



OXFORD JOURNALS
OXFORD UNIVERSITY PRESS

The Internal Organization of Government

Author(s): Jean Tirole

Source: *Oxford Economic Papers*, New Series, Vol. 46, No. 1 (Jan., 1994), pp. 1-29

Published by: Oxford University Press

Stable URL: <http://www.jstor.org/stable/2663521>

Accessed: 31-03-2016 21:02 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at

<http://about.jstor.org/terms>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Oxford University Press is collaborating with JSTOR to digitize, preserve and extend access to *Oxford Economic Papers*

THE INTERNAL ORGANIZATION OF GOVERNMENT

By JEAN TIROLE

1. Introduction

ONE OF the accomplishments of economic theory has been the development of a theory of organizations. Three paradigms, adverse selection, moral hazard, and incomplete contracting, have been used to analyze how workers, managers, directors or investors respond to various incentives. Self-interested economic agents can be motivated in roughly three ways. Formal incentives such as piece rate wages, bonuses, stock options and relative performance evaluation are based on verifiable measures of performance. Work inputs are monitored by foremen, fellow employees, bosses or boards of directors. Last, career concerns inside and outside the firm may encourage a forward-looking employee to work hard.

So far, incentive theory has been mainly motivated by and applied to private organizations. Yet, in view of the important role played by civil servants and politicians in our economies, one may wonder why limited attention has been devoted in this field to the internal organization of government. An answer to this question might be that there is little conceptual difference between governments and firms. Any distinction would be quantitative and left to empirical analysis. While this point of view has some appeal, there still seems to be some scope for a separate theoretical appraisal of the organization of government. The purpose of this paper is not to supply such an appraisal. Rather, its goal is to suggest some of the building blocks and some directions for research. I apologize to the reader for the lightness of the analysis, and just hope that this paper's only ambition, namely to encourage interest in the topic, will be fulfilled.

The general thrust of the paper is that the new methodology of incentive theory ought to enable economists to participate in and enrich a debate that has by and large been confined to other social sciences, in particular political science and sociology.

The first part of the paper (Section 2) discusses some specificities of the design of incentives in the public sector. While private enterprises are in a first approximation instructed to maximize profits, government agencies generally pursue multiple goals. Many of these goals are hard to measure. Furthermore, incentives based on measurable goals must be limited to not completely jeopardize the nonmeasurable dimensions of social welfare. Lack of comparison and heterogeneity of tastes of principals are identified as further factors leading to low powered incentives.

The second part of the paper discusses some implications of low powered individual incentives in government. First, career concerns, associated with the

prospect of re-election, promotion or employment in the private sector, are at least as pervasive as in the private sector (Section 3). Career concerns are articulated around some mission that is followed by the government official. The mission can be simple—pursue goal 1—or composite—achieve a balance between goals 1 and 2. Neither the choice of the mission nor the intensity with which it is pursued need be socially optimal. Indeed, there is a potential multiplicity of missions that can be followed by rational officials. Also, several missions can be pursued by different officials of the same agency. Last, composite missions that reflect the several goals of social optimization may not fit with the officials' self interest. Our economic analysis here complements recent work in political science on government agencies.

Another topic that is particularly relevant under low powered incentives is the issue of regulatory capture and collusion (Section 4). It is argued that viewing intermediate layers of a hierarchy (such as government agencies) as being better informed than their principals lays the foundations for a theory of regulatory capture. The officials can manipulate information to favor specific interest groups. The civil service and the regulatory structure are then partly designed to limit such manipulations. The paper discusses a few implications of this view, concerning the stakes of the interest groups, the determinants of the influence of an interest group and the design of institutions.

While the second part of the paper analyzes individual incentives, the third part studies the division of labor within government. Section 5 points out that legal restrictions on commitment by government agencies can be viewed as a division of control rights between successive administrations. Balancing their well-known limitations, short-term commitments by the government have the benefit of allowing correction of wrongful policies (possibly due to capture of the current administration) by future administrations. Section 6 discusses a few elements of the division of labor between government and the private sector in the context of privatization.

Sections 7 and 8 investigate the following puzzle: why isn't government designed to behave as a coherent entity? Government agencies as well as politicians are not expected (individually) to maximize social welfare, but rather to pursue antinomic missions. Section 7 argues that the control of economic agents such as a public enterprise may be best performed by creating multiple principals with dissonant objectives. For instance, public enterprises are often subject to two masters with substantially different goals: A 'spending ministry' represents the 'technical point of view' and behaves rather softly with regard to the firm. When the firm runs a large deficit, this ministry must relinquish control to a more rigorous ministry of finance that is primarily concerned with the budget deficit. The basic idea of the section is that this division of labor within government promotes better behavior by the public enterprise through the threat of a shift of control to a tough ministry in case of financial hardship.

Section 8 arrives at a similar conclusion on the optimality of a division of labor in government from a quite distinct perspective. Its premise is that competition in government among advocates of specific interests or causes may

give rise to good policy setting. Using enfranchised advocates generates precious information on the pros and cons of alternative policies, and creates a system of checks and balances. The idea can be applied to justify the existence and behavior of specialized ministries, biased representatives, multipartism or our democratic legal system.

2. Specificities of incentives in government

Why do the incentives of a high official in a foreign ministry differ from those of a top executive at IBM? What distinguishes the task of a correctional officer from that of an AT & T sales representative? Such questions may seem trivial or irrelevant. Yet they condition much of what we perceive as a good organization of government. If differences exist between the public and private sectors, they must be traced either to differences in the measurement system (points 2.1 and 2.2 below) or to differences in the governance structure (points 2.3 and 2.4). Before proceeding, it is important to stress that the differences are differences in degree, not fundamental nature.¹

2.1. *Multiplicity of goals*

The owners of a private corporation set the goal of 'maximizing profit' for the organization.² Some measurable variables, such as earnings or stock prices, are clearly related to this goal and can be used to build managerial incentive schemes. In contrast, the mandate of many government agencies is multi-dimensional. Indeed, the very intervention of government is often motivated by the idea that profit incentives by themselves would not yield socially optimal allocations. Other criteria such as consumer net surplus, pollution, development, or redistribution must also be taken into account.

The multidimensionality of goals *per se* does not hinder the construction of powerful incentive schemes. Such schemes can in principle carefully balance the use of measures of the various dimensions of performance. A clearly specified social welfare function with explicit weights on all dimensions of performance would be as implementable as profit. But the multidimensionality of goals often goes hand in hand with two difficulties.

First, several dimensions of performance are, unlike profit or cost, hard to measure. A regulator of a natural monopoly is supposed to ensure 'reasonable'

¹ This section has met with very opposite reactions. Some argued to me that the public sector cannot be compared with the private sector since government employees first face low powered incentives and, second, are on average more socially motivated. On the other hand, some thought I was overstressing the distinction between public and private sectors. I concur with the first group's assessment of the specificities of government, but also believe that these specificities just cannot be presumed but should be derived from the same first principles that govern the organization of the private sector.

² This of course is not quite correct. Because asset markets are incomplete in practice, the firm's objective (whatever it is, given that claimholders in general will not agree on this objective) may differ from profit maximization. We here take the view that such spanning issues can be ignored in a first approximation and that claimholders want the maximization of total firm value.

prices, but even an econometrician may have a hard time measuring the regulator's contribution to the net consumer surplus. And who will put reliable numbers on the US Department of State's performance in 'promoting the long-range security and well-being of the United States' and on the US Department of Labor's success in 'fostering, promoting, and developing the welfare of the wage earners of the United States'?

Second, and relatedly, the multiplicity of goals raises the issue of their weights. The Environmental Protection Agency is instructed to curb pollution at a reasonable cost for the industries. Suppose, perhaps heroically, that the levels of pollution and the costs imposed on the industries are measurable. Setting up a formal incentive scheme for the EPA requires putting weights on these two measures. Yet, it is difficult to define what is reasonable and what is not. 'Optimal' pollution levels depend on available technologies, on the shadow cost of unemployment, on atmospheric conditions and so forth. The very contingencies that are supposed to condition the formal incentive schemes are hard to include in an incentive scheme.³ It should also be noted, and we will come back to this point, that what is meant to be 'optimal' depends on what the EPA perceives to be its constituency.

2.2. *Lack of comparison*

A noisy observation of managerial performance reduces the efficacy of formal incentive schemes. One way of alleviating the imperfection of measurement of a manager's performance is to separate idiosyncratic risk from aggregate risk, that is the risk faced by the manager only from that faced by other managers in a similar situation. More prosaically, the performance of GM's managers ought to be compared to that of Ford's or more generally to that of the car industry before drawing conclusions on their efficiency. The feasibility of such 'yardstick competition' or 'relative performance evaluation' enhances the desirability and the strength of performance related incentives. In contrast, as Hicks (1935) pointed out, 'the best of all monopoly profits is a quiet life'. A modern version of this would be that the absence of yardstick is conducive to low-powered incentive schemes, where a low-powered scheme is one in which the agent bears only a small fraction of his performance.

That many government agencies have a monopoly position in their activity therefore suggests that their performance is hard to assess. True, elements of relative performance evaluation can be found at several levels of government. First, the performance of employees in an agency, for instance tax collectors with similar tasks, can be compared. But, at a higher level, the activity of the IRS as a whole can only be compared with that of its counterparts in foreign countries. Second, some government institutions such as hospitals or schools

³ A second example is provided by a procurement officer who is instructed to minimize costs while leaving reasonable profits to the contractor. What 'reasonable' means depends on hard-to-describe contingencies such as the effect of a bankruptcy on employment, the degree of competition in the industry, and so forth.

may face competition from the private sector. Third, there may be explicit competition among government organizations, as is the case among cities or states, or among agencies to gather intelligence or to catch drug dealers.

While this paper will discuss some aspects of competition in government, it will ignore some of the central issues in this regard.⁴ The next two distinctions relate to qualitative differences in ‘corporate governance’ (the role of the organization’s outsiders).

2.3. *Heterogeneity of owners’ tastes*

A corporation’s ownership in principle aims at maximizing total firm value. This goal is shared among investors and is stable over time. True, managerial incentives among other things require creating several constituencies, such as equityholders and debtholders, with somewhat conflicting goals. But the corporation issues heterogeneous securities in a controlled way. Contrast this with government agencies. The tastes of their principals, namely the people, are quite diverse and furthermore changing. While a corporation’s goal is well defined⁵ and time consistent and preference heterogeneity among claimholders is a deliberate construction, the goals of an agency are defined by a political process. And, because this ‘aggregate goal’ (if such a thing exists) changes over time in a noncontractible manner, incentives governing long-term choices by agency management that are deemed legitimate today may no longer be considered so tomorrow. This lack of time consistency of agencies’ objective functions suggests that commitment possibilities in the public sector will be more limited than in the private sector. (Section 5 will study another reason why commitment is limited in government.)

2.4. *Dispersed ownership*

Corporations often face dispersed shareholders and creditors. Agencies are in this situation with a vengeance. Big shareholders, bank debt, and boards of directors, which alleviate the representation problem in corporations, have imperfect counterparts in government. Political parties and interest groups do coordinate subgroups of voters, but their incentives need not be perfectly aligned with the preferences of their constituents.⁶ Agencies, like corporations,

⁴ Yet, some of these issues are amenable to a modern industrial organization treatment. Take federalism *vs* centralism. The costs of federalism resemble those falling under the heading of ‘wasteful competition’ in industries: non exploitation of returns to scale, imperfect taxation, excessive screening or segmentation (see Benabou, 1991), and so forth. The benefit of federalism is that competition keeps a lid on potential abuses of central decision making, namely incompetence or capture of decision makers, by offering the possibility of comparison. Competition may also promote product diversity in cases where central decision making fails to do so. A systematic analysis of the costs and benefits of federalism in terms of the new economics of organization would be welcome.

⁵ Heterogeneity of goals in the private sector is important in family-run firms, partnerships and cooperatives (see, e.g., Hansmann, 1988).

⁶ We must admit, though, that big shareholders or debtholders, the monetary preferences of

have their own boards of directors (e.g., congressional oversight committees), but the boards' incentives are different. Last, political takeovers also differ from private takeovers. Two limitations of political takeovers are, first, that they are a somewhat cumbersome way to replace management (the government),⁷ and, second (and this is related to point 2.3 above) that they may be motivated by changing tastes of the electorate rather than by a poor managerial performance, which may not be ideal for incentives purposes.

Overall, we have little to say on the issue of diversity of ownership and monitoring in government, although this is a potentially important distinction between government and corporations. Differences seem to be quantitative rather than qualitative. Also, for reasons we will discuss later, formal institutions for monitoring agencies are often more developed than for monitoring corporations. Thus, even if one can build a case that monitoring by owners is less effective in government, it may also be the case that monitoring plays as big a role in government as in corporations.

3. The incentives of politicians and civil servants

3.1. *Formal incentives*

Let us begin with monetary incentives. Such incentives do exist in the civil service, but we would expect, and do observe, low powered incentives⁸ to prevail in government, for two reasons.

The first factor for low powered incentives was mentioned in the introduction and relates to the difficulty in measuring precisely the performance of officials. The second factor is the tension that exists between measurable and nonmeasurable objectives. Very often, the latter conflict with the former. For instance, keeping a regulated firm's cost down conflicts with the provision of quality. Collecting high levels of taxes (a measurable dimension) may mean that the tax collector annoys the taxpayers. Lowering the cost of delivering mail while keeping delivery time constant implies a larger number of mistakes. The incentives literature has insisted on such conflicts among goals. Among recent entries in this literature, Laffont and Tirole (1991) argue that, when the goods or services provided by a regulated firm are experience goods, a concern for quality calls for low powered incentives. The reasoning is straightforward. While for search goods (whose quality is by definition observed before consumption) incentives for quality can be based on the level of sales, the provision of quality for experience goods (whose quality is revealed only by

which are aligned with those of small holders of similar claims, may collude with other parties, or else enjoy non monetary gains of following particular policies.

⁷ Also, such a takeover replaces the overall government, rather than a minister or the top officials in an agency (although good officials or ministers are sometimes kept when the government changes).

⁸ Low powered incentives mean that the agent receives a small fraction of his or her marginal product.

consuming) relies on the reputation concern of the firm. Reimbursing a high fraction of the firm's cost amounts to reducing the firm's cost of investing in reputation and thus raises the incentive to provide quality. In a similar spirit, Holmström and Milgrom (1991) analyze a general multi-task model of moral hazard. They show how incentives on one activity must take into account their effect on substitute or complementary activities (see their article for other references and related ideas).

The trade off between high powered schemes and quality exists in the private sector as well as in government. I would conjecture, though, that the quality concern is stronger in government than in the private sector. First, the government is mandated to internalize the effect of quality on consumer's surplus while the managers of a private corporation are not. Second, there is no such thing as the stock price of a government agency that would somewhat reflect the value of the agency's investment in reputation for high quality. At this stage, all this is very informal. In particular, non-monetary incentives (to be considered shortly) differ in the two sectors and only a global analysis of the packages of incentives can drive the point home.

The other two incentives are monitoring and career concerns. We will be particularly interested in career concerns here. Because formal incentives are weaker, career concerns may play an even bigger role in government than in the private sector.⁹

3.2. *Career concerns and missions*

Perhaps the main drive for civil servants and politicians is career concerns. They are concerned by the effect of their current performance not so much on their monetary reward, but rather on their reputation or image in view of future promotions, job prospects in the private and public sectors, and reelections. This concern induces them to work to 'mislead' the internal or external labor markets about their ability.

A decade ago (1982), Bengt Holmström provided us with a tractable model of career concerns. A bare-bones version of his model goes as follows: There are two periods: today and tomorrow. A manager's performance today (output, profit, . . .), denoted by x , depends on his talent θ and on his current effort e :

$$x = \theta + e \quad (1)$$

The manager's ability $\theta \in (-\infty, \infty)$ has mean $\bar{\theta}$ and is unknown to everybody. The manager's effort $e \geq 0$ involves disutility $g(e)$ with $g(0) = 0$, $g' > 0$, $g'' > 0$, and is known to the manager only. The performance x is observable by

⁹ It should be noted that, for the same reason, monitoring often is more pervasive in government as well. As Wilson (1989) observes: 'government executives spend much more of their time and energy on handling, face to face, external constituencies than do business executives' (pp. 31–32. Wilson for instance notes that the director of the FBI meets with his board of directors (the congressional committees) more than 18 times a year). And Fox (1988) estimates that a US weapons program manager must spend 30–50% of his time defending his project inside the Department of Defense and Congress.

everyone. Yet it is not verifiable in the sense that it cannot be described *ex ante* in a formal compensation contract. The manager is thus paid a fixed wage w_1 today. The model is a good approximation of situations in which formal incentive schemes play a minor role.

Tomorrow the manager will be employed in the same firm or an identical firm. For simplicity, his productivity for the employer will be θ .¹⁰ The manager will be free to choose among potential employees, and his wage tomorrow will equal the expectation of his ability given today's performance:¹¹

$$w_2(x) = E(\theta|x)$$

Letting δ denote the discount factor between the two periods, the intertemporal utility of a risk neutral manager is:

$$w_1 - g(e) + \delta w_2(\theta + e)$$

Let us look for a pure strategy equilibrium, with effort level e^* . Then

$$E(\theta|x) = x - e^* = \theta + e - e^*$$

The manager chooses e^* such that

$$g'(e^*) = \delta$$

The socially optimal level of effort is obtained only when the manager weighs the present and the future equally ($\delta = 1$).

Holmström's model points at four conditions for career concerns in government to be effective. First, the performance on the task should be visible by those who grant promotions and wage increases, are potential employers or will vote for or against the official. Second, the current performance should be informative about the official's ability in future tasks. Third, the official should be forward looking and not discount the future too much. And, fourth, signalling should not be too costly to the official.

I now build on Holmström's insight using ongoing research with Mathias Dewatripont. An aspect of career concerns that has seemingly gone unnoticed is the scope for multiple interpretations of performance. With the additive form presumed in (1), there is a unique pure strategy equilibrium. Yet, in most situations, this additive form may not be the most appropriate one. For, outcomes often reveal talent only if the manager devotes his attention to the task. Suppose that a Department of Justice lawyer sets himself the goal of maximizing the number of successful cases rather than that of ensuring the conformity of case selection and treatment to economic principles. Then an economic analysis of the cases prosecuted under his supervision reveals little

¹⁰ A justification may be that the manager has no career concern tomorrow and therefore does not exert any effort. Alternatively, one could generate effort by subsequent career concerns, as in Holmström (1982).

¹¹ We assume for simplicity that the manager is always paid a wage equal to his expected ability, and ignore problems associated with negative wages (which are negligible if the distribution of θ puts little weight on negative values).

about his talent. And if his superiors or the private sector understand this, future promotions and wages will hardly reflect performance in this direction. Therefore, the DOJ lawyer is right not to pay much attention to economic consistency. Similarly, a defense program officer whose talent is assessed on whether his programs are started and are kept going has little incentive to pay attention to costs and should focus on getting the programs done; and conversely the superiors and the labor market won't pay much attention to his cost performance. As a last example, suppose students have the choice among focusing on mathematics, focusing on Latin and working on both. Suppose further that both tasks are equally difficult and socially desirable. Yet, it may be the case that universities select the students on the basis of math grades and students neglect Latin because it is endogenously less informative than math.

To formalize the idea of multiple interpretations of performance in an example (a fuller treatment is out of the scope of this paper), suppose that (1) is replaced by a multiplicative form:

$$x = \theta e \quad (2)$$

and (from now on) that the support of the distribution of θ is $[0, \infty)$, and keep the other assumptions unchanged. In particular we assume that the second-period wage is $w_2(x) = E(\theta|x)$. (What is needed for the theory more generally is that a better performance shifts beliefs about talent in the sense of first-order stochastic dominance and thus raises the second-period wage.) Again, we look for pure strategy equilibria.

If no attention is devoted to the task ($e = 0$), then the performance is uninformative about ability, and w_2 is not affected by the observation of performance: $w_2(x) = \bar{\theta}$ for all x .¹² And, hence the manager rationally does not exert any effort. We will call this equilibrium the unfocused equilibrium.

There exists a second pure strategy equilibrium or focused equilibrium, in which the manager takes the task seriously and chooses effort $\hat{e} > 0$, and the labor market pays attention to his performance. By choosing e , the manager is perceived as having ability $\hat{\theta}$ while having real ability θ , where

$$\hat{\theta}\hat{e} = \theta e$$

The expected second-period wage is therefore $\bar{\theta}e/\hat{e}$, and the manager chooses

¹² What if the manager chooses a positive level of effort, so that $x > 0$? To sustain our no-effort equilibrium, we assume that the off-the-equilibrium-path observation $x > 0$ is interpreted as stemming from a type $\theta < \bar{\theta}$.

A possibly more satisfactory approach is to introduce noise in the observation of performance:

$$x = \theta e + \varepsilon \quad (2')$$

where ε is distributed on support $(-\infty, \infty)$. Then the issue of inferences off the equilibrium path does not arise. Note also that the specification in (2') is more satisfactory than that in (2) for another reason: The no-effort equilibrium is robust to small perturbations in the technology (such as $x = \theta(e + \alpha) + \varepsilon$, with α close to 0) if $g'(0) > 0$, for specification (2'), but not for specification (2).

e so as to maximize

$$w_1 - g(e) + \delta \frac{\bar{\theta}}{\hat{e}} e$$

yielding

$$g'(\hat{e})\hat{e} = \delta \bar{\theta}$$

which has a unique solution. The manager's utility in the focused equilibrium is

$$U_1 = w_1 - g(\hat{e}) + \delta \bar{\theta} \quad (3)$$

as opposed to

$$U_0 = w_1 + \delta \bar{\theta} \quad (4)$$

in the unfocused equilibrium.¹³

Basically the same point can be made in the context of multiple tasks, or goals, which is particularly relevant in government. A goal can be 'simple' or 'clear', or 'single'—pursue task 1 or pursue task 2—or 'composite'—pursue some combination of task 1 and task 2. Again, there is scope for a multiplicity of equilibria. A government official will pursue mission 1 if the government or private labor markets, or else voters, pay attention mainly to his performance on task 1. Accordingly, he will neglect task 2. Conversely, mission 1 may be ignored because attention is focused on mission 2.

Because social welfare is generally an aggregation of multiple goals, the existence of equilibria in which the government official pursues a composite mission, for instance splits his effort between the two tasks, is of much interest. Or, to put it another way, single-mission equilibria of the type discussed above do not fulfill the whole array of social goals. As Wilson (1989) notes:

These advantages of infusing an agency with a sense of mission are purchased at a price. An agency with a strong mission will give perfunctory attention, if any at all, to tasks that are not central to that mission. Diplomats in the State Department will have little interest in embassy security; intelligence officers in the CIA will not worry as much as they should about counter-intelligence; narcotics agents in the DEA will minimize the importance of improper prescriptions written by physicians; power engineers in the TVA will not think as hard about environmental protection or conservation as about maximizing the efficiency of generating units; fighter pilots in the USAF will look at air transport as a homely stepchild; and navy admirals who earned their flag serving on aircraft carriers will not press zealously to expand the role of minesweepers.

Composite mission equilibria may or may not exist. For example, suppose that the official may have high or low ability. The official has two tasks, 1 and 2, and may reach a poor or a good performance in either task. Assume further that an official with a low ability obtains a poor outcome in tasks 1 and 2 regardless of his allocation of effort. What then matters to the official is to demonstrate high ability when this is indeed the case. It is then optimal for the official to 'put all his eggs in the same basket', that is to allocate all his

¹³ See footnote 15 below for a discussion of whether w_1 should take the same value in (3) and (4).

attention to a single task; for there is no extra gain having a high performance in both tasks; it is far more important to make sure that at least one task is successful.¹⁴ In contrast, if high ability were demonstrated primarily by being successful in both tasks, then composite mission equilibria would exist.

Last, we should point at an interesting third possible type of equilibrium, the ‘fuzzy mission equilibrium’. In such equilibria, the official pursues a single mission (unlike in the composite mission equilibria), but the market does not know which (unlike in the single mission equilibrium). For instance, he chooses to focus on goal 1 with probability 1/2, and on goal 2 with probability 1/2. Equivalently, in the organization, half the officials pursue mission 1 and half pursue mission 2.

While the labor market does not observe the choice of the mission, it makes some *ex post* inference about which was chosen. To come back to the student example, one will put probability greater than 1/2, but lower than 1, that the student focused on Latin when passing Latin and failing mathematics. The reason why fuzzy mission equilibria may exist is that the market puts more weight on the best performance, and therefore it is important for the official to excel in his best performance. It is worth noting that, in the examples Mathias Dewatripont and I have developed so far, work incentives are stronger in the

¹⁴ To illustrate these ideas with a continuous example such as the one developed above, let a manager allocate his effort $\bar{e}$ between tasks 1 and 2:

$$e_1 + e_2 = \bar{e} \quad \text{and} \quad e_k \geq 0 \quad \text{for } k \in \{1, 2\}$$

(For instance, one might assume $g(e) = 0$ for $e \leq \bar{e}$, and $= \infty$ for $e > \bar{e}$. The results can be extended to the case where total effort is not fixed.)

And let performance be two-dimensional:

$$x_k = \theta e_k + \varepsilon_k \quad k \in \{1, 2\}$$

where the ability θ and the noise terms ε_1 and ε_2 are normal and independent, and ε_1 and ε_2 have mean zero and the same variance. Then, $\{e_1 = \bar{e}, e_2 = 0\}$ and $\{e_1 = 0, e_2 = \bar{e}\}$ are both equilibria. In these equilibria, there is a wrong allocation of effort if the optimum is to spread effort more evenly between the two tasks. Such inefficiencies could here trivially be solved, were a formal contract feasible (see Holmström–Milgrom, 1991).

In this example, there also exists a composite mission equilibrium, in which the official splits his attention between the two tasks. The market’s posterior expectation of the official’s ability is then of the form

$$\alpha \bar{\theta} + \beta(x_1 + x_2)$$

where α and β depend on the precisions of the prior and of the noises. The official therefore maximizes $E(x_1 + x_2) = \bar{\theta}(e_1 + e_2)$ and is indifferent as to his allocation of effort (assuming of course $\bar{\theta} > 0$). Two remarks are in order here.

First, the composite equilibrium is unique in its class. An equilibrium allocation (e_1^*, e_2^*) would yield posterior expectation

$$\alpha' \bar{\theta} + \beta'(e_1^* x_1 + e_2^* x_2)$$

The official would then maximize $E(e_1^* x_1 + e_2^* x_2) = \bar{\theta}(e_1^* e_1 + e_2^* e_2)$. The equilibrium is therefore either a single mission one or the composite mission one described above.

Second, the composite mission equilibrium is here quite unstable. Suppose that the official has some small intrinsic preference for one task over the other, which can be expressed by a private information variable with continuous distribution on a support including 0. Then, given the market’s updating rule, the official (with probability 1) chooses either $e_1 = \bar{e}$ or $e_2 = \bar{e}$. Hence the updating rule is no longer appropriate and the composite mission equilibrium disappears.

single mission equilibria than in the fuzzy mission ones even though the official focuses all his attention on a single task in both. The point is that the market is uncertain about the official's objective in a fuzzy mission equilibrium, and does not give full credit for a good performance, and full stigma for a poor one.

3.3. *Mission setting*

The multiplicity of equilibria when career concerns determine incentives suggests a possible lack of focus of managers. Some factors may help ensuring that the mission will be followed. First, following Schelling (1960), one may posit that some apparently irrelevant factors can help select a 'focal' equilibrium. In our context, the setting of a mission by a constitution, a law or a charismatic boss may create a common understanding between the sender and receiver of the performance signals. Wilson (1989) finds that clearly defined goals, such as 'pay benefits on time and accurately' for the US Social Security Administration and the associated client-serving ethic, work well. In contrast, multiple goals raise the issue of what weights should be put by the manager on the different goals, and therefore lead to a possible multiplicity of interpretations. Second, a mission forcefully articulated by a strong leader such as Pinchot at the US Bureau of Forestry or Hoover at the FBI may be more likely to be adopted.

Another factor facilitating the accomplishment of a mission is its alignment with professional norms. The Federal Trade Commission staff will emphasize legal or economic aspects of a case depending on whether the case is handled by lawyers or economists. This may be because lawyers want to signal their legal skills to law firms while economists are keen on proving their talents as economists to fellow economists in academia and consulting firms.

Yet another factor influencing the success of a mission is immediate self-interest. If 'producing power at the lowest cost' (as made explicit in the statutes of the Tennessee Valley Authority) gives rise to immediate rewards such as lack of Congressional hassle, the mandate is more likely to be followed. In other words, small formal incentives added to career concerns may help tilt the balance toward one equilibrium. Relatedly, career concerns must swamp short term incentives to escape the mission. As Wilson (1989, p. 38) notes, the focus of a correctional officer's energy is not his mission, be it rehabilitation or deterrence, but the control of inmates.

This brings us to the issue of where missions come from. They may be either externally determined or self imposed. We have reasoned as if missions were imposed on (or, rather, suggested to) officials, and examined some factors that may affect the success of the mission. In practice, officials sometimes pick a clear mission when their overall mission is vague. We mentioned the case of Pinchot who, from 1898 on, through personnel training and tight managing imposed the mission of managing forests to the US Forest Service, rather than just studying them and educating people as to their uses.

Do officials gain from having a mission? Consider the two equilibria $e = 0$ and $e = \hat{e}$ for the activity given by (2). While the employer prefers that $e = \hat{e}$, the official prefers $e = 0$. Because in equilibrium the official fools no one by working, he would prefer not to have to live to expectations.¹⁵

We feel the argument for the officials' aversion towards missions is less strong where they know their ability before choosing effort. Our intuition is that high ability officials prefer having a mission in order to be able to demonstrate this ability. Supposing that the announcement of a mission is credible (we haven't specified why), high ability officials want to make such an announcement. Lower ability officials are then forced to do the same in order not to reveal they are low ability, while they still have a chance of being perceived as having high ability if they are lucky in the mission.¹⁶ A complete justification of this intuition seems difficult to obtain given the multiplicity of equilibria created by the interpretation of signals such as announcing a mission.

Whatever the difficulties in uniquely pinning down equilibrium behaviour, we think that the fact that the officials may gain from the existence of a mission when informed about their ability while they don't when they are uninformed may have some bearing on mission setting. While we are in the realm of conjectures, we would expect officials to be more prone to refuse new tasks for which they have little information about their ability. This may shed some light on the many instances of agencies that refuse to take on new assignments (see Wilson, 1989, chapter 10), behavior that flies in the face of Niskanen's and Tullock's postulate that bureaucrats try to maximize their agency's size. It remains however to be assessed whether other factors such as fear of increased oversight, clashes of culture, and competition for resources, would not be better explanations for these non-imperialistic agency behaviors.

4. Rules vs discretion

The difficulty in giving formal incentive schemes to civil servants and elected politicians suggests that capture of decision making by interest groups is of greater concern in government than in private corporations. Indeed political scientists and constitution designers (Montesquieu, the American Federalists, Marx, Bernstein, . . .) as well as political economists of the Chicago and Virginia Schools have long insisted on the possibility of corruption of government decision making.

¹⁵ The assumption that w_1 is unresponsive to which equilibrium one is in seems a good approximation in the case of a civil servant. If the first-period wage reflected expected marginal productivity ($w_1 = 0$ in the first equilibrium and $w_1 = \theta\hat{e}$ in the second), the official might prefer the second equilibrium because it creates a commitment to work in the first period.

¹⁶ Assume that w_1 is fixed and consider the following two-stage game: First, the official announces a mission or not (this is 'cheap talk'). Second, the official chooses an effort. A first equilibrium of this game exists with 'no mission, and $e = 0$ '. A second equilibrium, assuming $g(e) = e$, exists with 'mission, $w_2(x) = \sqrt{2x/\delta}$, $\hat{e}(\theta) = \delta\theta/2$ and $U(\theta) = w_1 + (\delta\theta/2)$. There exist other equilibria as well. The officials with ability θ such that $(\delta\theta/2) > \delta\bar{\theta}$ prefer having a mission while the others would prefer no mission but are trapped in trying to prove their ability.

Jean-Jacques Laffont and I¹⁷ have attempted to unveil the implications of the potential for capture for the organization of government and regulation. Our starting point is that the scope for capture stems from the government officials' discretionary power, which in turn results from the superiority of their information relative to that of their political principals, e.g. Congress for agencies or voters for politicians. We endow the government official with superior information about desirable policy choices, presumably because he has more time or because he is more competent. The policy choices may concern procurement prices, consumer charges, rate structures, entry rules, subsidies to the industry and so forth. The official's use of his information affects the welfare of interest groups: incumbent firms, entrants, customers, taxpayers, or environmentalists. Each group has therefore an incentive to influence the government official to release only the information that favors it. The theory then traces the design of the civil service and regulation to the prevention of such behavior.

The formal analysis emphasizes a few main themes:

Reduction of stakes

To reduce the government officials' temptation to be captured, one may reduce the stakes interest groups have in the regulatory decision. This means relying less on the information held by the government officials and regulating instead by the rule-book. In our view, the central feature of a bureaucracy is that its members are not trusted to make use of information that affects members other than themselves, and that decisions are therefore based on rigid rules.

Let us illustrate the reduction of stakes with a few examples. Consider first the issue of which fraction of their cost government contractors or public utilities should bear. A low-powered incentive scheme is one in which the firm bears a small fraction of its cost; for instance a cost-plus contract reimburses all the firm's cost. In contrast, the firm bears a high fraction of its cost in a high-powered scheme, such as a fixed-price contract in which the firm is residual claimant for its cost savings. Suppose that society has two goals: induce government contractors and utilities to produce at a low cost, and (because of a shadow cost of public funds or for redistributive reasons) prevent them from making profits. It turns out that these two objectives are in conflict if the firm knows more than the regulator about its technology. A high-powered scheme gives good incentives for cost-reduction, while a low-powered scheme is efficient at preventing rents (the firm does not benefit from being luckily endowed with low costs if its cost is fully reimbursed).

Let us now posit that the regulator's role is to bring information to bear on the contract to be offered to the firm. And let us introduce the possibility of capture by the firm of the regulator. That is, the firm may influence the regulator to manipulate his report of information about desirable contracts.

¹⁷ 1993, chapters 11 through 16.

A low-powered incentive scheme fares better under a threat of ‘producer protection’, because it leaves low rents to the firm and those rents are fairly insensitive to the official’s information: There is little freedom in designing a cost-plus contract, while the regulator has substantial discretion in the choice of a price in a fixed-price contract!¹⁸

A second example is given by government competition policies. Suppose that the government has better information than voters about the desirability of opening a regulated market to competition. Competition promotes product diversity, and, by providing yardsticks, improves incentives. But there are costs to competition such as the duplication of fixed costs. Whether the market should be opened to competition depends on the relative assessment of these costs and benefits. It is intuitive that the threat of capture of the government officials by incumbents, potential entrants or customer groups, and the concomitant threat of excessively anti- or pro-competition policies, will tend to remove the officials’ discretion in choosing the level of competition and favor mechanistic rules for determining industry structures.

A similar idea can be applied to government auctions. While ordinary goods (under some assumptions) can be efficiently auctioned off by simple, non discretionary mechanisms such as first- and second-bid auctions, most government contracts have multidimensional characteristics. Price is one of them; various components of quality are others: reliability, speed, reputation for honesty, financial stability of the contractor, and so forth. The procurement officer’s discretion resides in the assessment of these quality attributes as well as, possibly, in the weighing of these attributes and price. Again, it comes as no surprise that a concern about potential favoritism by the procurement officer leads to auctions that give tangible variables such as price precedence over non tangible ones such as quality assessments. And, when such precedence is not imposed, government procurement rules often require a detailed and convincing description of the motivations for selecting a high-cost bidder.

Determinants of the influence of an interest group

Olson (1965) and others have argued that the influence of an interest group depends on the group’s organization. Producers and their large customers are usually well organized pressure groups (Stigler, 1971). Taxpayers in contrast are widely dispersed, and, in the absence of a taxpayer representative, extreme free riding prevents them from intervening in any specific regulatory issue. Small consumers and environmentalists traditionally suffered from the same problem, but have become better organized recently. A second, and trivial determinant of the influence of an interest group is the existence of a stake; one would not expect IBM to have much influence on agricultural policies.

An informational approach to capture economics, besides explaining why

¹⁸ On the other hand, low-powered schemes may be particularly prone to the corruption of the government auditors because of the importance they give to cost measurement.

capture can occur, also unveils a third determinant of the influence of interest groups: the nature of the informational asymmetries. Consider an example in which Congress relies on an agency to obtain information about the desirability of an industrial project. This project, if undertaken, pollutes. It will pass muster if the agency demonstrates that the project is sufficiently profitable. Let the agency, but not its political principal, have such information. The agency and environmentalists can collude to suppress this information and jeopardize the project. In this context, environmentalists have potential power. In contrast, consider a similar situation except that the project is a pollution-abatement one. When the agency has information favorable to the project (low implementation cost, say), environmentalists have no incentives to induce the agency to conceal this information. More generally, an interest group has more potential influence when its members gain from the government officials' restricting information flow than when they lose.

Incentive schemes vs institutions

Formal studies of corporate organizations have used two paradigms. One has been well established since the early seventies and presumes that complete contracts are designed to address incentive problems. The adverse selection model assigns private information to some parties about exogenous parameters. The moral hazard model assumes that some parties' endogenous choices remain private information. In both cases, incentive contracts are based on current and future commonly verifiable variables. The second, and conceptually more difficult paradigm is that of incomplete contracting. When contingencies cannot be costlessly included in contracts, the allocation of control rights, that is of rights to decide what to do in unforeseen or unspecified contingencies, starts playing a role (Grossman and Hart, 1986).

One can also approach government organization from these two angles. First, one can envision the government as a group of agents motivated by formal and complete incentive schemes. The agents are induced to choose discretionary actions and to reveal their information appropriately. Second, and maybe more realistically, one can view the government as a distribution of control rights over various kinds of decisions. This division is determined by constitutions, laws and tradition. Because control rights are only rough substitutes for optimal complete contracts, the exercise of control rights conferred on a single group of government officials may lead to substantial abuse such as self-serving actions and capture. This suggests, first, why control rights are often divided among several branches of government (for instance, executive and bicameral legislature); and, second, why a well-functioning democracy ought to make use of private watchdogs (media), independent judges, and advocates for under-represented groups (such as consumer advocates within government).

In our view, part of the reason the economics of organization haven't had more impact on political science is that many of the interesting normative questions in that field (how should government be organized?) relate to the

allocation of control rights and therefore rely on a yet unsettled incomplete contract methodology.

5. Division of labor within government: intertemporal aspects

The rest of the paper focuses on the division of labor in government (or, in Section 6, between the government and the private sector). This section analyzes how capture issues affect the intertemporal allocation of control rights in government. A recurrent argument in economics is that social welfare is optimized when a benevolent government can commit intertemporally. For instance, noncommitment by the central bank to a future path of the money supply creates an excessive incentive for the government to collect seignorage and induces suboptimal holdings of money by consumers. Similarly non-commitment to future tax rates on capital reduces the accumulation of private investment. In regulation, noncommitment to future schemes creates scope for the expropriation of a public utility's investment; it also makes the firm wary of demonstrating efficiency and gives rise to the ratchet effect. Very generally, it is clear that a benevolent government maximizes social welfare when committing to a long-term, complete contract, because it can always duplicate what would obtain under noncommitment and in general do better.

It is also clear that contracting costs put limits on commitment. Yet contracting costs cannot account for the many legal restrictions on commitment faced by governments. For instance, in many industries, the regulators are forced to sign short-term regulatory contracts.

Such restrictions can easily be rationalized by dropping the assumption of benevolence. If there is a chance that any given government favors specific interest groups, long-term commitment may be socially detrimental. In contrast, short-term commitments together with the rotation of governments (through elections, say) provide some check against inappropriate decisions.

The following simple example¹⁹ illustrates the costs and benefits of commitment. A firm supplies one unit of a good or service to the government in each of two periods. The firm's production cost may be low or high. The firm can also turn a high first-period production cost into a low second-period cost by sinking some private investment in period 1. Suppose, in a first step, that there are two consecutive and separate administrations or governments G_1 and G_2 in the two periods, and that administration G_t observes the firm's date- t cost at the beginning of date t . Assume that administration G_1 is allowed to sign a two-period (that is, long-term) procurement contract. In particular, it can commit to a fixed second-period price. The firm therefore invests when having high first-period cost as long as the reduction in the production cost exceeds the private investment cost. The benefit of a long-term contract is thus to allow efficient investment by the firm. In contrast, under short-term contracting, the firm knows that, once its investment is sunk, the date-2 administration will have the possibility to ratchet down the second-period price

¹⁹ Building on Laffont-Tirole (1993, chapter 16) and Tai (1990).

to the low cost level. Therefore, it anticipates no private gain from investment, and is better off not investing.

The cost of allowing long-term contracting arises when administration G_1 colludes with the contractor. A high price can then be sustained even when the firm starts with a low cost. In contrast, a short-term contract allows administration G_2 not to keep with administration G_1 's lenient contracting practices. (Our discussion is couched in terms of a choice between two institutions, allowing long-term contracting or not. But the same points can be made under complete contracting. Indeed, under some assumptions, the optimal complete contract can be implemented by one of these two simple institutions.)

The model can be extended to let administration G_1 be re-elected with some probability. Suppose that the probability of reelection increases with the voters' posterior beliefs that administration G_1 is 'honest' (that is, is averse to protecting the firm). Then administration G_1 has less incentives to collude with the firm, as a high procurement price conveys (imperfect) information that G_1 might be prone to protect the industry. An election with rational voters may thus make the government more accountable and may raise the desirability of commitment.

6. Division of labor between the government and the private sector

To what extent should the state intervene in the economy? This topic has wide ramifications, but its problematic is nicely epitomized by the issue of privatization. When should a firm be a public enterprise, a regulated private corporation or an unregulated firm? What should be the allocation of production between government and the private sector?

Schmidt (1991), Shapiro and Willig (1991), and Laffont and Tirole (1993, chapter 17) have offered preliminary analyses of the choice between a public enterprise and a private regulated firm. The starting point follows Grossman and Hart (1986) by noting that the ownership structure matters only to the extent that contracts are incomplete. The premise is thus that the government cannot commit to a detailed incentive contract when nationalizing or privatizing the firm.

In Laffont–Tirole, the cost of public ownership is a suboptimal investment by the firm's managers in those assets that can be redeployed to serve social goals pursued by the public owners. The idea is related to point 2.1 in Section 2. Social welfare maximization requires taking into account non-verifiable variables such as the effect of a policy on employment, regional development, level of imports, and other externalities. In contrast, the objective of the private owners of a corporation (maximization of profit) is aligned with verifiable performance measures (earnings, stock price). So private owners have no incentive to exert their control rights to redeploy investments to serve social goals, thereby perturbing formal managerial incentive schemes that necessarily do not incorporate those nonverifiable social goals. In other words, in a private

firm there is coherence between owners' incentives and variables underlying the managerial incentive scheme. In contrast, in a public enterprise, the managers' pursuit of performance in the verifiable dimension (profit) is hampered by interference that may divert investments from their original goal.

The cost of private ownership in Laffont–Tirole is that the firm's managers must respond to two masters—the regulator and the shareholders. As is well understood from the theory of common agency (see Bernheim and Whinston, 1986, for moral hazard, and Stole, 1990, and Martimort, 1991, for adverse selection), two parties contracting with the same agent exert externalities on each other unless the agent carries full responsibility for social welfare. In the case of a private regulated firm, the regulator in his choice of regulatory scheme and the shareholders in their choice of managerial incentive contract compete to extract managerial informational rent. Each provides incentives that are deemed too low powered by the other, a problem sometimes mentioned in regulation. This conflict about the power of managerial incentive schemes is but one instance of the inefficiencies created by the divergence of objectives between principals.

It should be emphasized that our distinction between a regulated private firm as having two principals and a public enterprise as having a single is simple minded. Indeed we argue in the next section that dividing tasks within government may be an efficient way of controlling public enterprises. But the main point—that for a given organization of government, privatization introduces a new principal with divergent incentives—is robust, and the fact that we would not expect the government's organization to be the same when handling public enterprises and private regulated firms does not invalidate this cost of privatization.

In Schmidt and Shapiro–Willig, the cost and benefit of public ownership differ from those described above. The basic postulation in both articles is that public ownership, by giving the government residual rights over the accounting structure, allows the government to have more precise information about the firm's cost than it would have in a regulatory context. The benefit of public ownership is thus that the government is better able to extract the firm's informational rent. The cost of public ownership differs between the two articles. Shapiro and Willig allow the government to be malevolent sometimes; one may prefer malevolent governments to be hampered by informational limitations, and thus one may prefer regulation to a public enterprise. Schmidt presumes a benevolent regulator who cannot commit intertemporally. The lack of information associated with private ownership in a sense commits the regulator not to expropriate too much the firm's investment.

7. Division of labor within government: multiminsty oversight

The last two sections are based on preliminary work with Mathias Dewatripont, and investigate the following puzzle: Why isn't government designed to behave as a coherent entity? Examples of dissonant objectives and tight systems of

checks and balances abound. Contractors and public enterprises are often subject to control by several government officials with substantially different goals. Public enterprises must respond to at least two masters: a 'spending ministry' with the mission of developing the industry and a finance ministry instructed to reduce the budget deficit. In France, the 'responsible minister' (*ministre de tutelle*) is meant to defend the 'technical point of view' and is *a priori* in charge of the public enterprise. But, many times, this minister is less powerful than the finance minister,²⁰ whose control becomes pervasive when the firm runs a large deficit. Financial control and the control right over new debt issues by the public enterprise give the minister of finance substantial power to impose its rigorous views on the firm. Even in Italy, where the Ministry for State Holdings is powerful, the required consent of the Treasury for major financial operations gives it nonnegligible influence. Overall, as Friedmann (1970) notes, 'he who pays the piper calls the tune'.

Similarly, the fate of US defense contractors depends on the relative powers of two principals, the Department of Defense and Congress, with substantially different objectives. Another example is provided by the division of labor between the executive and the legislature. The objective of the president, with a national constituency, necessarily diverges from that of a parliament where each member by design is meant to defend a limited constituency. Furthermore, voters have the possibility to elect executive and legislative bodies with politically conflicting objectives.

Now, the puzzle is not the existence of multiple parties in government. After all, agency theory has taught us that employing several parties to monitor each other or to create yardsticks may reduce agency costs. The puzzle is rather that government officials are given missions that differ from social welfare maximization and furthermore are at odds with each other. This section argues that multiheaded government may be an efficient institution to deal with external bodies such as public enterprises (or the private sector). The next section develops the idea that multiheaded government may help create a system of checks and balances within the government.

As we just mentioned, this section views multiheaded government as an instrument to control public enterprises. The starting point is quite simple and leads to a formalization of Kornai's celebrated 'soft budget constraint'. Suppose a public enterprise wishes to undertake a new investment such as going nuclear (electricity monopoly) or developing a space shuttle (space agency). Investment costs are incurred at two points of time. The size of the first installment depends on the firm's efficiency in developing, purchasing or installing the new technology, and is learned later on. Then the government must decide whether to pay a completion cost. Consider a welfare maximizing government's decision of whether to incur the second installment and thus complete the project. If the total investment cost is high, the government regrets having started the project in the first place, but given that the first installment is a sunk cost, it may well

²⁰ See, e.g., Levy (1970).

decide to complete the project anyway. Ideally, the government would like at the start of the project to commit not to finance the second installment if costs run over, in order to provide the firm with incentives to keep the investment cost down. Yet such a commitment lacks credibility. This time consistency problem weakens the firm's incentives. To restore the government's credibility, one can threaten the public enterprise with a shift of control to a cost conscious ministry when further investment requires substantial borrowing. This is done by subjecting borrowing to approval by a ministry of finance, and by giving this ministry a mission (budget balance, say) that does not internalize nonmonetary benefits of continuing the project.²¹

To formalize this idea, we use a variation of the endogenous multiprincipal model in Dewatripont and Tirole (1992). The public enterprise undertakes a new project. The project's initial investment cost $I \in \{I_0, I_1\}$, with $I_0 < I_1$, is random and depends on the firm's effort $e \in \{e, \bar{e}\}$. The firm's manager incurs disutility K (respectively, 0) from exerting effort $\bar{e}$ (respectively, e). The completion of the project costs $J > 0$, and yields a random benefit $\Delta \in [\Delta^{\min}, \Delta^{\max}]$, that for simplicity we decompose into a monetary benefit $\alpha\Delta$ and a nonmonetary benefit $(1 - \alpha)\Delta$, where $0 < \alpha < 1$ (see below for a discussion of this division in terms of cost reduction and increase in the net consumer surplus). We assume that I is verifiable while the action of stopping or completing the project is noncontractible; one interpretation may be that the level of new debt contracted by the firm is verifiable while other decisions are not. We also assume that Δ cannot be extracted from accounting data; for simplicity Δ is considered to be noncontractible. The effort determines the density of the benefit Δ of completing the project: $\tilde{f}(\Delta)$ for effort $\bar{e}$ and $f(\Delta)$ for effort e . Let $\tilde{F}(\cdot)$ and $F(\cdot)$ denote the associated cumulative distributions, and $\bar{x}$ and x the probabilities that $I = I_0$. The variables I and Δ are independent conditionally on effort. We assume the monotone likelihood ratio property: $\tilde{f}(\Delta)/f(\Delta)$ is increasing in Δ and $\bar{x} > x$.

The firm's manager does not respond to monetary incentives and receives a fixed wage; that is, he has no utility for money as long as he receives some minimum wage level (the theory can be extended to monetary incentives as discussed below). The manager derives private benefit B if the project is completed, and 0 if it is not. This benefit may stem from perks attached to playing with the new technology, from an associated increase in human capital, or else (in an extension of the model with imperfect information about the

²¹ This reasoning assumes some independence of the ministry of finance from intervention by the prime minister. A prime minister who would aggregate goals and systematically take over the ministerial tasks would recreate the single principal situation.

Similarly, having two principals would not improve on a single one if the two principals renegotiated only between themselves and required no concession from the firm (that is, if the firm obtained its best feasible outcome in the three-way renegotiation game). In such a case, only asymmetric information between the principals (created, say, by separate information collection) or other bargaining costs would yield a role for multiple principals, by limiting the efficiency of renegotiation.

manager's ability) from the signal sent to the labor market when the project is completed. The manager has reservation utility equal to 0.

Let us summarize the timing: The control rights within government are allocated (see below); the manager then chooses his effort; the uncertainty about I and Δ is resolved; the ministry in control for verifiable variable I decides whether to stop or complete the project. Note that we do not allow for renegotiation after the uncertainty is resolved and before the completion decision is chosen. It is easy to see that the same qualitative results would obtain if renegotiation were allowed, as long as the manager makes some concession of private benefits in order to induce completion when the ministry in control has a preference for stopping.

We now derive the optimal managerial incentive scheme (which is here confined to the state contingent decision of project completion, since formal incentive schemes are ruled out) by maximizing the expected benefit of completion subject to the constraint that the manager prefers $\bar{e}$. [We ignore the manager's welfare for simplicity.] Let Δ_k , $k \in \{0, 1\}$, denote the cutoff benefit when $I = I_k$. That is, the project is completed if and only if $\Delta \geq \Delta_k$. We have

$$\max_{\{\Delta_0, \Delta_1\}} \left\{ \bar{x} \int_{\Delta_0}^{\Delta^{\max}} (\Delta - J) \bar{f}(\Delta) d\Delta + (1 - \bar{x}) \int_{\Delta_1}^{\Delta^{\max}} (\Delta - J) \bar{f}(\Delta) d\Delta \right\}$$

subject to the incentive compatibility constraint:

$$B[\bar{x}(1 - \bar{F}(\Delta_0)) + (1 - \bar{x})(1 - \bar{F}(\Delta_1))] \geq B[\underline{x}(1 - \underline{F}(\Delta_0)) + (1 - \underline{x})(1 - \underline{F}(\Delta_1))] + K$$

The solution is straightforward: The cutoff rule satisfies $\Delta_0 < J < \Delta_1$. That is, optimal incentives require the government to be tougher when costs run over.

Now a single headed government maximizing social welfare would not create appropriate incentives. This government would complete the project if and only if $\Delta \geq J$, regardless of the realisation of I ! The soft budget constraint phenomenon occurs when

$$B(\underline{F}(J) - \bar{F}(J)) < K$$

that is when the incentive constraint is not satisfied for a completion rule that is insensitive to cost overruns.

Let us now turn to the implementation of the optimal completion rule. We start with the special case where $\Delta_0 = \Delta^{\min}$, and $\Delta_1 = J$. Then, the optimal completion rule can be implemented by the following institution: when investment costs remain reasonable ($I = I_0$), control remains with a spending ministry, whose mission is to complete projects, or indifferently, maximize output, technical progress or minimize consumer prices in some interpretations. This will implement $\Delta_0 = \Delta^{\min}$. When investment costs run over ($I = I_1$), control shifts to the finance ministry, which is instructed to strive for budget balance for the state. The finance ministry then compares the monetary return

$\alpha\Delta$ and completion cost J and implements $\Delta_1 = J/\alpha$. This example contains the gist of our idea. Of course, those particular values of Δ_0 and Δ_1 can arise only by a fluke, and less simple-minded missions must be given to our two ministries. We will come back after the next two remarks to missions for the finance ministry when $J > \alpha\Delta_1$ (purely monetary concerns makes this ministry too tough) or $J < \alpha\Delta_1$ (purely monetary concerns do not make it tough enough).

Remark 1. The model above is one of moral hazard. Alternatively, one could endow the managers with private information about the likely costs and benefits of the project before it is started. The logic of the model is then hardly changed. The shift of control to a tough principal in case of large financial needs then serves to reduce the firm's incentive to push a worthless project.

Remark 2. The intuition about why the theory can be extended to managerial monetary benefits (as in Dewatripont and Tirole, 1992) is the following: suppose that the project reduces the firm's cost and leads to lower consumer prices and higher demand. If managerial rents associated with production increase with the level of activity of the firm (as in Laffont and Tirole, 1993), project completion is then a reward for the manager.

To return to some of the open questions mentioned before, let us specialize the model by assuming project completion brings about a reduction in the firm's marginal cost. The price charged to consumers therefore depends on whether the process innovation takes place. There are many pricing rules that can be followed: for instance, marginal cost pricing, monopoly pricing, and Ramsey pricing (where the Ramsey price maximizes the sum of the consumer net surplus plus the firm's revenue evaluated at one plus the shadow cost of public funds). For concreteness, let us assume that the price is set optimally given that taxation is socially costly, that is that the price is equal to the Ramsey price. The monetary benefit alluded to before ($\alpha\Delta$) is then equal to (one plus the shadow cost times) the firm's increase in profit associated with the reduction in marginal cost. The nonmonetary benefit $((1 - \alpha)\Delta)$ is equal to the increase in consumer net surplus.

When $\alpha\Delta_1 < J$, a ministry of finance with purely monetary objectives is too tough, that is completes too little. To soften its behavior, it suffices to build as its objective a weighted average of the budget surplus and (minus) the consumer price index. Because the completion of the project reduces marginal cost and thus price, the ministry of finance becomes softer, and picks Δ_1 as its cutoff benefit if the weights are chosen appropriately. It is interesting in this respect to note that the French ministry of finance is in charge of keeping consumer prices low as well as obtaining financial balance.

When $\alpha\Delta_1 > J$, a ministry of finance with purely monetary objectives is too soft. It does not seem reasonable to reward it for high consumer prices, though, even if this would make it more prone to stop the project. A costly way to fine tune the ministry of finance's objective function is to give it the control rights not only on the amount of borrowing, but also on pricing. Indeed, a ministry

of finance with purely monetary objectives would charge the monopoly price. Because a process innovation raises profit less when prices are monopoly, rather than Ramsey prices (the marginal cost reductions apply to a lower number of units), the ministry of finance has less incentives to complete the project if it has control rights over prices than when it does not. Giving full control rights when $I = I_1$ to the ministry of finance thus makes it tougher. Such a policy however makes sense only if the deadweight loss associated with high prices is not too large.

8. Division of labor in government: checks and balances

Section 7 argued that goal setting in government may reflect a desire to control the behavior of other economic agents. It suggested why social welfare maximization perhaps should not be pursued by ministries with control rights. This section (also based on ideas developed with Mathias Dewatripont) arrives at a similar conclusion from a quite distinct perspective. Its idea is that competition in government among advocates of specific interests or causes may give rise to good policy setting.

The use of competition among enfranchized advocates has wider scope than government. The archetypal example of this can be found in courts. The defense attorney is expected to stand for the defendant, to the point that he is not meant to reveal information that would be useful for the jury in reaching a decision, but would hurt the defendant's case. Similarly, the prosecutor's job is to be as tough with the defendant as possible. No social welfare maximization or impartiality is expected from them. This system of conflict and partiality has prevailed for centuries and is deemed to be an integral piece of a democratic system. Another non-government example is that of a union or management in a firm that are not meant to represent the same interests.

Similar situations abound in government. No ministry's mandate is to maximize social welfare. The ministry of labor is there to defend wage earners, the ministry of industry to promote the industry, the ministry of the environment to protect the environment, and so forth. A second example is provided by the legislature. A representative is expected to make a case for his constituency, and not for the others. A third example is the division of labor between a nationally elected president and the legislature representing local interests against the center. Similarly, the US Senate, with its two senators per state, defends the interests of underpopulated states better than the House of Representatives with its roughly proportional representation. Last, multipartism is often a system of advocates with parties representing distinct political constituencies.

Several interpretations can be given to the notion of 'checks and balances'. We here take the view that for government to exhibit checks and balances, the cases for alternative policies or causes must be defended properly. Information must be created and clearly explicated, that bears on the pros and cons of those alternatives. Of course, this is only a necessary condition for good government,

as political decision making must act on this information appropriately. This section ignores the second issue by assuming that, somehow, the decision that maximizes 'social welfare' conditional on the information created and diffused is picked. This of course is a strong assumption, but its implications seem somewhat tangential to the main points we want to make here.

We thus study the creation of information for decision making. We first argue that a single information collector faces conflicting tasks when asked to gather information concerning opposing causes. Consider for instance a redistribution issue in which money can be given to A , or to B , or shared between the two. It is no easy task to structure incentives for an information collector that makes the case for both A and B by searching for grounds to favor one or the other. For a decision to share money between the two may be motivated either by a complete lack of information or by the discovery of two opposing effects. Now, it would be straightforward to structure incentives if one could give direct incentives based on the information collected, as is assumed in the literature: The information collector would be rewarded more for collecting pieces of evidence favoring both even if those cancel out in decision making, than for collecting evidence in favor of one, than in turn for collecting no evidence. In contrast, if rewards for information collection are indirect and based only on the final decision, the reward is constrained to be the same when two conflicting pieces of evidence are created and when none is created. The information collector's task is not focused enough if he must make the case for both. We will see that competition between open advocates of the two causes may generate better decision making, and we will analyze the costs and benefits of such competition.

We find the idea of indirect reward appealing in many problems. For information is often a difficult object to describe *ex ante* in an incentive scheme. A lawyer is paid by the plaintiff as a function of whether the case is won and of the level of damages awarded, but not of the information brought to bear or of the quality of the case made by the lawyer. Similarly, politicians and parties are often rewarded by voters on the basis of which decision was made rather than on how the decision was reached. Representatives are often judged on what they obtained for their constituencies. A minister's tenure is often assessed by how well he fulfilled the mission of his ministry, rather than by the quality of the arguments he gave to defend his cause. To be certain, I am here overstating the case for indirect rewards. Direct rewards for information collection and diffusion also exist in the form of career concerns. Some close to the decision making process will recall not only whether the bureaucrat or politician succeeded in pushing his point of view, but also whether a good case was made. So, in general, we have a mixture of direct and indirect rewards for information collection. The purpose of this section is to investigate the consequences of indirect rewards by ignoring direct ones.

Consider the following simple example: There are three possible policies A , B and status quo (indexed by a zero). For instance, A and B might be more nuclear or coal oriented policies. Or A and B might be two constituencies to

distribute money between, the status quo corresponding to equal sharing. There are two potential pieces of information: One that favors A and the other that favors B . The decision chosen is to favor a cause (A or B) if there is a piece of information favoring it, but none favoring the other. In the absence of information or in the presence of conflicting information, the status quo is chosen. Let us assume for the moment that a single information collector, or agent is used. This agent is risk neutral and has reservation utility equal to zero. To collect information favorable to cause i ($i = A, B$), he must incur private cost K ; with probability x , he then finds a piece of evidence favoring cause i , and with probability $(1 - x)$, he finds no evidence. He finds no evidence if he does not spend K . For the moment, we assume that the evidence is disclosed once discovered and is therefore used for decision making. We also assume that the stakes are sufficiently important that one would want the collector to spend $2K$ to search for the two possible pieces of information. We will take a complete contract perspective in which the agent's (indirect) reward is based on the decision. Let w_A , w_B , and w_0 denote wages when A is favored, when B is favored and when the status quo is chosen. The complete contract perspective is more appropriate in the case of a lawyer than for a politician, but the same points can be made in an incomplete contracting set up.

Let us look at the agent's incentive constraint. He obtains w_0 when exerting no effort. He gets

$$xw_i + (1 - x)w_0 - K$$

when he looks for information favorable to cause i and

$$x(1 - x)(w_A + w_B) + (1 - 2x(1 - x))w_0 - 2K$$

when he looks for the two kinds of information. Suppose, without loss of generality, that $w_A \geq w_B$. If the agent exerts any effort, necessarily $w_A \geq w_0$. It is easy to show that for $x \geq 1/2$, the agent never chooses to look for evidence in both directions. Thus, having two agents, each looking in one direction, is the only way to obtain the maximum information. To obtain effort in the two directions, it suffices to pay $w_0 = w_j = 0$ ($j \neq i$) and $w_i = K/x(1 - x)$ to agent i who is in charge of collecting information favorable to cause i .

Competition between the two agents thus allows society to obtain more information. Note that having one or two agents would be equivalent if direct rewards could be specified. It would then suffice to promise a single agent K/x per piece of evidence.

In this example, the single agent is reluctant to exert a second effort to find evidence favorable to cause B because he is afraid that this new evidence might annihilate the benefit he will derive if he finds evidence favorable to cause A . One may object that, if the agent can conceal evidence, he will do so if he finds evidence favorable to the two conflicting causes. He will keep one piece of evidence and throw away the other. It is interesting in this respect to note that, with a single agent and when $x \geq 1/2$, society obtains more effort by letting the

agent have property rights on his information and letting him dispose of information as he wishes.²²

This brings us to a more general discussion of the costs and benefits of competition in information creation.²³ In the example above, competition always dominates monopoly. To introduce a cost to competition, assume that an agent can destroy evidence and that in the process of searching for evidence favorable to cause i , advocate i has some probability of finding evidence favorable to cause j : the ministry of the environment may find that pollution is costly to curb, the ministry of energy may find that nuclear power will be expensive, and so forth. The advocate has no incentive to release this sort of information, while a more impartial agent would have some such incentive.

It is out of the scope of this paper to develop the analysis when agents can find favorable and unfavorable information. Here is some flavor of the results: Competition may lead to a 'lack of decisiveness' or 'immobility' or 'excessive balancing', in the sense that the status quo may be chosen because one camp is concealing information unfavorable to its cause while the other has not found any information at all. In contrast, monopoly may excessively favor decisions favoring a specific cause; as we saw earlier, a single agent has an incentive to conceal one of two pieces of information that cancel out in order to show that he has been busy and gotten things to move.

9. Concluding remark

The overdue interaction between the economics of organization and political science will most likely be very fruitful. Classical agency models of moral hazard and adverse selection can be used to explain low powered formal incentives, and to study the specificities of career concerns, capture, and monitoring in government. The newer, and less settled paradigm of incomplete contracting and property rights will be invoked to understand the size and involvement of government, its division in branches, the ministerial organization, the constitution and other institutions, and so forth. After all, much of the realm of normative political science is about the allocation of control rights!

In the introduction to his fascinating book on bureaucracy, J. Q. Wilson writes:

When I was a young and giddy scholar, I had hopes that [a theory of bureaucratic behavior] could be created (ideally, by me). I even tried my hand at a few versions. What resulted was not a theory of bureaucracy, but rather a few modest additions to the long list of theories about some aspect of bureaucracy. Over thirty years ago, James G. March and Herbert A. Simon

²² If $w_A \geq w_B$ and $(x - x^2)(w_B - w_0) \geq K$, the agent will want to exert the second effort if he has the property rights.

²³ Holmström and Milgrom (1990) identify another factor affecting the choice between one and two agents, namely the correlation of tasks. High correlation between tasks generates high benefits from relative performance evaluation and therefore favors competition between agents. (Formally, their model always has two agents. The issue is whether to prohibit side trading between them, or to allow it. In the latter case, the two agents behave much like a single one.)

wrote that 'not a great deal [of theoretical interest] has been said about organizations, but it has been said over and over in a variety of languages. That is still pretty much the case, as is evident from how often people still cite studies by March and Simon as support for one point or another. After all these decades of wrestling with the subject, I have come to have grave doubts that anything worth calling 'organization theory' will ever exist.

In view of the recent tremendous progress in incentive theory, I am more optimistic than this. While economists have a lot to learn from political scientists and sociologists, they also have a powerful language and powerful tools that in the future may yield a better understanding of government.

*IDEI, Université des Sciences Sociales de Toulouse,
Place Anatole France, F-31042 Toulouse cedex, France; MIT; and CERAS.*

ACKNOWLEDGEMENTS

This paper is the written version of the Hicks lecture given at Oxford by the author on April 29, 1992. Financial support from the Institute for Policy Reform (IPR) and the Agency for International Development (AID) under cooperative agreement PDC-0095-A-00-1126-00 is gratefully acknowledged. Views expressed in this paper are those of the author and not necessarily those of IPR and AID. The author is grateful to Jacques Crémer, Mathias Dewatripont, Bengt Holmström, Jean-Jacques Laffont, John Vickers and an anonymous referee for helpful comments. The paper makes substantial use of joint work with Mathias Dewatripont and Jean-Jacques Laffont.

REFERENCES

- BENABOU, R. (1991). 'Workings of a City: Location, Education, and Production', Working paper no. 582, MIT, Cambridge, MA.
- BERNHEIM, D. and WHINSTON, M. (1986). 'Common Agency', *Econometrica*, **54**, 923–43.
- DEWATRIPONT, M. and TIROLE, J. (1992). 'A Theory of Debt and Equity: Diversity of Securities and Manager–Shareholder Congruence', mimeo, Université Libre, Bruxelles, and IDEI, Toulouse.
- FOX, R. (with J. FIELD) (1988). *The Defense Management Challenge: Weapons Acquisition*, Harvard Business School Press, Boston.
- FRIEDMANN, W. (1970). 'Government Enterprise: a Comparative Analysis', chapter 16 in W. Friedmann and J. Garner (eds), *Government Enterprise: A Comparative Study*, Columbia University Press, New York.
- GROSSMAN, S. and HART, O. (1986). 'The Costs and Benefits of Ownership: a Theory of Lateral and Vertical Integration', *Journal of Political Economy*, **94**, 691–719.
- HANSMANN, H. (1988). 'The Ownership of the Firm', *Journal of Law, Economics and Organization*, **4**, 267–304.
- HICKS, J. (1935). 'Annual Survey of Economic Theory: The Theory of Monopoly', *Econometrica*, **3**, 1–20.
- HOLMSTRÖM, B. (1982). 'Managerial Incentive Problems: A Dynamic Perspective', in *Essays in Economics and Management in Honor of Lars Wahlbeck*, Swedish School of Economics, Helsinki.
- HOLMSTRÖM, B. and MILGROM, P. (1990). 'Regulating Trade Among Agents', *Journal of Institutional and Theoretical Economics*, **146**, 85–105.

- HOLMSTRÖM, B. and MILGROM, P. (1991). 'Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design', *Journal of Law, Economics and Organization*, 7, 24–52.
- LAFFONT, J.-J. and TIROLE, J. (1991). 'Provision of Quality and Power of Incentive Schemes in Regulated Industries', in W. Barnett, B. Cornet, C. d'Aspremont, J. Gabszewicz and A. Mas-Colell (eds), *Equilibrium Theory and Applications, (Proceedings of the Sixth International Symposium in Economic Theory and Econometrics)*, Cambridge University Press, Cambridge, MA, 161–96.
- LAFFONT, J.-J. and TIROLE, J. (1993). *A Theory of Incentives in Regulation and Procurement*, MIT Press, Cambridge, MA.
- LEVY, D. (1970). 'Control of Public Enterprises in France', chapter 7 in W. Friedmann and J. Garner (eds), *Government Enterprise: A Comparative Study*, Columbia University Press, New York.
- MARTIMORT, D. (1991). 'Multiple Principals and Asymmetric Information', mimeo, Université de Toulouse.
- OLSON, M. (1965). *The Logic of Collective Action*, Harvard University Press, Cambridge, MA.
- SCHELLING, T. (1960). *The Strategy of Conflict*, Harvard University Press, Cambridge, MA.
- SCHMIDT, K. (1991). 'The Costs and Benefits of Privatization', mimeo, University of Bonn.
- SHAPIRO, C. and WILLIG, R. (1991). 'Economic Rationales for the Scope of Privatization', mimeo, Princeton University.
- STIGLER, J. (1971). 'The Economic Theory of Regulation', *Bell Journal of Economics*, 2, 3–21.
- STOLE, L. (1990). 'Mechanism Design under Common Agency', mimeo, MIT, Cambridge, MA.
- TAI, A. J. (1990). 'Commitment in Repeated Hierarchical Relationships', mimeo, MIT, Cambridge, MA.
- WILSON, J. Q. (1989). *Bureaucracy: What Government Agencies Do and Why They Do It*, Basic Books