an environment free from drugs and violence. These goals are not by any means mutually contradictory, but given the finite resources of schools and teachers, they must compete for attention and therefore be substitutes to a considerable extent in the schools' production process. Moreover, teaching various skills to the most able students may conflict with teaching the same things to the least able ones in the same classroom. The goals are not precisely measurable; even where tests of achievement exist, interpretation of them and their results is often controversial. And even if the students' final achievement can be measured, another difficult process of inference is needed to figure out how much of it was the students' innate ability and how much the schools' "value added."

Multiple Principals: The system has several "stakeholders" who act as external principals in the agency relationship that is played out in the political arena. These include (1) parents and children, (2) teachers and their unions, (3) taxpayers at the local and national levels, (4) potential employers of the graduates, (5) society as a whole, (6) private schools, and (7) groups favoring or opposing specific items of content in the curriculum. These groups have very diverse preferences and emphases about the multiple goals. Parents want a mixture of some vaguely defined "good education" (which may differ according to their children's abilities) and day care; teachers and their unions want higher pay, better working conditions including small class sizes, and access to programs for improvement of their professional

skills and subsequent salary rewards for participating in these; taxpayers want low costs; employers want vocational skills; society as a whole wants good citizens; and private schools compete for pupils and some public funding.

Lack of Competition: Private schools, especially parochial ones, do compete with public schools. There is also some choice at the local level, for example magnet schools. Voucher programs are creating more competition. But for the vast majority of the population, the local public school remains the monopoly provider.

Motivated Agents: Many people enter the teaching profession for idealistic reasons or because they enjoy working with children.

To sum up, the system of public school education is a multi-task, multi-principal, near-monopoly organization with vague and poorly observable goals. This goes a long way toward explaining the disagreements over its problems and the inefficacy of the single-minded solutions that have been tried. Several papers presented at this conference, and in particular Eberts, Hollenbeck and Stone (1999) and Ballou and Podgursky (1999), examine in detail the aspects involving teachers and their unions.

The problem at the root of much of the policy debate about education is the poor performance of U.S. students on standardized tests, especially in international comparisons; see Hanushek (1996, pp. 35–37). Even this finding is not uncontested; thus Smith, Scoll and Link (1996, p. 16) say that the fact that Japanese students score better than U.S. ones on algebra tests in the eighth grade is simply because “in Japan most students take algebra in the seventh grade” but “in most cities in the United States . . . we do not let our students take algebra in the seventh grade.” (Of course this begs the question “Why not?”) Experience with attempted solutions is generally poor; for example, increased expenditures (Hanushek 1996, pp. 33–37), smaller class sizes (ibid, p. 38), requiring teachers to have advanced degrees (ibid, p. 38), and greater decentralization of school management (Summers and Johnson, 1996) are all found to have negligible or insignificant effect on student performance. These studies are criticized by Smith, Scoll and Link (1996, pp.21–24) for using inappropriate measures of performance. This is to be expected given the disagreements of different principals about the goals, but the preferred solution of Smith et al, namely “an assessment device that is designed to measure what is being taught,” (ibid, p. 24) can degenerate into a tautological approval of the existing system or one that teachers or their unions find the most convenient. Bishop’s (1996, p. 125) suggestion of following the system used in many other countries, where students’ learning is assessed through curriculum-based examinations instead of aptitude tests, but the examinations are set and graded not by the teachers themselves but at a national or regional level, may cope with this problem.

There is a large empirical literature on the effects of various reforms and reorganizations, but it yields conflicting and unclear results. Among the papers presented at this conference, Eberts, Hollenbeck and Stone (1999) find that merit pay does not raise average student achievement, and unionization does not lower it, although unionization may be detrimental to students at either tail of the spectrum of achievement. Ballou and Podgursky (1999) are more critical of unionization: they find that seniority-based pay schemes are better explained as outcomes of rent-seeking behavior by teachers unions than as efficient incentive schedules. Eberts et al. do not expect that exposing public schools to competition from charter schools or voucher systems would improve student outcomes; however, Hoxby (1999) finds that school choice can fundamentally change the teaching profession by increasing the demand for teachers with higher qualifications and motivation, and more math and science skills. Eberts et al. instead favor group incentives – school-building performance awards.

Turning to some previous literature, Smith, Scoll and Link (1996, p. 21) argue that reorganization “conducted with clarity of purpose” can be successful, but that is to deny the multiprincipal nature of the problem which precludes clarity. Parental choice, using vouchers or similar programs, creates the strong incentives of the market, but caters to the preferences of only one of the many political principals. Bishop (1996, pp. 134–135) reports some encouraging effects in international comparisons, but I have not found studies that look at all relevant dimensions. The reality of the opposition of one important group of stakeholders, namely teachers’ unions, must be taken into account, because they are in a position to sabotage the attempted reform.

Hannaway (1996, p. 103) clearly recognizes the multidimension, multiprincipal nature of the problem. She also emphasizes that outcomes are at best very imprecisely observable: “Defining and agreeing on goals in education is one problem; measuring progress toward these goals is even more difficult.” This leads her to conclude that explicit performance-based incentives by themselves will not succeed. She also argues that another often-advocated remedy, school-based management or decentralization, is also unlikely to be effective by itself, partly because teachers have their own different priorities about reforms – they focus on problems of student behavior and school facilities instead of the content and quality of teaching – and partly because parents, especially in low socio-economic status areas, are too busy or apathetic or free-riders and therefore inactive in local decision-making and oversight. She suggests that a combination of decentralization and incentives will work: observability is better at the local level so performance-based incentives will have fewer problems of weakness and multidimensional substitution, and the existence of objective explicit incentives will reduce the need for active and costly oversight. But such a system will create a new problem:

it will be a hierarchical agency, in which the lower tier agents (teachers) can collude with the intermediate-tier principals-cum-agents (school principals and parents). This will bias the results toward dimensions that matter more to these groups – working conditions, day-care aspects of school etc. – and other stakeholders in society such as employers will have to devise other ways to offer incentives or impose constraints on this coalition. It is not immediately clear that the net result will be beneficial.

Hannaway is clearly right in one important respect – successful reform must be systemic and multidimensional if it is to cope with the multiple dimensions of the problem. Hanushek (1996, pp. 42–43) also emphasizes that “many different approaches might be used simultaneously,” although he stresses performance incentives more than do some others. I think that our understanding of the issues can be improved by trying to think of the education system in terms of Wilson’s (1989, pp. 159) classification that was given above in section 4.2. The outcomes are multidimensional and hard to measure; some dimensions of the inputs are easy to verify. Therefore the school system is somewhere between being a “procedural” and a “coping” organization. We should expect to see weak explicit incentives, many constraints, and evaluation by evidence that the rules were followed. We should not expect to turn it into a craft organization that is left free to devise its own best procedures and judged by the outcomes.

This view suggests a few tentative ideas to guide reform and reorganization. Each might be a necessary condition; they are not going to be sufficient either singly or collectively. [1] Attempts to create an accurate, unidimensional, and generally agreed measure of performance, and devising powerful incentive schemes based on it, are likely to fail. [2] The powerful incentives created by exposure to competition using vouchers or similar schemes can serve some useful purpose, but their effectiveness is also limited because private providers will have similar difficulties in coping with multiple principals and managing multiple tasks in a hierarchy. [3] Implicit incentive, especially career concerns, can be useful. For that, it should be possible to achieve higher salary and status as teachers without having to become administrators. [4] Reports of immediate supervisors, although subject to influence activities, can take into account dimensions that are not verifiable, and therefore have a role. [5] Incentives for supervisors (school principals etc.) should be determined simultaneously with those for teachers, to take into account the problems of the hierarchical agency relationship. [6] Activities should be grouped together when they are complements, not substitutes, to permit stronger incentives and better effort. For example, teaching the most gifted students can involve a set of complementary actions, and teaching the least able ones likewise,

but teaching mixed-ability groups in one classroom or school is more likely to generate substitution of effort. Of course this creates tradeoffs with other desirable aspects of the school experience; as usual the first-best is a mirage. [7] More attention should be given to idealism and intrinsic motivation when recruiting teachers, because this can alleviate several of the incentive problems later.

5.2 JTPA

The Job Training Partnership Act (JTPA) of 1982 aims to provide training to the disadvantaged to improve their employment prospects. The training is provided in more than 600 independent centers, whose funding includes performance-based incentives. James Heckman and his students and coworkers have carried out several detailed empirical studies of the operation of this system. Their findings link well with the general theoretical considerations of sections 2 and 3.

The system is a multi-tier agency. The management of each center is proximately an agent of the Department of Labor, and eventually of the Congress and the public. The individual case workers are agents of the managers of their centers. The objectives of these parties differ. The stated aim of the Act is to improve the employment prospects and earnings of the disadvantaged. The system does focus on the disadvantaged, by limiting eligibility essentially to people in families below the poverty line or in unemployment.⁶ But the program is not an entitlement; centers have some discretion to vary local eligibility requirements, and case workers have discretion in accepting applicants into the program and deciding what training services to provide to each accepted applicant. More importantly, the stated aim pertains to the “value added” by the center’s training; but this is difficult to measure so the actual performance measures are gross concepts, namely the employment status and earnings after completion of the training, irrespective of whether the training contributed to the outcome or the trainees already had attributes conducive to good employment prospects at entry. Therefore the managers of the center have an incentive to select such applicants and turn down those whose employment prospects look hopeless. But the front-line case workers who do the selection have different objectives. Heckman, Smith and Taber (1996) use detailed data from one center to infer the case-workers’ objectives from their actions, and find that they “have a marked preference for admitting the least employable applicants.” The fact that the incentive payments go to the center as a whole, and cannot be used to pay

⁶This is a very rough statement; for more precise and detailed descriptions see Heckman, Smith and Taber (1996) and Courty and Marschke (1997). The same caveat applies to what follows.

higher salaries or bonuses to individual workers, may facilitate this behavior. Ironically, the case-workers' preferences may be closer to those of the top-level principals – the Congress and the public – in their focus on helping the most disadvantaged; therefore the behavior may serve as a good counter to the adverse incentives created for the middle-tier principals – the center managers – by the gross outcome based incentive scheme.

At a more detailed level, the implementation of the gross performance measure creates further problems, namely incentives for gaming. An accepted applicant starts training immediately. The center decides each applicant's training program, and "terminates" the trainee upon its completion. The trained person then enters the job market (with some help and counseling from the center), and the center can report the job market outcome at any date between termination and three months thereafter. Two dimensions of outcomes are reported: employment status and wage. On June 30 of each year, all outcomes reported by the center in the preceding 12 months are averaged, and the center gets a performance payment if this average exceeds a set standard.

The theory of section 3.1 tells us what to expect, and Courty and Marschke (1997) provide detailed evidence of just such behavior. The center has a 90-day option on the reporting date. Therefore it will report very good outcomes immediately, and wait on the others in the hope of improvement. This option will be most valuable (and therefore most carefully exercised) for the most volatile aspect, namely the employment status. The threshold incentive scheme creates further gaming. In June of each year, if the center is safely exceeding the standard or if it is so hopelessly behind that it has no hope of meeting the standard, it will report its bad outcomes at once to clear the decks and improve its prospects of meeting the standard for the following year.

The Department of Labor did try to modify the incentive scheme to remove some aspects of gaming; it required a follow-up report on the employment status precisely 3 months after the completion of training. The centers modified their behavior just enough to meet this. They provided special services for the follow-up period, such as transportation and child-care allowances and further job search help if the person lost the initial job, but nothing thereafter; see Courty and Marschke (1997, p. 387). This illustrates how incentives that focus on one of the many dimensions of an outcome bias the actions of the agent.

5.3 National Performance Review

In Spring 1993 President Clinton launched the National Performance Review. This was not a specific program, but was described as a "campaign to reinvent government". It included some general programs such as Performance Based Organizations and "reinvention

laboratories,” and several agency-specific reforms launched by congressional dispensation or executive directive. The main target of the initiative was the complex set of regulations that laid down the exact procedures constraining in detail the actions of government agencies, private contractors working for the government, and private firms in many of their activities bearing on matters like the health and safety of their labor force, and their impact on the environment. The reforms aimed to replace as many of these regulations as possible by incentives that would reward actual outcomes, leaving firms free to devise (or negotiate with their workers) and achieve the outcomes as efficiently as possible. Several section headings in the Vice President’s report two years later (Gore, 1995) make this clear: “Results, Not Rules,” “Rewarding Results, Not Red Tape,” and so on.

The report lists numerous examples of cost savings and better service to citizens that resulted, and claims that government as a whole can be improved in this way. Our overview of the theory of incentives, and general identification of the additional problems in designing incentives in the public sector, should make us wonder how this single initiative to implement performance-based incentives can lead to such sweeping results. And indeed, independent academic reviewers of this U.S. endeavor, and of its predecessors elsewhere, such as Margaret Thatcher’s 1988 “Next Steps Initiative” in Britain, and similar programs in Canada and New Zealand, find a more mixed and nuanced picture. I have located two reviews of such studies; of these, Roberts (1997) is on balance negative, while Thompson (1999) is positive. I will discuss their findings in two parts, the reduction of detailed regulations and constraints – the “works better” part of the Gore (1995) subtitle – and the increase in efficiency – the “costs less” part.

Roberts (1997) finds that “substantial deregulation is difficult to achieve.” The British parliament and the major Departments supervising the agencies have been reluctant to give them greater freedom of action, owing to a “lack of trust that agencies will make good and responsible use of freedoms.” He finds similar or worse obstacles in the United States; these include “difficulties in resolving internal disagreements about the legislative freedoms,” and not wanting “to set a precedent for other bureaus.” He also finds that Performance Based Organizations remain subject to many constraints, and need specific approval for each item of flexibility from several affected principals including the unions, the Office of Personnel Management, and in many cases the Congress. More recently, Congress turned down the Clinton administration’s proposals to make the Federal Aviation Administration a Performance-Based Organization, but in Canada with its parliamentary system air traffic control has been privatized; see Wald (1999). Our theoretical analysis indicated that clashes

of interest among multiple principals would lead to just such attempts to micromanage the agency to make sure it pays enough attention to each.

Roberts says that the National Performance Review has anticipated these problems by “restricting the range of potential reform candidates.” There are two criteria: the agency should have “a clear line of accountability,” which reduces the multiprincipal problem, and should have “funding predictability,” which in practice means that the agencies impose user fees and therefore already have features similar to those of private firms. Thompson (1999) gives several examples of success in the Reinvention Laboratories, most of which conform to this pattern – they are technical agencies that collect or disseminate information, expedite work processes, automate cash transactions, and so on. Agencies with more contentious tasks, such as “regulation negotiation,” had no performance measures.

Turning to cost reduction, Roberts argues that the British initiative “has not produced deep cuts in operating budgets or personnel requirements,” and that the government’s claims of cost reduction are misleading or exaggerated. For example, the British Patent Office claimed a 40 percent reduction in *some* costs, but its total costs increased by 13 percent in nominal terms and went down by only 5 percent in real terms. Many claimed reductions were relative to forecasts and not actual previous year costs, therefore these claims are manipulable. Many of the most dramatic reductions came from downsizing in state-owned *enterprises* and not genuine public service agencies. In the United States the corresponding entities would have been in the private sector all the time, so their experience is inapplicable here. Thompson (1999, Table 1) gives several examples classified as “successful,” but his measure of success is that the reform was still in place 3 years after launch; he does not offer any concrete measures or statistical tests of significance of cost reduction. Also, his sample is biased by the fact of selection in the Reinvention Lab Program.

On the whole, the case for success of the program is at best selective and anecdotal; more quantitative and statistically well grounded research is desperately needed. But so far as they go, the anecdotes conform to the theory’s predictions – performance based incentives will work well in agencies (or parts of agencies) where performance is relatively clearly and unambiguously measurable, that is, in Wilson’s craft organizations, but may be inappropriate in multiprincipal and multitask organizations where performance is a vague and contentious concept.

5.4 Competition and Privatization

The market provides strong incentives, and exposing a public agency to competition from private firms, or even outright privatization, would be the most direct way to provide such

incentives in the public sector. There have been numerous experiments or proposals to do this. In countries where many activities were undertaken in the public sector for ideological reasons, privatization or contracting out has proved successful, although even then there are some complaints about degradation of quality. In the United States, activities like communication and transportation, not to mention manufacturing, are already in the private sector, and privatization or contracting out is tried or proposed for matters like municipal services, in some specific functions of agencies like procurement in defense. A few experiments have been tried with private management of prisons.

Claims of success or failure of these are mostly partisan or anecdotal, but there is theoretical as well as empirical work bearing on the issue. Hart, Shleifer and Vishny (1997) alert us to the problems of quality degradation that can arise if activities like prisons, where quality is not easily contractible, are privatized. The reality is unclear; *The Economist* (2000 a) claims that privatized prisons in the United Kingdom, “[w]hile costing about 10% less than publicly run prisons to operate, . . . provide conditions comparable to the best in the country,” and that recent attempts to restore some of these prisons to the public sector are a “political fix” by the Prison Service Board.

Boyne (1998) reviews several empirical studies showing cost reduction from contracting out in municipal services, and criticizes them on grounds of statistical procedure. Some such studies compare cities (or regions within a city) to compare costs of a public agency and a private contractor providing the service, but do not control for other relevant matters. Even those that do suffer from sample selection biases. For example, “the choice of this mode [contracting out] may reflect an underlying preference for small government,” or with partial contracting out, “city officials would allocate the easier territory to their own workforce.” Boyne also argues that “efficiency gains of contracting out must be balanced against losses of equity, citizenship, and accountability”; he does not spell these concepts out in any detail, but they seem to stand for the special-interest concerns of some of the principals affected by the agency’s actions.

Heilman and Johnson (1992) have carried out detailed case studies of privatization of wastewater treatment. They find some cost savings; privatized facilities are designed and completed in a shorter period of time, but cost more (p. 115). They also find a paradox: “the private sector becomes more like the public sector than the reverse” (p. 190), and “the efficiency of privatization turns out to derive from the absence of competition during design and construction” (p. 195). This conclusion is debatable; they describe a vigorous process of competition (pp. 72–73), although this quickly narrows down to a small number and proceeds by negotiation between the officials and the competing proposers rather than pure

arm's length auctions. Other studies do find that actual and potential competition is very important in achieving cost reduction; examples include defense procurement, see Trunkey, Trost and Snyder (1997).

Williamson (1998) considers an interesting hypothetical possibility – can the U.S. State Department be run as a private bureau. The answer is obviously no, but examining the case in detail improves our understanding of the transaction costs that govern whether an activity should be in the private or the public sector. Defining and measuring the State Department's performance is virtually impossible; quality is very important, so is the ability to adapt and change with the circumstances. Its activities affect many principals in many different ways. Nor are the actions of its workers at all accurately measurable. Thus it is a coping organization. It can only have very indirect and implicit incentives, recruiting motivated people and building an organizational culture in which they can get rewards from professionalism and career concerns. The immediate political principals, most notably the President, must rely on trust and confidence in the information and assessments provided by the agency. This requires integrity or probity, which a private firm would find it difficult to promise credibly or translate into a bottom line of profit, and a government would find it difficult to design a contract for a private firm and to judge the competing bidders to make a selection.

Other agencies that perform important functions of a sovereign government have similar characteristics. Thus “private security guards . . . are less willing than sworn officers to run risks and face down attackers” (Wilson, 1989, p. 349), and mercenary armies have fared poorly against citizen armies.

To sum up, competition and privatization are likely to work best for craft organizations. Attempts to privatize procedural or coping organizations, where measures of performance are vague and contentious, will run into all the problems of multitask and multiprincipal agencies we encountered above, will meet political resistance, and as a result are unlikely to succeed.

6 Conclusions and Ideas for Reform

The purpose of this paper was to relate theoretical ideas on incentives to the case studies and empirical work on public sector agencies and organizations. While I found some links, much more research is needed, and any suggestions for reform must be very broad and tentative. Provided one interprets and uses them cautiously, however, some lessons do emerge, both for researchers and for practitioners.

Researchers should be encouraged by the fact that while the simplest, first-pass theory of section 2 does not give an adequate understanding of reality, the later richer theory of section 3 which pays attention to the important features of reality like multiple dimensions and multiple principals does give useful insights. Of course, much more remains to be done; future theoretical work in this area should focus on specific contexts and do justice to the richness of detail in particular cases.

Empirical research should not seek sweeping universal findings of success or failure of performance based incentives or privatization, but should try to relate success or failure to specific characteristics like multiple dimensions and principals, observability of outputs and inputs, and so on. Empirical research also needs care in handling endogeneity and various biases in sample selection.

Turning to suggestions for practitioners, we should first note the importance of paying attention to the complex interaction among multiple tasks and principals, or of regarding the organization as a whole in a “general equilibrium” manner. Identifying problems and seeking solutions one at a time is likely to create opportunities for the agency’s workers and managers (and clients) to game the system to their advantage. These considerations also mean that one must accept some weakness or imperfection of incentives, for example use linear schemes instead of step-functions, and more generally be content with the second or third best.

There are some implications for organization design. First, sometimes it may be desirable to split an agency, and privatize or open to competition those of its activities that have clear simple tasks and easily measured outputs with little risk of degradation of unobservable quality, and few or minor conflicting political stakes. Some whole agencies that are such “craft organizations” are candidates for privatization. In other kinds of organizations, one must expect some micromanagement from the multiple principals. This can be minimized by group together tasks that are complementary and affect like-minded principals.

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