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The Economics of Career Concerns, Part II: Application to Missions and Accountability of Government Agencies

MAŢHIAS DEWATRIPONT
ECARE, Universite Libre de Bruxelles, CEPR and CORE

IAN JEWITT
University of Bristol, CEPR and CMPO

and

JEAN TIROLE
IDEI, GREMAQ, CERAS, MIT

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The paper uses a simple multitask career concern model in order to analyse the incentives of government agencies' officials. Incentives are impaired by the agency pursuing multiple missions. A lack of focus is even more problematic in the case of fuzzy missions, that is when outsiders are uncertain about the exact nature of the missions actually pursued by the agency. Consequently agencies pursuing multiple missions receive less autonomy.

The paper further shows that professionalization creates a sense of mission for the agency, and that the specialization of officials raises their incentives. Last, the paper compares its predictions with the stylized facts on Government bureaucracies.

1. INTRODUCTION

What drives civil servants? Which goals do they pursue? What distinguishes Government agencies and private firms? To address these questions and others, this paper builds a simple multitask career concern model, and compares its predictions with the stylized facts on Government bureaucracies. Perhaps the most striking stylized facts, summarized in James Q. Wilson's celebrated survey of U.S. Government agencies (1989), are:

(a) *Differences between Government agencies and private firms*. In Chapter 7 of his book, Wilson stresses three key differences between Government agencies and private firms:

- *Preponderance of career concerns*: Financial incentives play a much more limited role in Government agencies than in the private sector.

- *Multiplicity and, possibly, fuzziness of objectives*: While private firms' managers can focus on profit maximization, Government agencies pursue multiple goals. Furthermore, the set of goals to be pursued may not reflect a clear understanding between the agency and its principals.
- *Limited autonomy*: Government agencies have much less freedom in their managerial decisions than their private counterparts.

(b) *Mission setting*. Wilson warns against a lack of understanding concerning the set of desirable goals. He stresses the concomitant necessity of developing a sense of "mission". In his view, the organization must eschew "vague objectives" and define a set of "critical tasks" or "operational goals" (pp. 25, 32–34):[1] The "culture" of an organization is a way to see what these critical tasks are and how to deal with them (p. 93). A "mission" is a single culture that is widely and enthusiastically shared by the members of the organization (p. 99).

(c) *Focus*. Wilson emphasizes the incentive cost of the pursuance of multiple goals. He stresses the need for focusing on a subset of tasks even at the price of sacrificing other important tasks. This pursuit of focus may lead well-run agencies to resist being granted new tasks (in contrast to Leviathan theories of Government), as "conglomerate agencies rarely can develop a sense of mission; the cost of trying to do so is that few things are done well" (p. 371).

He provides examples of important tasks that have deliberately been neglected by those U.S. agencies, listed in Table 1, that have successfully developed a sense of mission:

TABLE 1

Agency	General objective	Mission
Tennessee Valley Authority	Regional planning	Produce electricity
Social Security Program	Administer social security	Pay benefits on time
Department of Agriculture	Feed the nation	Help farmers
National Forest Service[a]	"Promote" the pool of forests	Manage forests
Texas Prisons[b]	Containment and rehabilitation of prisoners	Control inmates
Department of Transportation	Improve the safety of driving	Improve car safety

[a] At the turn of the century, under the leadership of Gifford Pinchot.
[b] In the 1970s, under the leadership of George Beto.

environmental issues and strategic planning by the Tennessee Valley Authority, environmental issues and education of the public by the National Forest Service, and rehabilitation of prisoners in Texas prisons.[2]

Examples of new tasks being resisted by agencies include the food stamp programme (helping the poor) by the Department of Agriculture, and supplementary programmes for people in need (poor, blind, disabled) by the Social Security Administration. In both cases,

1. For example, while the "education of children" is the objective of the school system, it has to be translated into a precise curriculum, examination methods, a system of discipline inside schools, and so forth.

2. Because neglected tasks can be quite important, we may want to create "advocates" for the associated causes. Our work differs from that of Dewatripont–Tirole (1999) on advocacy. In our paper, objectives are not *per se* incompatible, while the separation of tasks in the later paper results from an intrinsic conflict between goals (a success in one dimension comes at the expense of a poorer performance in another dimension.) An example of such intrinsic conflict mentioned by Wilson (p. 158) concerns the Immigration and Naturalization Service, which has found it hard to be simultaneously tough ("keep immigrants out") and nice ("let in necessary agricultural workers", "facilitate the entry of foreign tourists", and so forth.)

the new programmes implied missions remote from the agencies' core missions (namely, helping farmers and paying benefits to pensioners in a timely fashion, respectively).

(d) *Role of "professionals" and "narrow specialists" in creating a sense of mission.* Substituting "professionals", namely officials whose career concerns are at least partly determined by their professional environment, for "bureaucrats", whose career concerns are primarily internal, can help develop a sense of mission. For example, the massive hiring of engineers helped define the missions pursued by the Tennessee Valley Authority and the Department of Transportation (pp. 59–65). Similarly, the hiring of forestry experts was crucial in defining a mission for the National Forest Office.

(e) *Sense of mission and autonomy.* Finally, Wilson stresses the fact that agencies with a strong sense of mission are perceived to be more effective and are consequently given more freedom (p. 217). In this respect, professionalization can be a key ingredient to the preservation of one's autonomy. "The maintenance of some agencies depends so crucially on their appearing professional and nonpolitical that it would be foolhardy for an elected official to compromise that appearance" (p. 199).

To address these stylized facts, we extend Holmström's celebrated (1982) career concerns model to a multitask environment. In our view, an important distinction between a Government agency and a private company is that the former is instructed to pursue social welfare objectives while the latter is asked to maximize solely shareholder value. That is, the mandate of a Government agency is to internalize a number of externalities (employment, pollution, education, *etc.*) besides the monetary dimension of its activity. In a sense, an agency is the ultimate "stakeholder society". Agencies must therefore pursue goals that, unlike financial objectives, are hard to measure and therefore to reward directly. As will be shown in Section 3.3, this observation implies that agencies may operate more or less on a fixed budget and that career concerns are paramount in prodding officials to pursue the agencies' goals.

The key insight of the career concern model is that, even in the absence of monetary incentives, an agent of uncertain talent expends effort in order to convince the relevant "labour market" of her high talent; a high performance raises the perception of her ability and translates into future job opportunities within or outside the organization. In a companion paper (Dewatripont *et al.*, 1999), we investigate the properties of the career concerns model and derive general results on the relationship between information structures and incentive intensity. This paper in contrast derives specific organizational implications of the multitask career concern model. It first makes the following observation: in the presence of complementarity between effort and talent, multiplicity of equilibria can arise: market expectations about high or low effort can be self-fulfilling. In a multitask context, this implies that the agent can end up focusing on the set of tasks the market expects her to focus on.

In our set-up, we obtain the following set of predictions:

- Expanding the set of tasks pursued by the agent typically reduces total effort. This can even lead to a collapse of effort if too many tasks are pursued because the link from performance to the market's inference about talent becomes too weak.
- Fuzzy mission equilibria, namely equilibria in which the market is uncertain about the nature of tasks pursued by the agent, typically involve less total effort than equilibria in which the market knows the effort allocation across tasks (while still

not observing effort) because the uncertainty weakens the link from performance to the market's inference about talent.

- These two results imply that a principal who hires a "narrow specialist", whose talent is known to be low for all but a subset of tasks, can count on more effort and has less incentives to monitor the agent.
- Since effort in the career concern model is driven by talent uncertainty, the principal faces a tradeoff between the riskiness of overall performance and effort, a tradeoff which is not present in explicit incentive models.

The first three results nicely back Wilson's evidence. The first result predicts a positive correlation between "accountability" of an organization (its effort level) and its "focus". The second result says that accountability increases with the "clarity" of its mission. And the third result implies that "narrow professionals" are naturally more accountable, and thus are conferred more autonomy. Finally, the fourth result is a logical implication of our analysis and is consistent with Wilson's evidence, although it is not stressed by him. While in the explicit incentive model, reducing riskiness of operations typically raises effort, it does not in the career concern model; since agents work in order to "impress" the market about their talent, talent uncertainty raises effort. It thus pays the organization to specialize its members in subsets of tasks for which talent risk is positively correlated; the downside of this is that it may destabilize the overall performance of the organization. We feel that this tradeoff is a significant feature of government organizations, as opposed to explicit-incentive private firms, and one of the key insights of this paper.

The paper is organized as follows: Section 2 details the model, while Sections 3 to 6 look in turn at the four predictions just described. Finally, Section 7 concludes.

2. THE MODEL

2.1. *Description and equilibrium*

There are two parties, called the "agent" and the "market" (or the "organization", or the "principal"). The agent chooses an unobservable vector of "actions" or "efforts" $a = (a_1, \ldots, a_n)$ and incurs private cost $c(a)$. The market then observes a vector of observables or performance variables $y = (y_1, \ldots, y_m)$ and takes actions that result in benefit or reward t for the agent, whose utility is then

$$t - c(a).$$

The reward t reflects the market's expectation of an unknown parameter θ conditional on the observables y. As in the standard career concern model, θ will be referred to as the "agent's talent" and for most of the paper is taken to be a scalar. As in our companion paper, let $f(\theta, y|a)$ denote the joint density of talent and observables given effort vector a, and

$$\hat{f}(y|a) = \int f(\theta, y|a)d\theta,$$

denote the marginal density of the observables. The agent's reward for performance variables y and equilibrium actions a^* is thus

$$t = E(\theta|y, a^*) = \int \theta \frac{f(\theta, y|a^*)}{\hat{f}(y|a^*)} d\theta.$$

Let c_a and $\hat{f}_a$ denote the gradients with respect to efforts of the cost function and of the marginal distribution (we will use "primes" for derivatives in the scalar case), and suppose that the market anticipates equilibrium effort vector a^*. The agent chooses a so as to maximize her expected utility

$$\max E[E(\theta|y, a^*)] - c(a), \tag{2.1}$$

where the first expectation is with respect to performance and the second with respect to talent. As shown in our companion paper, this leads to:

Proposition 2.1 (Equilibrium condition). *In an equilibrium of the career concern model, the gradient of the cost function is equal to the covariance of talent and the likelihood ratio*:

$$\operatorname{cov}\left(\theta, \frac{\hat{f}_a}{f}\right) = c_a(a^*). \tag{2.2}$$

2.2. *The multi-task normal model*

This paper applies the analysis to multiple tasks in order to investigate the connection between effort incentives and the set of activities pursued by the agent. We undertake this analysis within a framework which, although specific, allows us to consider the additive-normal and multiplicative-normal models as special cases.

The multi-task normal model. Assume that performance concerning task $i \in \{1, \ldots, N\}$ is given by

$$y_i = \theta(\mu a_i + b) + \gamma a_i + \varepsilon_i,$$

where μ, γ and b are positive known constants, $a_i \geqq 0$ is effort expended on task i and, as earlier, θ and ε_i are independently distributed and

$$\theta \sim \mathcal{N}(\bar{\theta}, \sigma_\theta^2) \quad \text{and} \quad \varepsilon_i \sim \mathcal{N}(0, \sigma_\varepsilon^2).$$

Holmström's model is a special case of this model with $\mu = 0$ (and $b = \gamma = 1$). A positive μ depicts a complementarity between talent and effort.

We distinguish between the (exogenous) number of potential tasks (N) and the number of tasks actually pursued (n), that is the number of tasks for which $a_i > 0$. We assume complete symmetry of the different tasks in order not to introduce a technological bias in favour of a focus on specific tasks.

Unless otherwise stated, we will assume that the principal cares only about

$$Y = \textstyle\sum_{i=1}^{N} y_i.$$

In this benchmark case, only $\hat{a}$ matters, not its distribution across individual tasks.[3] But of course, other objective functions can be entertained. For example, the principal might have a preference for the effort being split equally among the tasks for a given total effort.

In the same vein, we assume away any economies or diseconomies of scope, so the cost function can be written as a function, $c(\hat{a})$, of total effort $\hat{a} \equiv \sum_{i=1}^{N} a_i$. We assume

3. Note that an increase in the number of tasks brings about a mechanical bonus $\bar{\theta}b$ per new task, unless b is renormalized (equal to some constant divided by the number of tasks) when the number of tasks varies. Since this "mechanical bonus" plays no role in the analysis, which focuses on effort, we do not bother renormalizing b in this way.

$c' > 0$, $c'' \gtrless 0$, $c'(0) \geqq 0$. [The figures will be drawn for the quadratic cost function $c(\hat{a}) = \hat{a}^2/2) + d\hat{a}$.]

The single-task case. To build intuition before embarking on the analysis of multiple tasks, let us first consider the case in which $N = 1$. We thus have a single-task, single-performance model, but where talent matters more, the higher the effort. In other words, talent matters little if the agent shirks, but makes an important difference if the agent "tries to make things happen". When talent and effort are complements, performance is more likely to be informative about talent, the higher the effort. It is then easy to envision the following self-fulfilling behaviours: If the market puts substantial weight on the agent's performance, the agent is induced to exert high effort, which in turn leads the market to pay much attention to the agent's performance. And conversely.[4] Specifically, Proposition 2.1 then yields

$$\frac{\bar{\theta}\mu + \gamma}{(\mu\hat{a} + b) + \dfrac{\sigma_\varepsilon^2}{(\mu\hat{a} + b)\sigma_\theta^2}} = c'(\hat{a}).$$

The marginal cost of effort (the right-hand side of this condition) is increasing in $\hat{a}$. The covariance between θ and the likelihood ratio (the left-hand side of this condition) depends on $\hat{a}$ only through its denominator, and this only when $\mu \neq 0$. Indeed, in the pure additive case ($\mu = 0$), the signal-to-noise ratio is independent of effort. With a multiplicative effect ($\mu > 0$) the derivative of the denominator of the covariance with respect to effort,

$$\mu\left[1 - \frac{\sigma_\varepsilon^2}{\sigma_\theta^2(\mu\hat{a} + b)^2}\right],$$

is increasing in $\hat{a}$. There exists a level of $\hat{a}$, call it $\tilde{a}$, such that this derivative is positive for all $\hat{a}$s larger than $\tilde{a}$. Depending on parameter values, $\tilde{a}$ is strictly positive or not. For example *ceteris paribus*, for σ_ε^2 small enough, the covariance between θ and the likelihood ratio is always decreasing in effort. To understand this, consider the pure multiplicative model without noise: $y = \theta a$. For a given equilibrium effort a^*, the market estimates θ as y/a^*, so that a given increase in effort by the agent leads to a weaker upward revision of the market's estimate of talent.

For positive σ_ε^2, another effect goes however in the opposite direction: higher expected effort leads the market to give more weight to talent relative to noise when observing good performance. Indeed, for $b = 0$ (pure multiplicative case), when the market expects $\hat{a} = 0$, it attributes good performance *solely* to good luck, which is not the case when it expects positive effort.

For low $\hat{a}$s, this second effect can dominate the first one for b small enough or $\sigma_\varepsilon^2/\sigma_\theta^2$ high enough. In any case, for $\hat{a}$s high enough, the first effect always dominates.

Figure 1 shows the unique equilibrium in the additive case. Figure 2 shows the unique equilibrium when $\mu > 0$ and b large or $\sigma_\varepsilon^2/\sigma_\theta^2$ low. Finally, the last case is depicted in Figure 3, where two stable equilibria may coexist (the intermediate one being unstable).

Remark. If performance y were verifiable, then, following Gibbons–Murphy (1992), one might ask whether career concerns and explicit incentives are complement or substitutes. For the additive-normal model with mean-variance preferences and linear explicit

4. The multiplicity of equilibria in the career concerns model bears some resemblance with Arrow's (1973) theory of discrimination.

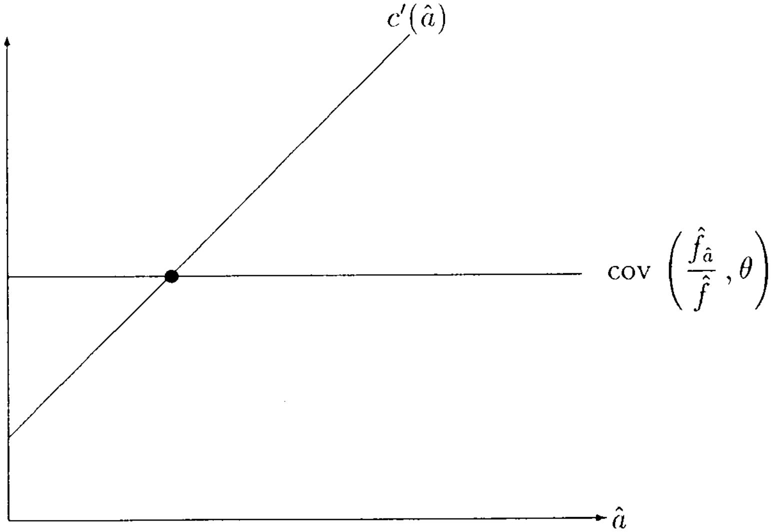

FIGURE 1
$\mu = 0$ (additive case)

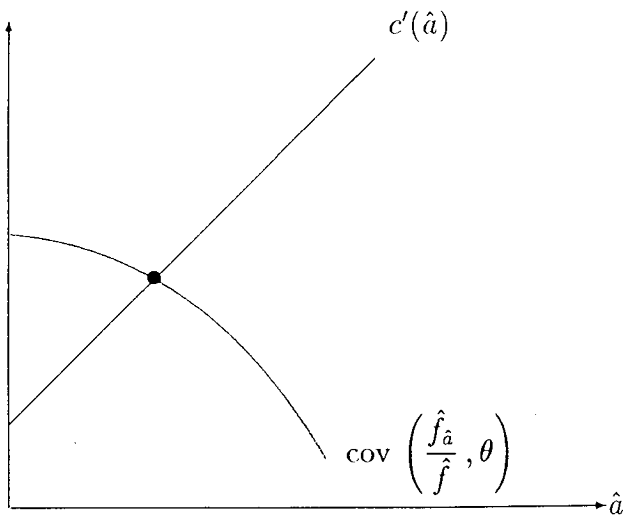

FIGURE 2
$\mu > 0$; b large or $\sigma_\varepsilon^2/\sigma_\theta^2$ small (weak multiplicative element)

incentives, Gibbons and Murphy show that an increase in the discount factor (and thus in career concerns) leads to a reduction in the slope of the current explicit incentive scheme. Figure 3 suggests why with a multiplicative technology explicit and implicit incentives may become complements (see Dewatripont *et al.* (1997) for more detail). Suppose that the marginal cost curve, $c'(a)$, lies above, without intersecting the implicit incentive curve, cov $(fa/f, \theta)$. Then as the discount factor grows and the two curves come closer to each other, it may become optimal to boost explicit incentives so that the total (explicit plus implicit) incentive reaches the marginal cost curve. Explicit incentives increase effort

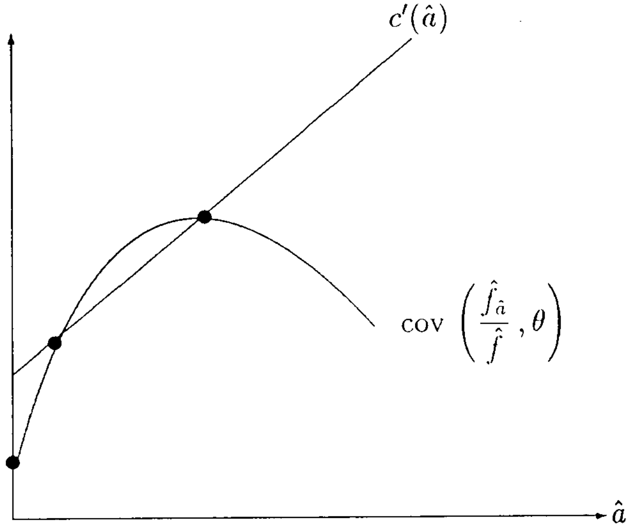

FIGURE 3
$\mu > 0$; b small or $\sigma_\varepsilon^2/\sigma_\theta^2$ large (strong multiplicative element)

and, when effort and talent are complements, induce the market to look more closely at performance. Through this channel explicit incentives reinforce career concerns, which may lead to a positive covariation of the two types of incentives.[5]

3. MULTIPLE TASKS, MISSIONS AND FOCUS

This section investigates the relationship between the *number* of tasks the agent pursues and total effort.

3.1. *Analysis*

3.1.1. *Observation of aggregate performance only.* We first look at the case where only the total performance on a subset I of tasks

$$Y_I = \textstyle\sum_{i\in I} y_i,$$

is observed by the market. The multi-task model then reduces to a single-task one. Whatever the set of tasks the agent could or would be allowed to work on, if the market only observes Y_I, the agent expends effort solely on the tasks included in I. How does total effort, a, depend on I? If I includes n tasks,

$$Y_I = \theta(\mu\hat{a} + nb) + \gamma\hat{a} + \textstyle\sum_{i\in I} \varepsilon_i.$$

5. The complementarity between explicit and implicit incentive schemes arises both "globally", to affect the *set* of equilibria, as well as locally, in terms of the high effort equilibrium. The more spectacular effect of explicit incentive schemes is when they expand the equilibrium set to include a positive effort equilibrium. Similarly, in some cases, they can *reduce* the equilibrium set by knocking off the zero effort equilibrium. But there is also a local complementarity between explicit and implicit incentive schemes: in the high effort equilibrium, raising explicit incentives raises effort, which in turn raises the attention the market gives to performance, thereby providing further effort incentives to the agent.

We obtain[6]

$$\mathrm{cov}_n\left(\frac{f_{\hat{a}}}{f}, \theta\right) = \frac{(\bar{\theta}\mu + \gamma)}{(\mu\hat{a} + nb) + n\sigma_\varepsilon^2/[(\mu\hat{a} + nb)\sigma_\theta^2]}.$$

Positive equilibrium levels of effort are those which equate this covariance with $c'(\hat{a})$. An increase in n lowers the covariance between talent and the likelihood ratio, and thus equilibrium effort, in all three cases. The most interesting one concerns Figure 3 where, for n large enough, the high-effort equilibrium disappears, as shown in Figure 4.

In the (Holmstrom) additive-normal model, a decreases continuously with n, which may not be the case when a multiplicative effect is introduced: As Figure 4 demonstrates, there is then a maximum $n, \hat{n}$, that allows for the high-effort equilibrium; beyond that value, a can only be zero.

The reader can obtain intuition for why total effort decreases with n, by focusing on the pure additive ($\mu = 0$) and the pure multiplicative ($b = \gamma = 0$) cases. For notational simplicity, assume moreover $b = \gamma = 1$ in the pure additive case, and $\mu = 1$ in the pure multiplicative case.

Consider first the "noiseless case", that is, $\sigma_\varepsilon^2 = 0$. In this case, the pure additive and the pure multiplicative models become, respectively

$$Y_I = \theta n + \hat{a},$$

$$Y_I = \theta\hat{a}.$$

Clearly, in the pure multiplicative case, changing n leaves $\hat{a}$ unchanged. Instead, in the pure additive case, incentives to expend effort go down, since the market infers the following θ from a performance Y_I given effort expectation $\hat{a}^*$

$$\frac{Y_I - \hat{a}^*}{n} = \theta + \frac{\hat{a} - \hat{a}^*}{n}.$$

There is moreover a second effect of an increase in n on effort, similar in both cases: the variance of $\sum_{i=1}^{n} \varepsilon_i$, namely $n\sigma_\varepsilon^2$, increases with n. In total, effort thus goes down when n increases.

Another interpretation goes as follows, in the pure additive case. Since, for $\mu = 0$ and $b = \gamma = 1$.

$$\mathrm{cov}_n\left(\frac{f_{\hat{a}}}{f}, \theta\right) = \frac{1}{n + \sigma_\varepsilon^2/\sigma_\theta^2} = \left[\frac{\sigma_\theta^2}{\sigma_\theta^2 + \sigma_\varepsilon^2/n}\right]\Big/ n,$$

Raising n increases the signal-to-noise ratio, since θ is multiplied by n while *n independent* errors appear in additive form; an increase in n further reduces the relative effect of effort $\hat{a}$ and talent θ on performance. While the first effect raises effort incentives—and this would be *less* the case if talent across tasks were not perfectly positively correlated—the second effect, which dominates overall, reduces effort incentives.

Let us summarize our results in the following:

Proposition 3.1 (Benefit from focus). *Consider the multi-task normal model and assume that only the aggregate performance on n tasks entrusted to the agent is observable.*

6. Since all ε_is are uncorrelated, the distribution of Y_I is normal with mean $\bar{\theta}(\mu\hat{a} + nb) + \gamma\hat{a}$ and variance $\sigma_\theta^2(\mu a + nb)^2 + n\sigma_\varepsilon^2$. Consequently,

$$\frac{f_{\hat{a}}(Y_I)}{f(Y_I)} = \frac{[(\theta - \bar{\theta})(\mu\hat{a} + nb) + \sum_{i \in I} \varepsilon_i][\bar{\theta}\mu + \gamma]}{\sigma_\theta^2(\mu\hat{a} + nb)^2 + \sigma_\varepsilon^2}.$$

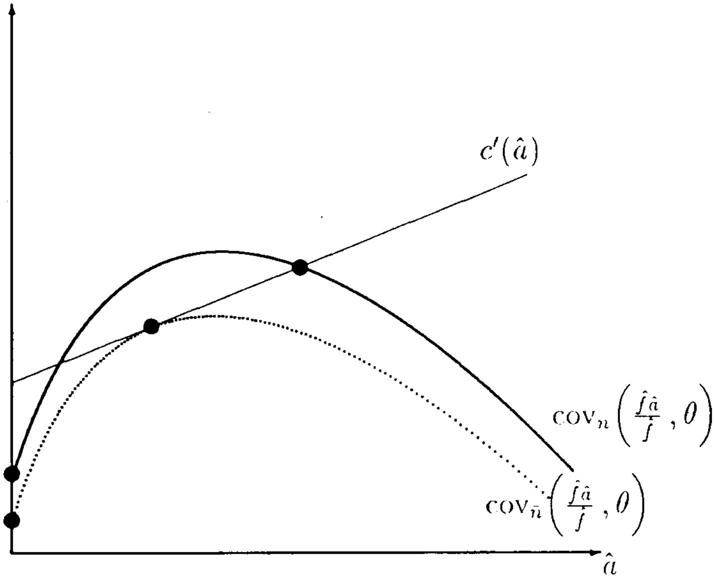

FIGURE 4

The higher the number n, the lower the stable, positive equilibrium total effort. Furthermore, in the presence of a multiplicative effect ($\mu > 0$) *and for* $c'(0) > 0$, *there is a value of n, n, beyond which the high-effort equilibrium disappears altogether.*

How robust is Proposition 3.1? One could first object, in the additive case, to the fact that raising n raises the impact of talent on performance Y_I: if it means splitting the agent's total working time into more slices, it might make more sense to have, in the "noiseless" case

$$Y_I = \frac{\theta}{n} n + \hat{a} = \theta + \hat{a}.$$

However, in this case, Proposition 3.1 is again valid: for $\sigma_\varepsilon^2 = 0$, raising n leaves total effort unchanged, and for $\sigma_\varepsilon^2 > 0$, it reduces total effort.

More important for the result is the assumption that raising the number of tasks raises the amount of pure noise (captured here by $\sum_{i=1}^{n} \varepsilon_i$). We feel this assumption is appropriate whenever effort is about raising the *expectation* of performance without affecting its variance. This is why performance on each task has an exogenous additive risk component, and the agent's effort changes this riskiness *solely* through talent uncertainty. Relaxing this assumption could change the results: for example, changes in n would become irrelevant for total effort if we had

$$Y_I = (\theta + \hat{a})\varepsilon \quad \text{or} \quad Y_I = \theta\hat{a}\varepsilon,$$

where ε would be independent of n. In reality however, effort is often not uncertainty-enhancing, so Proposition 3.1 is in our view quite general. Exploring conditions under which it might fail is however an interesting topic for further research.

Note also that the above analysis determines total effort a, but says little about its distribution across tasks. In this benchmark case, neither the agent nor the principal care about this distribution. If, instead, one introduced just a tiny amount of economies of scope in the agent's cost function, a would be spread equally across all tasks whose performance is reported as part of Y_I. This will suit the principal whenever he has convex preferences across tasks.

3.1.2. *Disaggregated performance accounting.* A specificity of the above analysis is that it restricts public information to the observation of aggregate performance

$$Y_I = \sum_{i \in I} y_i .$$

A plausible alternative is to assume the observability of individual performances

$$S_I = \{ y_i | i \in I \}.$$

Whenever I includes at least two elements and in the presence of multiplicative effects disaggregation may expand the multiplicity of equilibria: There may be a tendency for the agent to focus on the tasks the market expects her to focus on![7]

Proposition 3.2 (Disaggregated performance measurement). *Consider the multi-task normal model. In the pure additive case* ($\mu = 0$), *the unique equilibrium effort* a^* *is the same whether aggregate* (Y_I) *or disaggregated* (S_I) *performance is observed. In the pure multiplicative case* ($b = 0$), *the set of equilibria corresponding to the disaggregated information structure* S_I *is the union of the symmetric equilibrium sets for the aggregated information structures corresponding to subsets* $I' \subseteq I$, *that is to the observation of*

$$Y_{I'} = \sum_{i \in I'} y_i .$$

Proof. In the pure additive case, Y_I is a sufficient statistic for S_I as far as updating θ is concerned, so observing S_I or Y_I makes no difference. In the pure multiplicative case, when a_i is expected to be equal to 0, y_i is considered as pure noise and disregarded by the market, making $a_i = 0$ optimal for the agent. For each $I' \subseteq I$, there is thus an equilibrium where $a_i = 0$ for $i \notin I'$, and a_i is positive and constant across is$\in I'$, and where total effort is the same as that when only $Y_{I'}$ is observed. ||

Remark. Propositions 3.1 and 3.2 can be seen as corollaries of Proposition 5.1 of our companion paper (Dewatripont *et al.*, 1999). Consider a two-task problem. In the additive case $\mu = 0$, total effort is the same whether y_1 and y_2 or $y_1 + y_2$ is observed, and it is lower than if y_1 or y_2 is observed alone. Assume for example, without loss of generality, that $a_1 = a$ when y_1 alone is observed, and consider the effect of making y_2 observable on top of y_1. Because y_2 is good news for θ conditional on y_1, condition (a) of the proposition holds. Moreover, since effort a_1 decreases y_2 conditional on y_1, condition ($\neg$b) holds, and thus effort and news are oppositely ordered. By Proposition 5.1, the observability of y_2 thus reduces effort.

In contrast, in the pure multiplicative case ($b = \gamma = 0$), assuming again $a_1 = \hat{a}$ when y_1 alone is observed, the observability of y_2 on top of y_1 preserves the equilibria that obtain when only y_1 is observed: If $a_2 = 0$ is anticipated, y_2 is pure irrelevant noise. On the other hand, there exist also equilibria with $a_1 = a_2$. What matters in the pure multiplicative case is the set of *market expectations about focus*. Instead, in the pure additive case, what matters is *observability of tasks*.

3.2. *Interpretation*

3.2.1. *Focus: Task allocation or information systems?* How should Proposition 3.1 be interpreted? One possibility is that the agent is allocated all N tasks, but that only the

7. In the absence of economies of scope in the effort cost function, multi-task equilibria are in fact unstable: Were the market to put slightly more weight on any given task, the agent would "react" by concentrating her efforts solely on that task! On the other hand, the presence of economies of scope can ensure the local stability of the equilibria referred to in Proposition 3.2.

aggregate performance on subset I is made public. This set-up induces effort allocation only on subset I, and, the smaller the number of tasks included in I, the higher the total effort, which is the appropriate evaluation criterion.

Another interpretation is that I is the subset of tasks given to the agent. In this case, allocating more tasks to the agent brings an expected "mechanical" bonus θb for each additional task. However, focusing solely on effort remains the appropriate interpretation if one thinks of "dividing" the set of N tasks into subsets, one for each agent. In this interpretation, we identify a benefit of the division of labour, in terms of higher individual efforts.

Preferences over focus. Under either interpretation a principal interested in maximizing $Y=\sum_{i=1}^{N} y_i$ and thus indifferent with respect to the *distribution* of individual performances (the y_is) should thus try and induce focus. As for the agent, in the case of an exogenous date-1 financial compensation, she prefers a broad mission, so as to reduce effort: Indeed, she realizes she will fool no one by working in equilibrium, and sees a broad mission as a commitment not to expend effort. If, instead, the agent is able to obtain *ex ante* a wage equal to expected productivity, committing to a focused mission through the observability of a single y_i maximizes the agent's wage.

3.2.2. *Equilibrium selection*. How should Proposition 3.2 be interpreted? In the pure additive case, things are simple, since the result of Proposition 3.1 is replicated. In contrast, the multiplicity of equilibria in the pure multiplicative case raises the question of equilibrium selection. Still, we can say that the result of Proposition 3.1 is "robust", if we are ready to assume that, when S_I is expanded, the equilibrium number of tasks with positive effort (weakly) rises. Equilibrium selection remains a challenge for game theory, and this paper cannot pretend to contribute to resolving this challenge. The above assumption is natural, and guarantees that focus remains at least weakly optimal for total effort, even in the pure multiplicative case. Note moreover that introducing an additive component for talent to performance would reinforce the positive impact of focus on effort.

3.2.3. *Career concerns versus explicit incentives*. What results rely on career concerns, as opposed to pure explicit incentives? Proposition 3.1 would also hold in a simple linear explicit incentive scheme context with CARA preferences, since expanding I means more noise. In this sense, it is our "technological assumptions" which generate a benefit of focus in Proposition 3.1. Under explicit incentive schemes, the roles of θ and ε are more symmetric than under career concerns, as Section 6 will make clear.

In this section, the difference between career concerns and explicit incentives lies in Proposition 3.2:

— Under explicit incentive schemes, the multiplicity of equilibria is not a concern.
— In the additive case, which has a unique equilibrium, expanding S_I lowers total effort, while with pure explicit incentives, one can always disregard additional information, which is at best irrelevant.

The insights lead us to the following observations in terms of comparisons with the literature:

Relationship to the Holmström–Milgrom task exclusion result. Holmström and Milgrom (1991) show that it may be optimal to prevent an agent from pursuing tasks, the gains of which cannot be shared by the principal and which might induce a diversion of effort away from tasks that are more profitable to the principal. Our task exclusion result has a very different nature. Indeed, according to the logic of Diamond (1984)'s diversification result, adding more tasks could only benefit the principal under explicit incentives if performance measurements on all tasks were available. The Holmstrom–Milgrom result is linked to an asymmetry in measurement, while our result emphasizes the benefit from focus in a symmetric situation.

Implications for information aggregation. The implications of Proposition 3.2 depend on what is assumed concerning the principal's control of the agent's visibility to the market. Let us content ourselves with the case in which the principal has *full* control over the agent's visibility. That is, the principal selects the set I of tasks and further decides whether the aggregate performance (Y_I) or individual ones (S_I) are observable (in the same way a school decides on the topics followed by students and whether to release only their overall performance or a detailed account of their grades).

Together with Proposition 3.1, Proposition 3.2 then suggests that disaggregated performance measurement may be costly. Suppose that, under aggregate performance measurement, the principal would like the agent to focus on n^* tasks (n^* may exceed one if the marginal utility of performance for the principal on each task is decreasing, or if there are complementarities across tasks). If the principal releases individual performances on the n^* tasks, then she runs the risk that the agent focus on a subset of tasks. [There is actually another hazard, which will be discussed in Section 4; we have assumed that the labour market correctly anticipates which mission(s) are pursued in equilibrium by the agent. In the next section, we will label these "clear missions". Disaggregated performance accounting creates scope not only for a focus on a subset of missions but also for "fuzzy missions", that is situations in which the labour market is no longer sure which mission(s) the agent is pursuing.] Thus the implicit incentives model does not deliver the same conclusion in this respect as the explicit incentives paradigm, in which aggregation is generally detrimental and at best neutral (Holmstrom–Milgrom (1987) and Laffont–Tirole (1990)).[8]

3.3. *Limited monetary incentives in Government*

We have assumed that none of the dimensions of performance is contractible. This of course is rarely the case. In particular, an agency's cost is readily measured. One may wonder why monetary incentives are so limited within Government, and whether the possibility of providing agencies with monetary incentives alters our analysis. Our argument in the matter is a mere transposition of a standard one in the literature on multitask explicit incentives.[9]

8. Holmstrom and Milgrom (1987) consider a repeated moral hazard model in which the agent controls the drift of a Brownian process. They show that if the agent has constant absolute risk aversion, the optimal contract between the agent and the principal can be conditioned solely on (and be chosen linear in) the overall performance. Laffont and Tirole (1990) consider a multitask adverse selection problem. The agent's realized cost on task i depends on a (possibly task-specific) adverse selection parameter, her effort on the task, some observable variable (such as the quantity of good i), and possibly some additive task-specific noise. They derive conditions under which subcost observation is useless, that is under which the agent's reward can be based only on aggregate cost.

9. Holmstrom and Milgrom (1991) show that when efforts on different tasks are close substitutes in the agent's production function, no incentives should be provided on contractible tasks if the principal wants to promote effort on noncontractible tasks. Our argument is a straightforward application to implicit incentives of that in Holmstrom–Milgrom. [Holmstrom–Milgrom assume that the agent delivers an exogenous amount of effort in the absence of explicit incentives. We endogenize this amount through career concerns as in Laffont–Tirole (1991), who show that the incentive intensity of a cost centre should be reduced if incentives for another task, namely quality, are provided by reputational concerns and this other task becomes more valuable to the principal.]

Suppose, still in the framework of the multi-task normal model, that y_1 stands for (minus) the agency's cost, while $y_2, \ldots, y_N$ are still noncontractible. The principal designs an explicit incentive scheme based on the realization of y_1, perhaps subject to the agent's limited liability constraint. Consider an equilibrium allocation in which the agent exerts efforts a_1^* on task 1, a^* on task 2 through n and 0 on the other tasks (in the symmetric multitask normal model all efforts on pursued noncontractible tasks must be equal). Let w_1 denote the derivative of the expected y_1-contingent wage with respect to a_1, measured at a_1^*. When efforts are perfect substitutes (the effort cost is $c(\sum_i a_i)$), the equilibrium conditions are

$$w_1 + \frac{(\theta\bar{\mu} + \gamma)(\mu a_1^* + b)}{(\mu a_1^* + b)^2 + (n-1)(\mu a^* + b)^2 + \sigma_\varepsilon^2/\sigma_\theta^2} = \frac{(\theta\bar{\mu} + \gamma)(\mu a^* + b)}{(\mu a_1^* + b)^2 + (n-1)(\mu a^* + b)^2 + \sigma_\varepsilon^2/\sigma_\theta^2}$$
$$= c'(a_1^* + (n-1)a^*).$$

We can now consider three possibilities: (i) Either $a^* = 0$. Then the agent focuses on the monetary task. The agency is then run as a *private firm*. (ii) Or $w_1 = 0$. In this case the equilibrium $a_1^* = a_2^* = \cdots = a_n^* = a^*$ can be obtained by offering the agency a *fixed budget*, as is assumed in this paper. (iii) Or else $w_1 > 0$ and $a^* > a_1^* \geqq 0$. This last possibility is however ruled out by the equilibrium conditions in the additive case ($\mu = 0$).

Proposition 3.3 (Budget-run agencies). *Suppose that only the cost performance of the agency can be contracted upon. Then in the additive case, the agency is run either as a private, cost-minimizing entity or as a fixed-budget agency.*

Proposition 3.3 of course describes an extreme case. In practice, some monetary cost-minimization incentives can be provided without abandoning the other tasks. But such incentives are in general likely to be limited and cost minimization will be pursued often more through tight monitoring of the agency.

4. FUZZY MISSIONS

The multitask analysis with disaggregated performance accounting of Section 3.1.2 focused on situations in which the market perfectly understands which missions the agent selects. But the market may be uncertain as to which mission the agent is actually pursuing. To the extent that the market is ignorant not only about the agent's level of effort but also about its allocation across tasks, the market needs to infer this allocation of effort from the agent's vector of performances in order to properly update its beliefs about the agent's talent. A "fuzzy mission" equilibrium is thus an equilibrium in which the market (perhaps imperfectly) learns about the mission(s) pursued by the agent from the vector of performances. Technically, the distinction between clear and fuzzy mission equilibria is similar to that between pure and mixed strategy equilibria.[10]

This section compares two situations in which the agent specializes in a single task. In the case of a clear mission, the market knows the agent specializes in task 1, say. By contrast, in a fuzzy mission equilibrium, the agent specializes in mission $i \in \{1, \ldots, n\}$ with probability $1/n$ and the market is not informed of the agent's choice. The key question then is whether the agent has more incentive to exert effort when the market knows the

10. As in Myerson (1998), the mixed strategy here refers solely to a randomization over the allocation of effort, and not to a randomization over its level.

mission. Intuition suggests that fuzzy missions create a garbling of information and therefore generate less incentives than clear missions. And, indeed, the information structure in clear and fuzzy mission equilibria can be ordered in the Blackwell sense, since the information about the choice of mission is suppressed in the case of a fuzzy mission. Our companion paper however shows that regularity conditions are required for comparisons of information structures. These regularity conditions are satisfied for the following specification:

The no effort–no information multiplicative case

$$y_i = a_i\theta + \varepsilon_i, \qquad \varepsilon_i \text{ logconcave iid}, \qquad i = 1, \ldots, n.$$

$$\theta \geqq 0 \text{ with probability 1 and } \log\theta \text{ has a logconcave density.}$$

Proposition 4.1 (Incentives in clear and fuzzy missions). *Assume disaggregated performance accounting.*

(i) *In the additive normal case, incentives are identical in fuzzy and clear mission equilibria.*
(ii) *In the no effort–no information multiplicative case, incentives are higher under a clear mission than under a fuzzy mission.*

The intuition for Proposition 4.1 (which is proved in the Appendix) is the following. First, in the additive model, $\sum_i y_i$ is a sufficient statistic about θ, and the market's inference about talent does not depend on the expected allocation of effort across tasks, just as in Proposition 3.2. In contrast, in the multiplicative case, inference about talent crucially depends on the market's expectation about the allocation of effort. In a mixed strategy equilibrium, the market infers from the vector of performance levels both a value for talent *and* an allocation of effort. This is why incentives for effort provision are lower: *good performance on a task the agent has focused on is attributed only partly to high talent since it is attributed only partly to high effort on that task.*

While derived under restrictive assumptions, Proposition 4.1 suggests that the scope for multiple missions creates a further hazard beyond the lack of focus. The incentive intensity is further impaired by the lack of understanding by the market of which missions are pursued by the agent. We conjecture that fuzziness is facilitated when agents are heterogeneous in a way that is not observed by the labour market, as is the case when some agents have an intrinsic preference for task 1 and others for task 2, say. Similarly, the generalization of our model to multidimensional talent and multiple labour markets may lead *a priori* identical agents to select different missions.

5. FOCUS, PROFESSIONALIZATION AND AUTONOMY

Our results show that in a multitask context in which the information about task performance cannot be suppressed, the agent may be too dispersed. To restore focus on a particular task j, the principal may wish to hire a "narrow specialist", able only to perform this task. In this case, it may be impossible to have equilibria where effort is positive on any task other than j. Note here that by "narrow specialist" we do not mean an agent who has a productivity on task j that is higher than that of other agents. The mere fact that it has a high cost of pursuing the other tasks is enough to eliminate a number of lower-effort equilibria and to ensure high effort for task j. In this respect, we can talk about *higher accountability of narrow specialists*.

This result is consistent with Wilson's account of the role of "professionals" in shaping the mission of agencies towards a subset of tasks in their potential agenda. In turn, our framework leads to another prediction detailed in Wilson: The higher degree of autonomy enjoyed by "professional" agencies.

Indeed, assume the agent can perform at most two tasks and consider the following timing:

Stage 1: The principal hires an agent, who is either a "bureaucrat" or a "professional". Both types of agent are identical except that the professional has zero productivity on one task.

Stage 2: At a cost k, the principal can "monitor" the agent, *i.e.* force the agent to focus on a particular task. If the principal does not monitor the agent, the agent freely selects her level of effort on each of the two tasks.

In this framework, professionalism creates focus, while the bureaucrat's incentive intensity may be impaired by the hazards studied in Sections 3 (lack of focus) and 4 (fuzziness). This may force the principal to engage in a costly monitoring of the bureaucrat, while no monitoring is required for the same outcome in the case of a professional.

To be certain, bureaucrats have a comparative advantage when there is uncertainty about the relative value of the tasks. Suppose that after the agent has been hired but prior to the principal's monitoring activity, the principal learns that one task is more valuable than the other. Then the principal can instruct the generalist bureaucrat to focus on the important task, while this may prove impossible if the wrong type of professional has been hired. We thus conclude that professionals are particularly effective when there is little uncertainty about organizational goals.

6. THE TRADEOFF BETWEEN TALENT RISK AND INCENTIVES UNDER CAREER CONCERNS

Let us now introduce task-specific productivity and ask how effort is related to the bundle of tasks given to the agent.

Consider the additive-normal model. Assume the following performance for task $i = 1, 2$

$$y_i = \theta_i + a_i + \varepsilon_i .$$

Let θ_i and ε_i be normally distributed

$$\theta_i \sim \mathcal{N}(\bar{\theta}, \sigma_\theta^2) \quad \text{and} \quad \varepsilon_i \sim \mathcal{N}(0, \sigma_\varepsilon^2).$$

While ε_1 and ε_2 are independent and are independent of two dimensions of talent, the latter may be correlated (the case of perfect correlation was treated above). Assume that prospective employers care about

$$\theta_1 + \theta_2 .$$

What can we say about total effort $a_1 + a_2 = \hat{a}$ as a function of the correlation coefficient ρ between θ_1 and θ_2? We have

$$y_1 + y_2 = (\theta_1 + \theta_2) + \hat{a} + \varepsilon_1 + \varepsilon_2 ,$$

which has a normal distribution with mean $2\bar{\theta}+\hat{a}$ and variance $2(1+\rho)\sigma_\theta^2+2\sigma_\varepsilon^2$. This yields

$$\frac{f_{\hat{a}}(y_1+y_2)}{f(y_1+y_2)}=\frac{(\theta_1+\theta_2-2\bar{\theta})+(\varepsilon_1+\varepsilon_2)}{2(1+\rho)\sigma_\theta^2+2\sigma_\varepsilon^2},$$

and

$$\operatorname{cov}\left(\frac{f_{\hat{a}}}{f},\theta_1+\theta_2\right)=\frac{2(1+\rho)\sigma_\theta^2}{2(1+\rho)\sigma_\theta^2+2\sigma_\varepsilon^2}.$$

Consequently, equilibrium total effort will be higher, the higher the correlation between θ_1 and θ_2. Indeed, since the mean of $\theta_1+\theta_2$ is kept constant, a higher ρ simply means a higher signal-to-noise ratio: The higher the initial uncertainty about talent relative to pure noise in performance, the higher the effort expended by the agent.

This observation has implications about *clustering of tasks* among agents, If one has to allocate N tasks in total to agents who can each do only n tasks, effort will be maximized by grouping tasks that require "similar" talents.

Assume for example that four tasks must be performed. Assumed two agents are hired, A and B, and each is given two tasks. The output in task i is

$$y_{\mathrm{i}}=\theta_{iK}+a_i+\varepsilon_i,$$

for $K\in\{A,B\}$ if agent K is allocated to task i, has task-specific talent θ_{iK} and expends effort a_i on task i. Assume that the θ_{iK}s have identical mean θ and variance σ_θ^2 and all ε_is have zero mean and variance σ_ε^2. Tasks 1 and 2, and 3 and 4 respectively, are related in that θ_{1K} and θ_{2K} are positively correlated and so are θ_{3K} and θ_{4K}; all other dimensions of talent are otherwise uncorrelated. Suppose further that, due to learning by doing, the market cares only about $\sum_{i\in I(K)}\theta_{iK}$, where $I(K)$ is the set of the two tasks allocated to agent K (say, the market will reemploy the agent in the same tasks tomorrow). Incentives are maximized by allocating tasks 1 and 2 to one agent and tasks 3 and 4 to the other.[11]

This "specialization result" is specific to the career concern paradigm: In a model where the agent cares solely about monetary incentives as in Holmstrom–Milgrom (1991), task allocation should reduce the total variance due both to pure noise and talent risk and, by doing so, effort can be increased, since the tradeoff between effort and risk has been improved (Diamond (1984)).

We believe that the positive correlation between effort and talent risk in career concern models, a feature which is reversed in explicit incentive scheme models, is a key insight that helps us understand the importance that scholars like Wilson have given to "focus" in explaining Government agencies' performance.

7. CONCLUDING REMARKS

This paper is a first step at providing a formal model of the relation between the objective function of Government agencies and their performance. A multitask career concern

11. Of course, in a more general model, there are costs to creating focus by clustering related tasks in this way. First, suppose the principal's objective function exhibits complementarities between unrelated tasks: Instead of $\sum_{i=1}^4 y_i$, it becomes $F(y_1+y_2,y_3+y_4)$ with $F_{1,2}>0$. For $F_{1,2}$ sufficiently large, the principal will sacrifice incentives and reduce the risk of unmatched performances (y_1+y_2) and (y_3+y_4) by allocating unrelated tasks to agents. Second, risk averse agents will be concerned about the substantial wage risk attached to specialization. These costs however do not invalidate the basic insight of this section, namely the beneficial incentive effect of specialization.

model provides a precise interpretation of concepts such as "missions" and their "focus" or "clarity". Our model moreover backs the sociological evidence that emphasizes the benefits of focused and clear missions in terms of agency performance. And it points to a fundamental tradeoff between their level and riskiness of performance.

Our feeling is that this paradigm can be fruitfully expanded, for example to a dynamic perspective where effort choices are repeated and where the evolution of mission design can be analysed. Another important extension will consider multiple labour markets when talent is multidimensional. For example, an official in a government agency may well behave differently, for example focus on different tasks, depending on whether she intends to pursue her career in politics, in the civil service, in a law firm or in academia. Last, in situations where there are either multiple equilibrium clear missions or fuzzy missions, it is important to understand how specific missions come about. Wilson (1989) for instance emphasizes the role of clear statements about missions and of charismatic leadership. A formal modelling of these selection mechanisms would substantially clarify Wilson's observations. Also, history matters, perhaps because of adaptive learning, learning by doing, or collective reputations. Again, future research should explain why we observe corporate cultures that are stable with respect to mission pursuit. All these issues could in fact usefully apply beyond Government agencies: several issues addressed here are clearly relevant for private firms, at least when they are confronted with difficulties of providing explicit incentives for certain jobs.

APPENDIX

Proof of Proposition 4.1

(ii) In the no effort–no information multiplicative case, the expected payoff conditional on outcome y in a fuzzy mission in which $a=(a_1,\dots,a_n)=e_i=(0,\dots,a^*,\dots,0)$ with probability $1/n$, $i=1,\dots,n$ can be written as

$$E^F=\sum_i E^i\cdot p_i$$

where $p_i=p_i(y)$ is the posterior probability that the agent specialized in the i'-th task conditional on observing $y=(y_1,\dots,y_n)$ and $E^i=E^i(\theta|y_i,a^*)$. Applying Bayes rule yields

$$p_i(y)=\frac{f_i}{\sum_j f_j}=\frac{f(y|e_i)}{\sum_j f(y|e_j)}$$

$$E^F-E^k=\sum_i(E^i-E^k)\cdot\frac{f_i}{\sum_j f_j}$$

and therefore the difference in marginal incentive (fuzzy minus clear) for an agent specializing in task k is given by

$$\int(E^F-E^k)f_{ak}\,dy=\int\sum_i(E^i-E^k)\cdot\frac{f_if_k}{\sum_j f_j}\cdot\frac{f_{ak}}{f_k}dy.$$

Trivially, rewriting the above equation by relabelling the summation operators gives

$$\sum_k\int(E^F-E^k)f_{ak}\,dy=\int\sum_i\sum_k(E^k-E^i)\cdot\frac{f_if_k}{\sum_j f_j}\frac{f_{ai}}{f_i}dy.$$

Changing the order of summation and adding to the previous equation, we obtain

$$2\sum_k\int(E^F-E^k)f_{ak}\,dy=\int\sum_k\sum_i(E^i-E^k)\cdot\frac{f_if_k}{\sum_j f_j}\left(\frac{f_{ak}}{f_k}-\frac{f_{ai}}{f_i}\right)dy$$

$$=\sum_k\sum_i\int(E^i-E^k)\cdot\frac{f_if_k}{\sum_j f_j}\left(\frac{f_{ak}}{f_k}-\frac{f_{ai}}{f_i}\right)dy.$$

Hence, if for each i, $k = 1, \ldots, n$

$$\int (E^i - E^k) \cdot \frac{f_i f_k}{\sum_j f_j} \left(\frac{f_{ak}}{f_k} - \frac{f_{ai}}{f_i} \right) dy \leqq 0,$$

then clear missions provide greater incentives than fuzzy missions. This condition will certainly hold if the integrand is everywhere nonpositive.

Because $E[\theta|y_i, a_i]$ is nondecreasing in y_i, and $\hat{f}_a/\hat{f} \equiv \hat{f}_a(y_i|a_i)/\hat{f}(y_i|a_i)$ is nondecreasing in y_i, one sees that this is true for the no effort–no information multiplicative case since $(E^k - E^i)$ and $(f_{ak}/f_k - f_{ai}/f_i)$ always have the same sign. This proves part (ii) of the proposition. For part (i), notice that for the additive normal case, $\sum y_k$ is sufficient for θ regardless of which task the agent specializes in. It follows that inferences about θ are made from the equation $\sum y_k = n\theta + a + \sum \varepsilon_k$, regardless of the expected allocation of effort across tasks.

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