

A Theory of the Political 'Firm': A Multi-task Model of Bureaucratic Jurisdictions

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ABSTRACT

One of the main questions economists have grappled with over the past forty years is why some transactions are performed through markets while others are performed within firms. Though rich theories of the firm have been developed for private organizations, there is no analogous theory of public organizations. This paper addresses this oft overlooked area in the study of political organizations: how do tasks, issues, and jurisdictions, get grouped or spread among organizational units? To answer this question, I adapt the formal technology of multi-task agency theory, initially proposed by Holmstrom and Milgrom (1991) and later developed by Itoh (1994). My model generates a number of predictions about when tasks will be combined in a single agency and when they will be segregated into two. The key determinants of the organizational choice are the location of the policies relative to the elected official's ideal point, the difference in costs between organizational forms and the extent to which the official has control over assigning incentives. Perhaps the most interesting of these results is that the elected official can use task assignment as a political tool. For example, suppose that a principal has an existing task to which he is opposed, that this task has an existing set of incentives, and that he cannot legislate the task away. Suppose further, that this official now has a new task that he prefers, behind which he can provide incentives. Then, for this environment, an elected official will choose to *group* the tasks together, providing high-powered incentives for the preferred task, so that the agent will not only exert effort on this new task, but will *also* largely ignore the original task.

One of the main questions economists have grappled with over the past forty years is why some transactions are performed through markets while others are performed within firms. Though rich theories of the firm have been developed for private organizations, there

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is no analogous theory of public organizations.¹ This paper is a first step in the development of such a theory by addressing the question: how do tasks, issues, and jurisdictions, get grouped or spread among organizational units? Or, in terms of the economic theory of the firm, why do some government transactions occur *within* agencies and some occur *across* them? And similarly, why do some agencies focus on one or very few policies, while others have a large set they must implement?

Since the beginning of the century, growth in the size of the federal government has been explosive. Along with the growth in government involvement and government spending has come a corresponding growth in government *organization*. Since the onset of the New Deal in 1933 until 1994, over one hundred fifty federal agencies, excluding those for military and foreign policy, were created *de novo*. In addition, in every presidential administration during that time there have been significant reorganizations, with agencies being combined, splintered or eliminated.²

The *specific* structure that the government employs is the product of a multitude of *choices* by the officials and bureaucrats who set it up. For each policy that must be implemented through a formal organization, an official must decide whether to give jurisdiction over that policy to an existing organization or to set up a new one. Further, on an ongoing basis, these choices must also be reevaluated, and to the extent that it is possible, the officials have to decide whether to alter previous decisions. Despite the importance and relative complexity of this issue, or perhaps because of it, there is scant scholarship on the nature of the *reasons* organizational boundaries and jurisdictions are drawn the way that they are.

The public administration literature does address the question of when agencies are formed, merged, or eliminated. As Moe points out, however, these studies generally start with a normative focus, leading these scholars away from positive theorizing about the

¹ See for example, Armen Alchian and Harold Demsetz, "Production, Information Costs and Economic Organization," *American Economic Review* 62 (1972), pp. 777-795; Oliver Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (Free Press: New York, 1985).

² Carl Grafton, "Response to Change: The Creation and Reorganization of Federal Agencies," in Miewald, Robert and Michael Steinman, eds, *Problems in Administrative Reform* (Nelson-Hall: Chicago, 1984), p. 26.

political calculus behind these choices.³ Broadly speaking, public administration theory provides three reasons for government reorganization: technical efficiency, socioeconomic change, and political factors. The orthodox view is that jurisdictional boundaries are drawn to promote efficiency. As Beyle and Crow point out, from 1965 to 1978, over twenty states went through massive reorganizations of their executive apparatuses with the stated objective of improving coordination and saving money.⁴ As Hult summarizes, "Thus a frequent response to charges of bureaucratic inefficiency, ineffectiveness, and unresponsiveness is reorganization—creating, combining, separating, killing, or rearranging agencies.... Policymakers often conclude that the creation of new units—either de novo or as reconstructions of existing offices—is the only way to circumvent sclerotic bureaucracies and to force action or address new problems."⁵ Specialization and segregation of tasks to add focus, and the combination of tasks to coordinate, are the hallmarks of this view of governments' overall structure. "By bureaucracy," Yates explains, "the apostles of administrative efficiency meant merit and expertise certainly, but merit and expertise organized in such a way to provide for strong hierarchy and a specialization of functions."⁶

A second reason scholars of public administration cite for jurisdictional decisions is either technological or social change. This view is strongly embedded in sociology: it is not the political actors that are prompting reorganizations, but broad institutional and social processes. According to this view, technological progress brings new issues to the door of government policy, and therefore necessitates new implementation structures in order to manage them. As Grafton summarizes, "Why do agency creations and reorganizations occur? In introductory texts on American government and public administration the answer is that these events are caused by socioeconomic changes. This is also the nearly universal justification given by sponsors of creation or reorganization and legislative orders. Such issues as energy shortages, changing agricultural conditions, or the increasing complexity of

³ Terry M. Moe, "Politics and the Theory of Organization," *Journal of Law, Economics and Organization* 7: SP.

⁴ Thad L. Beyle and Edward W. Crowe, *State Government Reorganization: A Bibliography* (Council of State Governments: Lexington, KY, 1979).

⁵ Karen M. Hult, *Agency Merger and Bureaucratic Redesign* (University of Pittsburgh: Pittsburgh, 1987), p. 4.

⁶ Douglas Yates, *Bureaucratic Democracy: The Search for Democracy and Efficiency in American Government* (Harvard: Cambridge, MA, 1982), p. 26.

society are often pointed to..."⁷ One prime example of this vein is Noell's study of bureaucratic complexity. Noell found that four socioeconomic variables—population, societal complexity, wealth and geographic area—were strong correlates of both the size and complexity of state bureaucracies.⁸ A related view also draws from institutional sociology: according to this view, bureaucracies are created and reorganized because of the diffusion of innovation. Kaufman for example points out that the First Hoover Commission prompted three widespread reorganizations at the state level in the post-War period.⁹

While these explanations for the bounding of government agencies provide a normative focus, they ignore a crucial aspect of the nature of these phenomena. In particular, they ignore that jurisdictional decisions are the intentional choices of those who have public authority. A third set of public administrationists recognizes this objection. The starting point for these scholars is that *empirically*, there are many cases in which there is no relationship between organizational actions (either agency creations or reorganizations) and changes in efficiency, policy effectiveness, or responsiveness, to new requirements. While the evidence is mixed, it prompted some to ask why this would be the case in light of more traditional explanations. As Garnett comments, "Although there is a lack of systematic research about its effects, ...[there is] an increased appreciation of how large a role politics plays in administrative reorganization. The major actors in reorganization possess political objectives (along with others) and operate within political constraints. Even constitutional and judicial constraints and influences are typically the product of a negotiation process. The institutional forms chosen are the result of political forces as well as themselves having political consequences..."¹⁰ Although some public administrationists have moved towards a more intentionalist, and therefore, complete explanation of the *political nature* of public organizational boundaries, its promise has ended in its identification of the issues. Indeed, the

⁷ Carl Grafton, "Response to Change: The Creation and Reorganization of Federal Agencies," in Robert Miewald and Michael Steinman, eds., *Problems in Administrative Reform*, (Nelson-Hall: Chicago, 1984), p. 26-27.

⁸ J. Noell, "On the Administrative Sector of Social Systems: An Analysis of the Size and Complexity of Government Bureaucracies in the American States," *Social Forces* 52 (1974), pp. 549-598.

⁹ Kaufman, Herbert. *The Administrative Behavior of Federal Bureau Chiefs*. Brookings: Washington, DC. 1981; also 1963, p. 22. See also J. L. Walker, "The Diffusion of Innovations Among the American States," *American Political Science Review* 63 (1969), pp. 880-899; James L. Garnett, "Why State Executive Reorganizations Occur: Competing and Complementary Theoretical Perspectives," in Miewald and Steinman, pp. 197-221.

¹⁰ Garnett, p. 203.

major shortcoming, or perhaps the next step, in this vein of research is that it remains largely post hoc explanations and descriptions of the decisions. Drawn back to their normative roots, these scholars ultimately fail to provide testable hypotheses and predictions about what organizational forms are likely to result in particular political situations.

One place one might turn for such theory is the rational choice school within political science. Over the past twenty years, positive political theorists have increasingly recognized that organizations matter. Starting in the early 1970's and continuing today, these theorists have demonstrated how institutional and organizational design, rules and procedures, have an impact. With respect to the bureaucracy, positive theorists have a lot to say about why government agencies are structured the way they are. Unfortunately, however, this commentary has largely grown out of an interest in explaining the way in which elected officials can control the agents they must trust to implement their policies faithfully. A number of scholars—McCubbins, Noll and Weingast, Ferejohn and Shipan, Weingast and Moran, McCubbins and Schwartz, for example—argue that elected officials have ample means—budgets, procedures, oversight, appointments—to control bureaucrats. Others such as Moe, Rothenberg and Horn, have pointed out that agency structure can also be used as a means of limiting potential future interference in the implementation of particular policies.¹¹ In almost all of this literature, an agency's existence or creation is taken to be exogenous; the question they implicitly ask is "Given that I am creating an agency, how should I do it?" While this is certainly a valid question, its very nature leads these scholars away from a potentially important insight: the choice of creating the agency itself, as opposed to using

¹¹ Barry R. Weingast and Mark J. Moran, "Bureaucratic Discretion or Congressional Control? Regulatory Policymaking by the Federal Trade Commission," *Journal of Political Economy* 91 (1983), pp. 765-800; Barry R. Weingast, "The Congressional-Bureaucratic System: A Principal Agent Perspective (With Applications to the SEC)," *Public Choice* 44 (1984), pp. 147-191; Matthew D. McCubbins, Roger C. Noll, and Barry R. Weingast, "Administrative Procedures as Instruments of Political Control," *Journal of Law, Economics and Organization* 3 (Fall 1987), p. 243-277; Morris P. Fiorina, "Congressional Control of the Bureaucracy: A Mismatch of Incentives and Capabilities," in Lawrence C. Dodd and Bruce I. Oppenheimer, eds., *Congress Reconsidered*, 2nd edition (1983); John A. Ferejohn and Charles R. Shipan, "Congressional Influence on Administrative Agencies: A Case Study of Telecommunications Policy," in Lawrence C. Dodd and Bruce I. Oppenheimer, eds., *Congress Reconsidered*, 2nd edition (1983), pp. 393-411; Roderick Kiewiet and Matthew D. McCubbins, *The Logic of Delegation: Congressional Parties and the Appropriations Process* (Chicago: University of Chicago, 1991); Murray Horn, "The Political Economy of Public Administration: Organization, Control and Performance of the Public Sector," Harvard University Thesis (1989); Terry M. Moe, "Politics and the Theory of Organization," *Journal of Law, Economics and Organization* 7: SP, p. 106-129; Terry M. Moe, "The Politics of Bureaucratic Structure," in John E. Chubb and Paul

existing channels, is an important one as well, and also an object of choice for the political actors involved.¹² And to the extent that these meta-organizational choices are important, there is no existing political theory that generates predictions about when government officials, faced with a policy to implement, will choose to set up a new agency, place it in an existing agency, or reorganize a number of policies in a hybrid choice.

As a starting point for understanding jurisdictional decisions, I employ the formal technology of *multi-task agency theory* developed initially by Holmstrom and Milgrom and developed further by Itoh. The key innovation in these models is that they examine the dynamic choices of principals and agents in a setting where there are a number of activities to be performed. I depart from these models, however, in applying them to political situations. Holmstrom and Milgrom's model, for example, only considers a single organizational form—one principal employing one agent—which requires adaptation to a situation in which a number of possible organizational forms must be chosen from. Itoh provides guidance here. In his model, the principal not only chooses the incentive contracts to provide for agents in multi-task settings, but also the hierarchical structure within which those contracts operate. Again, however, Itoh's model does map well to political situations. In the private world, the principal has a unitary objective: maximizing profits and value. In the political realm, however, policy outputs are not normal goods. Instead, officials are often charged with implementing some policies which they like and some they might not. This means that officials can prioritize their policies, wanting more outputs of some and less of others.

To take account of these uniquely political features, I make a number of modifications to the traditional approach. Most importantly, I utilize a set of models in which the principal, or public official, weights policy *outputs* by their policy *content*. In other words, if a principal likes a particular policy, then output to that policy will give the official utility; but if the policy is one which the official dislikes—in terms of a formal, spatial model, one which is very distant from the official's ideal point—then more output will generate *disutility* for the

E. Peterson, eds., *Can the Government Govern?* (Washington, DC: Brookings, 1989); Lawrence Rothenberg, *Regulation, Organizations and Politics: Motor Freight Policy at the Interstate Commerce Commission* (1994).

¹² This is not to say that the question of agency boundaries is completely ignored. For example, Moe discusses the political calculus behind the creation of the National Institute for Occupational Safety and Health. There is scant broad theory, however, which derives *predictions* about when a new agency will be created.

official. Thus, the principal's choice of contracts is not simply one in which marginal effort and costs are equated; now the ideological component of the production function means that officials might even want to *discourage* outputs.

The second analytical move I make, then, is to embed this calculus in a choice of organizational forms by the public official. One of the key features of multi-task environments is that resource constraints, interdependence between tasks, and congruity in measures, means that when tasks are grouped, the effort put forth by an agent to one task will depend on the effort provided to the other ones. My models show how this dependence between tasks creates an opportunity for public officials who face implementation of a mixture of policies, some that they like, some that they do not. Unlike in a private firm, in which the allocation of tasks depends solely on economic efficiency, in this case, the assignment of tasks or jurisdictions to agencies can be used as a *political tool*. For example, if a principal is faced with two tasks, an existing policy which he does not like, and a new policy which he wants implemented, should he assign them to one agency or two? If his sole concern was efficiency, he might choose to segregate them, if that is the lowest cost way to have them implemented. However, since he cares intently about the content of the outputs, he will have a natural incentive, under the right conditions, to centralize. The rationale is that by grouping the tasks, and then providing higher-powered incentives for the task he likes, the official can accomplish two objectives simultaneously: he not only achieves the implementation of his own policy, but also the *distraction* of attention *away* from the policy he does not like. Notice also that this centralization impulse is not costless to society. To achieve this objective, the principal must provide higher power incentives than he would have under a specialized structure. What this means is that is that for the same output, he must pay the agent more for each unit of effort. He is willing to do this, because for the elected official, effort devoted to tasks he does not like generate disutility.

In thinking about the broader sweep of politics, there are a number of stylized facts to which these results might be applied. Most obviously, the theory developed here generates sharp predictions, based on the degree of control over incentives, relative monitorability of different tasks and policies, and ideological intent of each policy, about whether or not two tasks will be grouped together or split into separate agencies. More generally, the principals

developed might be applied to broader political phenomena. Consider the wave of deregulation that occurred in the 1970's. During this period, deregulation was accompanied by reorganization of the bureaucracy.¹³ Why did those two things go together? One plausible explanation is that with less regulation, fewer resources were required, and therefore, amalgamation was justified. While this argument is almost certainly true in terms of broad patterns of amalgamation, to understand the *specific* amalgamations, or even decentralizations, of a host of agencies' tasks, the theory developed here might provide an answer. If deregulation is the objective, it would posit, and statutes are difficult, in some cases, to alter, another avenue to achieve deregulation is available: centralizing tasks and providing incentives so that even though regulatory agencies still exist, regulatory outputs would decline. Finally, the paper also makes a contribution to the agency control and discretion literature. This literature seeks to explain, if and how public officials can ensure that bureaucracies' focus will be turned towards the officials' political objectives. The literature is rich with both theory about specific control mechanisms—procedures, budgets, and oversight, for example—and examples of how they are used.¹⁴ By demonstrating how task and jurisdictional assignment can also be used to achieve political objectives, the theory adds an additional mechanism to our understanding of political control.

The rest of the paper proceeds as follows. In Section 4.1, I lay out the basic model, describing the players, actions, sequence of play, and information. In section 4.2, I analyze the equilibrium for the basic model to generate predictions about the behavior of the principal and the agent or agents. In section 4.3, I weaken the assumption that the principal is able to fully determine the incentives for all tasks. Instead, I assume that there is an existing task which has a fixed contract which the principal cannot change. Here, I show that the principal will have an even stronger incentive to centralize in many cases. Finally, in section 4.4, I conclude with a discussion of the implications of the models for students of politics and public administration. Broadly speaking, the models show how under varying degrees of

¹³ Martha Derthick and Paul J. Quirk, *The Politics of Deregulation* (Brookings: Washington, DC, 1985).

¹⁴ See for example, Weingast and Moran; McCubbins and Schwartz; McNollgast; Jonathan Bendor and Terry M. Moe, "An Adaptive Model of Bureaucratic Politics," *American Political Science Review* 79 (1985), pp. 755-774; Ferejohn and Shipan; Moe, "The Politics of Bureaucratic Structure;" and Weingast.

control by public officials, jurisdictional assignment can and will be utilized to manipulate political outcomes.

4.1. The Basic Model

The basic model is a modified version of the multi-task agency models originally appearing in Holmstrom and Milgrom and later in Itoh.¹⁵ An elected official (the principal) P must choose how to assign two tasks $t=(1,2)$. The principal is required to delegate implementation of the tasks; he is unable to implement them himself. Each of these tasks is characterized by its policy impact on a one-dimensional policy space $x_t \in \mathfrak{R}$.¹⁶ At the moment, I assume these are exogenously determined. Here, we can think of the official as being in charge of implementing a policy, but having no say over the target of the policy. For example, say that the division between determining EPA standards and implementing them is between Congress and the President. In this case, the President might like or not like the policy he has been given to implement, but still has some say over the incentives and rewards for agencies charged with implementing the policy. The principal must choose one of two organizational forms $f \in (s,c)$. If he chooses $f=s$ it means that the tasks are *specialized*, with two agents each performing one of the tasks. If he chooses $f=c$, the tasks are *centralized*, with a single agent performing both tasks. The official's benefit depends on the amount of effort dedicated to each task less his costs to obtain that effort. In particular, I assume that output for the tasks is separable, and that each is characterized by an *output function* $O_t(e_t)$ which is an increasing, concave function in the amount of effort e_t expended on a particular task. I assume a particular form for the output function to simplify the analysis:

$$O_t(e_t) = e_t$$

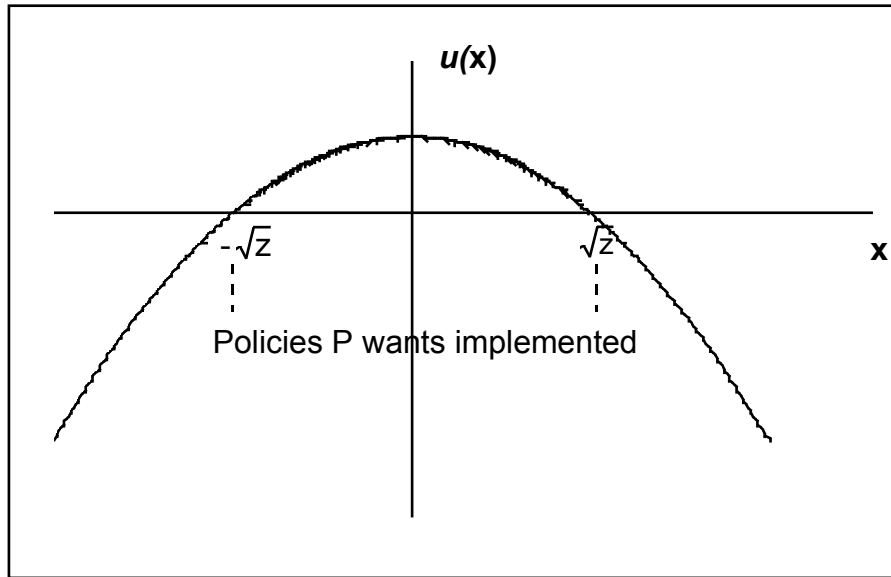
¹⁵ Bengt Holmstrom and Paul Milgrom, "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design," *Journal of Law, Economics and Organization* 7 (1991), pp. 24-52; Hideshi Itoh, "Job Design, Delegation and Cooperation: A Principal-Agent Analysis," *European Economic Review* 38 (1994), pp. 691-700.

The principal's benefit for a particular amount of output depends on the task's relationship to his own ideal point, which, without loss of generality, I assume is 0 . The principal's benefit then, is the product of the amount of output for a particular task and his ideal point. The principal also incurs two types of costs. The first is the wage he must pay the agents. Assuming the wage takes the linear form, the total wages paid are denoted $w(e_1, e_2)$. The second is a cost based on the organizational form he chooses. This cost is called $C_p(f)$ and I assume $C_p(c) \leq C_p(s)$. This assumption captures two facets of agency organization. First, elected officials are not only concerned about agency outputs. They must also be concerned about the costs of implementing a policy at all. Second, there are fixed costs associated with setting up new agencies. This means that there are scale effects in policy implementation. The degree to which such fixed costs exist determines this cost differential between a larger-scale centralized agency and two smaller scale ones. Finally, I assume the principal is risk-neutral. Putting these assumptions together, the principal's payoff is:

$$\sum_{i=1}^2 \{(z - x_i^2)O_i(e_i)\} - w(e_1, e_2) - C_p(f) \quad (1)$$

Note that the first term in (1) is a fairly non-standard conception of utility

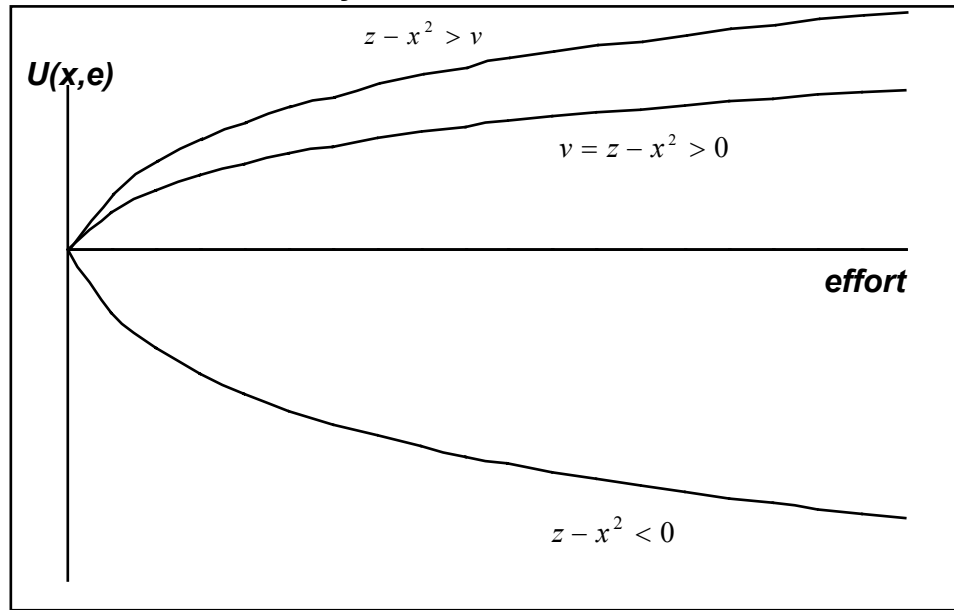
¹⁶ This assumption can be relaxed so that the two policies can be located jointly *either* in \mathfrak{R}^1 or \mathfrak{R}^2 . Such a modification does not affect the results.

Figure 4.1. Principal's Preferences Over Policies

for an elected official. In most political spatial models, the principal is concerned *exclusively* with the policy that is chosen.¹⁷ Here, we disaggregate the policy point and the effectiveness in which it is carried out. This is equivalent to conceiving of policy implementation as a two-part process in which a target policy is chosen, and *then* the degree to which that policy is implemented depends on the degree of output. Figure 4.1 illustrates the policy component of the benefit function. The z term in the measure of distance allows for a positive utility to be obtained from non-ideal point policies. If this is set to zero, then it is the traditional negative quadratic utility used in many spatial models that address policy choices. In this case, however, if $z \leq 0$, it is clear that an official is unwilling to bear *any* costs, either in

¹⁷ The traditional negative quadratic utility function is of the form $-(x_P - x_i)^2$ where x_P is P 's ideal point. Since $x_P = 0$, this is the same as $-x_i^2$. The z term simply acts as a normalizing intercept so that for part of the x -space, $U_P(x_i)$ can be positive.

Figure 4.2. Principal's Expected Utility as a Function of Policy and Effort



organizing or providing incentives for, any non-ideal point policy which is a degenerate case. Thus, to obtain results for policies exogenously determined in which an official will enjoy some (if not his ideal) utility, in general, we analyze cases in which $z > 0$. Note, this means that the principal obtains a positive utility for any $x_i \in (-\sqrt{z}, \sqrt{z})$. Further, the increasing output function means that the *overall policy benefits* (by which I mean the first sum in P 's utility function given in (1)) is a normal good for the principal if the policy has positive utility for the principal. Figure 4.2 illustrates the combined impact on utility of the spatial term and the output function in the principal's utility function. A second modification in the traditional conception is embodied in the second two terms. In particular, the official must also pay costs to obtain output. These costs depend on the incentive contract provided to the agent and the organizational costs. Here, we depart from the traditional conception in that we assume that the official cares not only about the policy and its output, but also how much he has to pay (in terms of political capital, budget outlays or other incentives) in order to achieve the policy.

The wage payment has two facets. First, I assume there is a noisy signal $\mu(e_1, e_2)$ of the agent's effort which is the only contractable information. Specifically, I assume that

$$\mu(e_1, e_2) = e_1 + e_2 + \varepsilon$$

where ε is normally distributed with mean zero and variance σ^2 . Second, the wage contract is assumed to take a linear form, following Milgrom and Holmstrom, Itoh, and Feltham and Xie.¹⁸ Thus, the wage contract is $w_t = \alpha_t \mu_t + \beta_t$ if $f=s$ and $w = \alpha\mu + \beta$ if $f=c$. Note that β is a fixed component of income, and α is the incentive component.

In traditional agency models, these incentives have a familiar interpretation: commissions or bonuses provided for achievement of financial objectives. In public organizations, the notion of incentive contracts is more problematic. This is for two reasons. First, in many cases financial incentives cannot be provided. While financial rewards are not possible in many agencies, however, that is not to say that politicians have no incentives to motivate agents. Although more blunt, numerous scholars have shown that a range of instruments, such as budgets, oversight, merit pay, and career advancements and dismissals can be used as incentives for public servants.¹⁹ A second objection to an incentive-based model is that in many cases the output of agents is unobservable, particularly in what Wilson has termed "coping" and "procedural" agencies. Contrary to this conclusion, however, agency models can accommodate these situations. By assuming that output or effort is measured *noisily*, these objections amount to an argument about the variance of μ , conditions which can be examined using this model.²⁰

I assume that the principal draws the agents he needs to implement the policy from a pool of homogenous individuals who have a reservation wage of zero. Although the reservation wage in practice will be higher, since we are primarily interested in the relationship between incentives and effort, and because we assume the incentive contract has a constant β , it does not affect the analysis to make this assumption. An agent incurs a cost

¹⁸ Itoh; Holmstrom and Milgrom; Gerald A. Feltham and Jim Xie, "Performance Measure Congruity and Diversity in Multi-task Principal/Agent Relations," *The Accounting Review* 69 (1994), pp. 429-453. Indeed, the main effect of "blunt" instruments is that the potential incentive contracting scheme must be a step function but can still be an increasing function of μ . In that case, all of the results here would hold, with solutions being such that they minimized compensation for a given step.

¹⁹ Weingast and Moran; McCubbins and Schwartz; Ferejohn and Shipan; Bendor and Moe; Moe, "The Politics of Bureaucratic Structure"; Jean Tirole, "The Internal Organization of Government," *Oxford Economic Papers* 46 (1994), pp. 1-29; Wilson.

²⁰ Wilson, pp. 158-171.

for the effort he exerts. This cost is a convex function that is assumed to take the specific form

$$C(e_1, e_2) = \frac{1}{2}ce_1^2 + \frac{1}{2}ce_2^2 + \gamma ce_1e_2$$

Thus, when an agent is assigned only one task, the effort he expends on the other task is zero and his costs are strictly the appropriate quadratic term in the function above. The constant $c > 0$ is a measure of sensitivity to effort levels. The parameter $\gamma \in \Re$ is a measure of synergy between the two tasks for an agent. If it is positive, it means the agent suffers *diseconomies* from having to do two tasks. If it is negative, then he obtains *positive synergies* by working on two (similar) tasks. An agent is assumed to be risk-averse, and his utility is assumed to be of the negative exponential form, that is $u_A(y) = -e^{-r[w(\cdot) - C(\cdot)]}$ where $r > 0$ is a coefficient of absolute risk aversion and $y = w(\cdot) - C(\cdot)$ is the agent's income.

To summarize, the game has four stages:

Stage 1. P picks an *organizational form* $f \in \{s, c\}$;

Stage 2. P picks an *incentive contract* $w(\mu)$ under $f=c$ or $w_i(\mu_i)$ under $f=s$. This means that P must pick either α or (α_1, α_2) respectively;

Stage 3. A_1 and A_2 respectively pick *effort levels* e_1 and e_2 ;

Stage 4. μ is determined and payoffs are made.²¹

Since the compensation rule is of the linear form and utility function is of the familiar constant absolute risk aversion form, we can write the agent's *certainty equivalent*, the

²¹ Implicitly, I am assuming that there is no commitment problem between the agent and the principal, that an agreed upon contract will be executed. In models of private firms, this assumption is not difficult to accept, since contracts are enforced within a legal structure. Commitment is more problematic in a situation since there is no such enforcement mechanism. As a first cut, however, to identify the nature of the incentive problems, rather than the enforcement problem, I ignore this issue here. Indeed, elsewhere, others such as Ting have argued that the commitment problem can be overcome with repeated play, as long as there is observability of principals reneging on agreements. (Michael Ting, "Turf Wars," Stanford University, mimeo, 1997)

amount that would be required for the agent to be utility neutral if there was no variance in her compensation, as

$$CE_t = \alpha_t e_t + \beta - \frac{1}{2} c e_t^2 - \frac{1}{2} r \alpha_t^2 \sigma^2 \quad \text{under } f=s$$

$$CE = \alpha(e_1 + e_2) + \beta - \frac{1}{2} c e_1^2 - \frac{1}{2} c e_2^2 - \gamma c e_1 e_2 - \frac{1}{2} r \alpha^2 \sigma^2 \quad \text{under } f=c$$

Combining this with the benefit to the principal, we obtain the *certainty equivalent of joint surplus* under the assumptions above. .²²

$$JS_s = (z - x_1^2) e_1 + (z - x_2^2) e_2 - \frac{1}{2} c e_1^2 - \frac{1}{2} c e_2^2 - \frac{1}{2} r \alpha_1^2 \sigma^2 - \frac{1}{2} r \alpha_2^2 \sigma^2 - C_p(s) \quad \text{under } f=s$$

(2)

$$JS_c = (z - x_1^2) e_1 + (z - x_2^2) e_2 - \frac{1}{2} c e_1^2 - \frac{1}{2} c e_2^2 - \gamma c e_1 e_2 - \frac{1}{2} r \alpha^2 \sigma^2 - C_p(c) \quad \text{under } f=c$$

(3)

The principal therefore maximizes the joint surplus subject to the incentive compatibility constraints, which are simply the first order conditions from the agent or agents' problem. This means we can find the solution triple (α, e_1, e_2) or quadruple $(\alpha_1, \alpha_2, e_1, e_2)$ for the joint problems facing the principal and agent(s). For $f=s$ this is simply

$$\max_{\alpha_1, \alpha_2, e_1, e_2} JS_s \quad \text{subject to}$$

(i) $\alpha_1 = c e_1$
(ii) $\alpha_2 = c e_2$

Similarly, for $f=c$, we find the solutions from

²² See Holmstrom and Milgrom for justification of this approach. In general, since the agents' effort will always be set such that the expected utility from w is equal to the costs of effort, the principal has coincident interests with the agents to minimize the effort for a given level of output.

$$\max_{\alpha, e_1, e_2} JS_c \quad \text{subject to}$$

$$(i) \quad \alpha = ce_1 + \gamma ce_2$$

$$(ii) \quad \alpha = ce_2 + \gamma ce_1$$

Given these results, we can now examine the nature of specialization decisions, incentives provided and output outcomes under different assumptions about the degree to which the principal can alter the incentives and types of policies.

4.2. Exogenous Policies and Completely Endogenous Contracts

The first set of results examine the nature of the contracts that are provided when the policies are exogenously determined, but contracts for both tasks are completely determined by the principal. In this case, we are describing a situation where there is a complete division of labor between *policy-making* and *policy implementation*. Although this situation might seem to be an unusual one, we analyze it for two reasons. First, it provides a good base case for examination of more strict constraints on the principal's opportunities to determine the direction of policy implementation on his own. Second, although in general there is an overlap between policy making and policy implementation, it is not the case that the distribution of power say between Congress and the executive is equal. In particular, if we imagine that there is asymmetric power in these two arenas between Congress and the President—the Congress has more power in setting policy than its day to day implementation, for example—then we would expect the *target generating bargain* is different than the *policy implementation ideal point*.

Irrespective of the policy's location on the policy space, the agent will always choose an effort which satisfies the incentive compatibility constraints. Thus, we can turn to the choice of the optimal incentive contracts. We can solve for the optimal shares under the two organizational forms by solving the above constrained optimization problems. Then the optimal shares under $f=s$ are

$$\alpha_i^* = \begin{cases} \frac{(z - x_i^2)}{1 + rc\sigma^2} & \text{if } (z - x_i^2) > 0 \\ 0 & \text{otherwise} \end{cases} \quad (4)$$

The optimal share under $f=c$ is

$$\alpha^* = \begin{cases} \frac{(z - x_1^2) + (z - x_2^2)}{2 + (1 + \gamma)r\sigma^2c} & \text{if } (z - x_1^2) + (z - x_2^2) > 0 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

The proofs of these derivations are contained in the appendix. Note that if the utility that the principal gets is negative, he would like to encourage a negative effort. However such behavior is ruled out by the agent's participation constraint. Therefore, if the utility is negative, P will set the incentive component to zero. Further, the share is decreasing in the variance of a task's measurement. This is a familiar result from agency theory: as it becomes harder to monitor a particular activity, agents will devote less effort to the task.²³

We can also solve for the equilibrium effort chosen by the agent or agents. From the incentive compatibility constraints, which are simply the first order-conditions from the agent's problem, we know that the agent will set his effort as

$$e_i^* = \frac{\alpha_i^*}{c} \quad \text{for } f=s \quad (6)$$

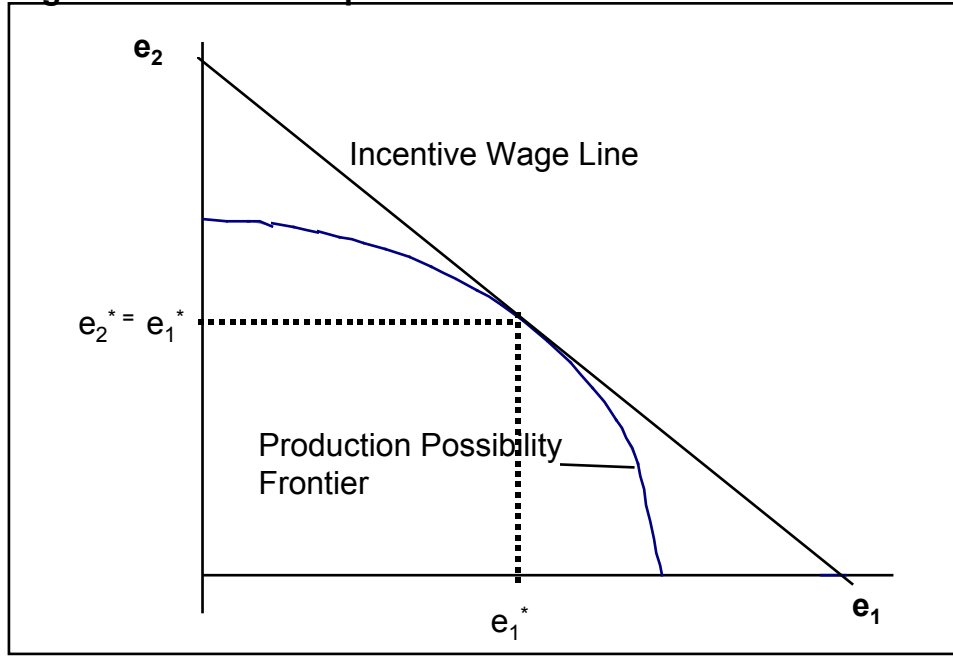
$$e_1^* = e_2^* = \frac{\alpha^*}{2c} \quad \text{for } f=c \quad (7)$$

²³ See for example, Bengt Holmstrom, "Moral Hazard and Observability," *Bell Journal of Economics* 10 (1979), pp. 74-91.

These effort levels raise a number of interesting points. First, under the specialization form, the effort levels devoted to the two tasks can differ, but under the centralization form, they do not. The reason for this is that when the principal chooses to centralize, he only provides one incentive for the sum of all of the agent's effort. This means that the agent, trying to maximize the sum of output, chooses efforts for the two activities that are *equal*, since both have the same form of diminishing marginal returns. In Figure 4.3, I illustrate graphically why an output-maximizing agent will choose to devote identical efforts to the two tasks under centralization. The symmetry of the cost function means that the production possibility frontier (PPF) is an arc which is the upper right quadrant of a circle centered at the origin. Further, the incentive wage line has to be such that $e_1 = -e_2$, since the performance measure μ is a separable, unweighted function of e_1 and e_2 , and there is a single incentive α . Thus, the point of tangency, which is the optimal efforts for the two tasks from the agent's perspective, must be at points where $e_1 = e_2$. Second, this is a significant departure from the results for Itoh's model, and indeed, other multi-task models of the principal-agent problem. The reason is that in traditional models, the principal obtains benefits from both tasks, in equal proportion. Thus, she is indifferent between output from one task or another. In this case, however, the task's target policy acts as a weighting on how much the principal obtains from the implementation of that policy. When she combines tasks together, she is only able to obtain benefits for these tasks in equal proportions, although she would prefer if the agent's efforts were proportional to the spatial weights; so the principal pays an aggregation cost by centralizing.²⁴ Third, the parameter c is a measure of the *sensitivity* of an agent, under any scheme, to incentives. The partial first derivative of both of the expressions for effort is negative; this means that as c increases, the agent is less willing to respond to incentives. Finally, we obtain the same result as Holmstrom and Milgrom, that as the incentive increases, an agent will devote more effort to a task.

²⁴ Itoh, pp. 695-697; Feltham and Xie.

Figure 4.3. PPF and Optimal Efforts under Centralization



Using the above equilibrium results for the two organizational forms, we can turn to the primary task at hand: determining the optimal organizational structure. Here, we must consider three cases: broadly speaking, they are different combinations of policies in terms of their utility for the principal. The cases are summarized in Figure 4.5. To simplify the analysis, for now, we assume that for the agent, the two tasks are separable in cost which means $\gamma = 0$, and normalize $c=1$.

Case 1. Suppose both x_1 and $x_2 \in (-\sqrt{z}, \sqrt{z})$. The principal chooses the form that maximizes his joint surplus, so he chooses s if and only if $JS_s^* > JS_c^*$, where the asterisks indicate that these are the certainty equivalent joint surpluses *evaluated at their equilibrium values*. In this case, P will choose s if and only if

$$C_p(c) - C_p(s) < \frac{(1+v)(w_1^2 + w_2^2) + (2-6v)w_1w_2}{8v^2} \quad (8)$$

where

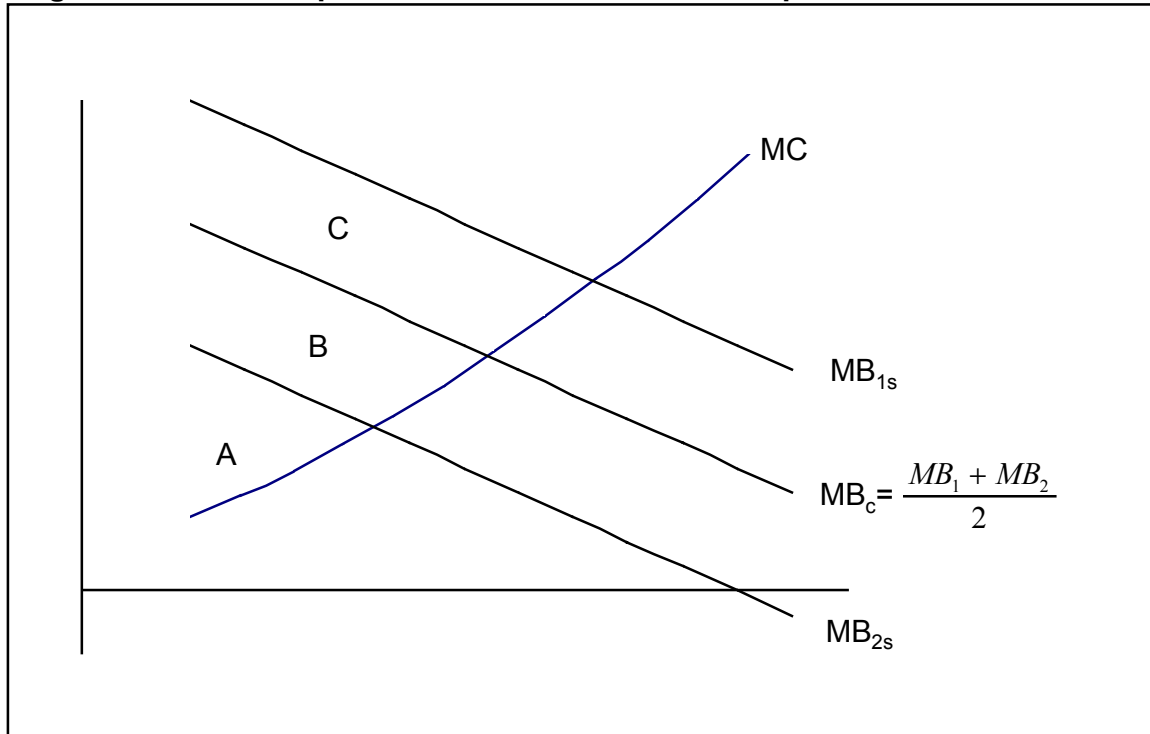
$$w_i = z - x_i^2$$

$$v = 1 + r\sigma^2$$

In the context of separability, then, if the principal gets positive utility from both policies he has to make a tradeoff. On the one hand, he gains a benefit for centralizing. This follows from the fact that the centralized organization is less costly to him. However, there is a cost to him for centralizing as well. The principal would like for the agent to choose the optimal levels of effort *for each* task, in other words, to set the marginal cost of the effort equal to the marginal benefit to the principal less the incentive paid *for that task*. For example, suppose that one of the tasks has a target policy equal to zero and the other has a target policy which is $\sqrt{z} - \eta$ where η is very small. In this case, the principal is willing to provide a higher incentive, and thus garner a higher effort for the first task than the second; his marginal benefit is higher in the former case than the latter. As noted earlier, however, if the principal centralizes the task, he is no longer able to provide a differential incentive based on the particular task. Thus, if P chooses a uniform incentive for both tasks, the agent then picks an effort level which is equivalent for both tasks, and therefore higher than the principal's optimum in one case and lower in the other. Thus, there is an *aggregation cost* to the principal to choose centralization. If he is allowed to choose the incentives for all tasks, he will choose based on the *closeness of the two policies* and the *differential in costs between the organizational forms*. Figure 4.4 illustrates the aggregation loss from centralization. Under specialization, each task has separate marginal benefit curves. Thus, the surplus is the difference between these two curves and the marginal cost curve for the agent, which is constant across tasks. In particular, the joint surplus under specialization is $2A + B + C$ from Figure 4.4. Under centralization, there is only a single marginal benefit curve, which is simply the average of the two individual benefit curves. The surplus under centralization, then, is $2(A+B)$. So the difference in the joint surplus is $C - B$. That this value is strictly positive follows directly from the fact that the marginal cost is convex and increasing, so the joint surplus is always higher under specialization. Another way to see this fact is by noting that imposing a single incentive scheme on two tasks is a constraint on the joint problem and so therefore must yield a weakly lower utility. Finally, note that if we relax the assumption $C_p(c) \leq C_p(s)$, then if $C_p(c) \geq C_p(s)$, for any values of x_1 and x_2 , the principal will choose to segregate the tasks in to two separate organizations. The reason is that for all pairs (x_1, x_2) , the principal gains the benefit of two cheaper organizations and being able to set the

incentives and thus the effort levels at their most optimal levels. In this case, specialization is a dominant strategy.

Figure 4.4. Joint Surplus Under Centralization and Specialization



Case 2. Suppose without loss of generality that $x_1 \in (-\sqrt{z}, \sqrt{z})$ and $x_2 \notin (-\sqrt{z}, \sqrt{z})$. P will choose s if the cost differential between the organizational form is not prohibitive.

In this case, one of the target policies generates a positive utility for the principal and the other does not. From the above analysis, we know that when the principal has an opportunity to set the incentives separately, if he does not enjoy benefits from a policy, he will set the incentives to zero for that policy which will lead to no output for that task. As before, he has to decide if the costs of splitting the tasks into two organizations is outweighed by the prospect of less than optimal efforts allocated to the two tasks. This result is qualitatively the same as that for Case 1. However, it differs in an important respect: For a given policy $x_1 \in (-\sqrt{z}, \sqrt{z})$, in the second case, he will be less likely to put the tasks into a single organization. In this case, we can think of a number of possible scenarios. If the disliked task is much worse than the liked task, the principal will be more likely to separate

the two tasks for a given set of organizational costs. This amounts to a judgment of how far from the x -intercept the policy is. In other words, if $\sqrt{z} - |x_1| > |x_2| - \sqrt{z}$, the principal will consider both organizational forms and decide based on the cost differential between the two forms, as before. However, if the costs are prohibitive, then the agent will choose a centralized form, and set the incentive component to zero. This means that the principal, depending on the costs of the organization, might not get output for *either policy*. Similarly, if the cost differential between organizational forms is high, the principal might still choose to centralize the tasks. But if the liked and disliked policies are sufficiently close, he will provide a positive incentive and will get output for both policies, including the one he gets negative utility from.

Case 3. Suppose without loss of generality that both x_1 and $x_2 \notin (-\sqrt{z}, \sqrt{z})$. In this case, P will always choose c .

Since both of the target policies generates a negative utility for the principal, there is no tension between organizational costs and output incentives. No matter what the organizational form, the principal will set all incentives equal to zero. Thus, under both forms, the agent's output and thus effort will also be zero. This means that the joint surplus will simply be the negative of the organizational costs. Given the assumption that $C_p(c) \leq C_p(s)$, this means the principal has a dominant strategy to always choose to group the tasks together and set $\alpha = 0$.

Figure 4.5. Factors Determining Choice of Organizational Form

TARGET POLICIES	COST DIFFERENTIAL	
	Low	High
both within $(-\sqrt{z}, \sqrt{z})$	<ul style="list-style-type: none"> • choose <i>specialization</i> set $\alpha_1, \alpha_2 > 0$ 	<ul style="list-style-type: none"> • choose <i>centralization</i> set set $\alpha > 0$
one within $(-\sqrt{z}, \sqrt{z})$	<ul style="list-style-type: none"> • choose <i>specialization</i>, set $\alpha_1 > 0$ and $\alpha_2 = 0$ 	<ul style="list-style-type: none"> • choose <i>centralization</i>, set $\alpha = 0$ if $\sqrt{z} - x_1 < x_2 - \sqrt{z}$ or $\alpha > 0$ otherwise
neither within $(-\sqrt{z}, \sqrt{z})$	<ul style="list-style-type: none"> • choose <i>centralization</i>, set $\alpha = 0$ 	<ul style="list-style-type: none"> • choose <i>centralization</i>, set $\alpha = 0$

4.3. Partly Exogenous Contracts and Organizational Choice

In the previous section, I considered a model in which a principal can determine the incentive contracts for all tasks, even if she does not determine the policies themselves. While applicable in some situations, in others, the principal will not get to alter either existing policies or existing contracts. As Moe notes, in the United States, because structural and incentive mechanisms for agency control are often passed in legislation, it is difficult for current public officials to undo previous decisions because of the multiplicity of veto players in the American system of separation of powers. In this sense, the principal is *time-bound* by earlier acts, particularly those that are enacted in statute.²⁵ In this section, I extend the basic model by assuming that there is an *existing* agency, which has been set up under a different regime, and that this agency's mandate and incentive are statutorily determined. Now the principal is even more constrained. What happens when the public official is unable to alter either the incentives or the objectives of the existing task? The principal must determine whether he should place the new task in the existing agency or segregate the new task into

separate agency. Here the result is that the principal will in certain cases, use organizational choices for *political reasons*. In one case in particular, the principal will combine tasks as a way of *distracting effort* away from policies which he does not like.

To analyze this case, we must first specify the nature of the two tasks. I assume that there is an existing policy x_1 and a new policy x_2 . To consider the most interesting case, one in which P is faced with an existing task he does not like, I also assume that the existing policy is one which P gets disutility from and the new policy is one of his choosing. In other words, $x_1^2 > z$ and $x_2 = 0$. In this case, however, I assume that there are *separate measures* of performance for each task, $\mu_t(e_t) = e_t + \varepsilon_t$ where ε_t is normally distributed with mean zero and variance σ_t^2 . P does not get to determine the incentive share for task 1. This was determined by a previous regime for which $x_p = x_1$. Instead, he picks two things, an incentive share for task 2, α_2 , and an organizational form $f \in (s, c)$, where f is defined in the same way as in the previous sections. Finally, I assume that agents have limited resources, such as time, to devote to their work. Formally, I impose this constraint by stating that there are only k units of time that the agent can devote over the given time period, so that $e_1 + e_2 = k$. To make the constraint relevant, I assume that k is small, which in this context means

$$k \leq \min\left(\left\{\frac{z}{1+r\sigma_t^2}\right\}_{t \in (1,2)}\right) \quad (9)$$

The reason I only impose this constraint now is that previously, from the symmetry of the agents' problems, little analytical leverage would be gained by having a constraint such as this. Since the agent has a convex cost function that is separable in effort, as noted before, when there is only a single output measure, the agent will always allocate effort equally to both tasks; so if the constraint binds in that case, it simply means effort will be allocated $\left(\frac{1}{2}k, \frac{1}{2}k\right)$, which will lead to substantively identical results at higher analytical costs. Again,

²⁵ Terry M. Moe and Michael Caldwell, "The Institutional Foundations of Democratic Government: A Comparison of Presidential and Parliamentary Systems," *Journal of Institutional and Theoretical Economics*

this assumption clarifies the principal's trade-offs more clearly without substantively affecting the formal results. Finally, to explicate the main points more clearly, I assume

$$C_p(c) = C_p(s), \gamma = 0 \text{ and } c = 1.$$

Given these assumptions, the previously determined share α_1 will be the same as in (4), since the previous regime's problem is to provide optimal effort for an ideal task. So here,

$$\alpha_1 = \frac{z}{1 + rc\sigma_1^2}$$

Next, we turn to the agent's effort for task 2 under each organizational form. Applying the resource constraint from (9), we have that $\alpha_1 = k$. The agent maximizes his certainty equivalent, subject to his resource constraint, so under $f = s$, agent 2's problem is:

$$\max_{e_2} CE_{2s} = \max_{e_2} \alpha_2 e_2 + \beta - \frac{1}{2} e_2^2 - \frac{1}{2} r \alpha_2^2 \sigma_2^2 \quad s.t. \quad e_2 \leq k$$

which yields an optimal effort:

$$e_2 = \begin{cases} \alpha_2 & \text{if } \alpha_2 \leq k \\ k & \text{otherwise} \end{cases} \quad (10)$$

Applying (9), however, we have that $e_{2s} = k$.

For $f = c$, the agent's problem is:

$$\max_{e_1, e_2} CE_c = \max_{e_1, e_2} \alpha_1 e_1 + \alpha_2 e_2 + \beta - \frac{1}{2} e_1^2 - \frac{1}{2} e_2^2 - \frac{1}{2} r \alpha_1^2 \sigma_1^2 - \frac{1}{2} r \alpha_2^2 \sigma_2^2$$

$$s.t. \quad e_1 + e_2 \leq k$$

Since the constraint is binding by assumption, we have:

$$e_t = \frac{k + \alpha_t - \alpha_s}{2} \quad \text{where } s \neq t \quad (11)$$

(11) is an important result. It highlights that an agent's effort on a particular task is *increasing in the share for that task and decreasing in the share for the other task*. Not surprisingly, given that an agent must allocate his effort across two tasks, he will choose to focus more on the one which promises a higher reward.

Now we can solve for P 's optimal choice under each organizational type. As before, the principal maximizes the joint surplus, subject to the incentive compatibility constraints which are simply the first order conditions from the agents' problems. Thus, we have, for $f = s$, the principal solves:

$$\max_{\alpha_2, e_1, e_2} JS_s = (z - x_1^2) e_1 + z e_2 - \frac{1}{2} c e_1^2 - \frac{1}{2} c e_2^2 - \frac{1}{2} r \alpha_1^2 \sigma_1^2 - \frac{1}{2} r \alpha_2^2 \sigma_2^2$$

$$\text{subject to } e_t = k$$

The solution to this problem yields the following equilibrium share, a restatement of (4):

$$\alpha_2^* = \frac{z}{1 + r \sigma_2^2}$$

Since (11) is binding in this case, we have $e_{2s} = \alpha_{2s} = k$. Under $f = c$, the principal solves the same problem, except with the constraint (13):

$$\begin{aligned} \max_{\alpha_2, e_1, e_2} JS_s &= (z - x_1^2)e_1 + ze_2 - \frac{1}{2}ce_1^2 - \frac{1}{2}ce_2^2 - \frac{1}{2}r\alpha_1^2\sigma^2 - \frac{1}{2}r\alpha_2^2\sigma^2 \\ &\text{subject to } e_t = \frac{k + \alpha_t - \alpha_s}{2} \quad s \neq t \end{aligned}$$

The optimal share under centralization then is:

$$\alpha_{2c}^* = \frac{2k + x_1^2}{2 + r\sigma_2^2} \quad (12)$$

Before analyzing P 's organizational choice, it is illuminating to consider the implications of the principal's optimal choice of contracts. First, P will pay a higher share for task 2, the more extreme task 1 is. In other words, as shown in Figure 4.6, as the absolute value of x_1 increases, the incentive provided for task 2 increases. To see this, note that

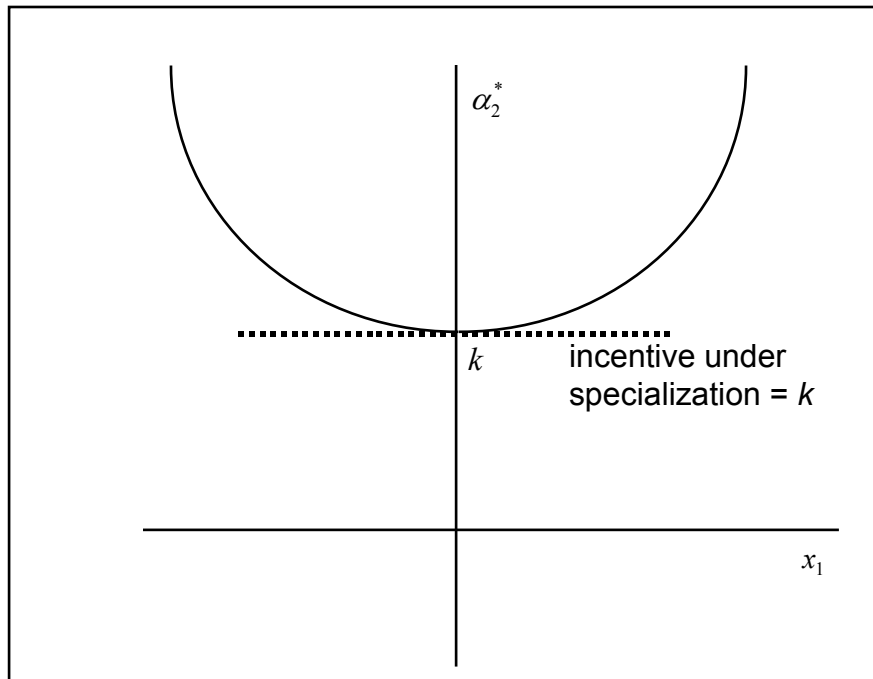
$$\frac{\partial \alpha_{c2}^*}{\partial x_1} = \frac{2x_1}{2 + r\sigma_2^2} \Rightarrow \frac{\partial \alpha_{c2}^*}{\partial |x_1|} > 0$$

The reason for this is that in a centralized organization, as noted, the incentives for one task affect the allocation of effort to the other task. Thus, as the policy which the principal has no control over gets more and more extreme relative to P 's ideal policy location, he will provide higher and higher incentives for the task he does like in order to *distract attention away from the little preferred task*. Second, the incentives paid under centralization are weakly higher than that paid under specialization. The reason for this is that the principal is willing to pay an extraordinary amount under centralization to get an appropriate allocation. Since the tasks are grouped, the relative weightings of the incentives will determine the efforts the agent puts forth, according to (11). Thus, to get more effort on task 2 (and less on task 1), the agent is willing to pay an additional incentive. Third, the optimal incentive α_{2c}^* is decreasing in the error in measurement of task 2, since

$$\frac{\partial \alpha_{2c}^*}{\partial \sigma_2^2} = -\frac{r(2k + x_1^2)}{(2 + r\sigma_2^2)^2} < 0.$$

The reason for this is that the higher the variance of the measure, the higher cost it is to achieve marginal improvements in the allocation of effort between task 1 and task 2, creating downward pressure on the incentive for task 2.

Figure 4.6. Optimal Share for Task 2 under Centralization



Next we consider P 's optimal choice of organizational form. The principal will choose which ever form gives her the higher joint surplus, evaluated at the equilibrium quantities of the triple (α_2, e_1, e_2) . This implies the following proposition proved in the appendix:

PROPOSITION. P will choose $f = c$ if and only if $x_1 > x_1^*$, where x_1^* is a decreasing function of σ_1^2 and an increasing function of σ_2^2 .

This result has a number of implications. First, the public official faces a *fundamental trade-off* in choosing the organizational form. If he chooses to specialize, he gains the optimal output of his own task at the lowest price. The cost, however, is that he obtains the same amount of effort devoted to a task he might not like. If that task is very extreme, he will obtain a great deal of disutility from the implementation of the task by the agent.

Alternatively, when he centralizes, he can have the agent focus on the task he likes; even to the complete elimination of any effort for the task P does not like. In this way, as mentioned, the principal can use centralization as a means of *distracting attention away from tasks he does not like to ones that he does*. The cost, however, is that P must give larger payments to the agent. In order to get the agent to focus single-mindedly on the "good" task, the principal has to pay the agent a large premium over what he would have to if the agent was specializing: for the same amount of effort devoted to task 2, the principal has to pay more. In this sense, there is a smaller joint surplus for society when a principal faces highly divergent tasks.

Second, the more extreme the existing policy, the more attractive centralization becomes. The reason for this is because it makes the principal's trade-off easier. If a policy is very distant from P 's ideal point, the greater the (marginal) disutility of effort devoted to that task. Thus, as policies become more extreme, the cost of diverting attention away from the task becomes relatively smaller.

Third, the relative monitorability of the two tasks affects P 's decision. Since P does not like the existing task, as noted, he is willing to pay a higher incentive for task 2 in order to distract agent's attention away from the policy he does not like. But the value of this distraction depends on how much effort the agent will devote to the existing task. As noted above, under specialization, the agent will devote less effort to a task which is poorly monitored. Thus, as the variance of the measure of that task increases for a given amount of effort, an agent will devote less effort to it, meaning that for high variance tasks, the incentive for the principal to centralize reduces.

Fourth, the model helps explain the stylized fact of over-commitment of resources to agencies. In a firm, shareholders and managers do not need to be worried about misallocation of effort for two equally monitorable tasks. If the profit function has not changed, then a

change in the shareholders will have no effect on the optimality of the incentive schemes. In political situations, however, this is not necessarily the case. The model shows that when there are *ideological shifts* (represented by extreme values of x_1), political principals will have an incentive to reorganize. Further, these reorganizations will not be done to promote efficiently carrying out existing tasks. If the principal chooses to centralize, he will have to "overpay" the agency in order to get a given level of output, and at the same time will *lower* output for existing programs.

4.4. Discussion

The choice of organizational forms is more complex in political than private environments. While profit-maximizing firms have unitary objectives, creating some coincidence of interests between principals and their agents, in political situations, it is often the case that principals *would prefer no output* of some activities that have to be implemented. In this paper, I offer examples of how public officials can manipulate outcomes through the choice of incentive structures, on the one hand, and more importantly, organizational forms on the other hand.

In situations in which public officials have complete control in every period over setting incentives, then in choosing such incentives, they face tradeoffs between specialization and centralization. In particular, if centralization is less costly, *ceteris paribus*, officials would prefer to have larger scale organizations. However, all policies are not equal and some are more well-liked by officials than others. As the model in section 4.2 indicates, public officials will therefore have to weight the loss from centralizing, and therefore not being able to manage each task discretely against the benefit of optimal output on each policy.

In some situations, the assumption that all incentives can be altered by officials might not be appropriate. Although some forms of incentives are available to officials in the current period (such as budgets and oversight), others are written into statute and therefore difficult for current officials to alter if passed by previous regimes (such as deck-stacking and

procedural guidelines).²⁶ In section 4.3, I make stricter assumptions about the ability of political principals to alter such existing contracts. Under these assumptions, officials make similar tradeoffs between the centralized and decentralized task assignment. The important difference is that reorganization has an additional benefit against specialization under these assumptions. If public officials decide to centralize implementation, they obtain an additional benefit in comparison to the earlier model. Officials who choose *not to reorganize*, will provide incentives so that effort on the task they most prefer will be optimal. At the same time, there will be overproduction of output, from the principal's perspective, for the task that the principal does not like. Thus, if that task is very far from the ideological location of the current official, it will be worth it to centralize and reduce agents' effort devoted to that task, even if doing so sacrifices some output of his own preferred policy or alternatively, requires the principal to provide greater overall wages than he would have otherwise. In this case, the choice of organizational form becomes the only tool for manipulating policy outcomes. By centralizing, the official can *divert attention* away from an existing task that he does not like. To achieve this, however, the official must pay a hefty price: the incentives provided to the agents must be even more high-powered than under the other regimes. In this sense, then, officials will *pay more to get less* output from agents.

Implications. Collectively, these models, although merely a first-step, have a number of important implications. First, they highlight that, as in private firms, we can think of the organizational and incentive choices involved in setting up public organizations as a product of an interplay between those who need to employ others to implement a set of tasks and the agents they must employ to do so. As with the results from *economic agency theory*, the agents in these models behave in a familiar fashion: risk averse, effort avoiders, they are motivated by incentives, and their effort will be such that an agent's marginal cost is equivalent to her incentive. Second, organizational forms involve costs. In the case of specialization, if there are significant fixed costs for an organizational type, then creating two organizations will cost more than creating a single one. Centralization is not costless, however. In particular, segregating tasks in separate formal organizations makes it easier to monitor those tasks. This means that there is an *aggregation cost* to centralized forms: since

²⁶ Weingast and Moran; Moe, "The Politics of Structural Choice"; McCubbins and Schwartz; McNollgast.

it is harder to set separate incentives for the two tasks, there is misallocation of effort between each, involving (political) efficiency losses for the official. Third, and perhaps most importantly, the models demonstrate how organizational choices are fundamentally *political* decisions. As shown in the model in section 4.3, political officials are not only concerned with the optimal implementation of their own policies. Instead, public officials can use organizational forms and task groupings to achieve larger political ends. When deciding on the implementation structure of a new policy, public officials will search the terrain for existing agencies in which to install the new policy. In many cases, the assignment of these tasks will have two effects: first, it will achieve at least some implementation of the preferred-to policy; but at the same time, in choosing centralization, officials can *distract* attention and effort *away* from tasks that the official does not like. This means that task assignment becomes a crucial factor in determining the overall structure of government and actions taken to reach that structure.

As noted earlier, there are many potential applications of the results and implications of these models. In particular, the models generate predictions for when agencies will be merged, and when they will be kept separate. This will help students of bureaucracy better understand moves such as President Carter's decision *not* to fold the Consumer Product Safety Commission (CPSC) into the Department of Commerce. The choice came to a head in 1978, when Carter received strong advice from both business interests and his own advisors that the agency would do better to be folded into other agencies, particularly the Department of Commerce. Carter considered this advice, but ultimately rejected it. He was concerned, along with consumerists and many members of the legislature, that consumer product safety regulation would be easily swamped by other policies in a not-so-friendly Department of Commerce; it would have been easy for enemies to distract regulatory attention to other issues.²⁷ The case of the CPSC points to a broader scale empirical investigation of the predictions of the models presented here.

²⁷ Congressional Quarterly, *Federal Regulatory Directory* (CQ Press: Washington, DC, 1990), pp. 48-49; United States Senate Committee on Commerce, Science, and Transportation, *Consumer Product Safety Amendments of 1981: Report to Accompany S. 1155* (U.S. G.P.O.: Washington, DC, 1981); United States House Committee on Interstate and Foreign Commerce, *Extension of Consumer Product Safety Act: Report Together with Additional and Separate Views to Accompany H.R. 12442* (U.S. G.P.O.: Washington, DC,

More generally, the theory provides a plausible explanation for why there have been so frequent reorganizations of government, particularly during regime changes.²⁸ Just as new executives in a private firm, new public officials often use reorganization as a way of "sending a message" and changing organizational cultures. But in the public domain, where practices and policies from previous regimes will inevitably endure, the reorganization can have a more subtle rationale: redirection of attention away from existing and towards current officials' policies.

1978); United States Senate Committee on Commerce, Science, and Transportation, *Consumer Product Safety Act Authorization of 1978* (U.S. G.P.O.: Washington, DC, 1978); United States Senate Committee on Commerce, Science, and Transportation, Subcommittee for Consumers, *Reauthorization of Consumer Product Safety Act* (U.S. G.P.O.: Washington, DC, 1978).

²⁸ Grafton, p. 26.

APPENDIX 4.A1. PROOFS OF RESULTS

PROPOSITION. Under $f = s$ the optimal shares are

$$\alpha_i^* = \begin{cases} \frac{(z - x_i^2)o_i}{1 - rc\sigma^2} & \text{if } (z - x_i^2) > 0 \\ 0 & \text{otherwise} \end{cases}$$

Proof. Let $w_i = (z - x_i^2)o_i$. Substituting the incentive compatibility constraints into the principal's Lagrangian we get the following maximization problem

$$\max_{\alpha_1, \alpha_2} \frac{w_1\alpha_1}{c} + \frac{w_2\alpha_2}{c} - \frac{\alpha_1^2}{2c} - \frac{\alpha_2^2}{2c} - \frac{1}{2}r\alpha_1^2\sigma^2 - \frac{1}{2}r\alpha_2^2\sigma^2 - C_p(s)$$

The first order conditions of this problem are of the form:

$$\frac{w_i}{c} - \frac{\alpha_i}{c} - r\alpha_i\sigma^2 = 0$$

Solving for α_i and substituting for w_i gives the first part of the result. The second part comes by noticing that if $(z - x_i^2) < 0$, this result is negative which contradicts the assumption that $\alpha_i > 0$. ■

PROPOSITION. Under $f=c$ the optimal share is

$$\alpha^* = \begin{cases} \frac{(z - x_1^2)o_1 + (z - x_2^2)o_2}{2 + (1 + \gamma)r\sigma^2 c} & \text{if } (z - x_1^2)o_1 + (z - x_2^2)o_2 > 0 \\ 0 & \text{otherwise} \end{cases}$$

Proof. The principal's Lagrangian is

$$\begin{aligned} L = & w_1 e_1 + w_2 e_2 - \frac{1}{2} c e_1^2 - \frac{1}{2} c e_2^2 - \gamma c e_1 e_2 - \frac{1}{2} r \alpha^2 \sigma^2 - C_p(c) + \lambda(\alpha - c e_1 - \gamma c e_2) \\ & + \mu(\alpha - c e_2 - \gamma c e_1) \end{aligned}$$

From the incentive compatibility constraints, we have that $e = e_1 = e_2$. Substituting this into the Lagrangian, the first order conditions of this problem are:

- (1) $e_1: w_1 - ec(1 + \gamma) - \lambda c - \mu \gamma c$
- (2) $e_2: w_2 - ec(1 + \gamma) - \lambda \gamma c - \mu c$
- (3) $\alpha: -r\alpha\sigma^2 + \lambda + \mu$
- (4) $\lambda, \mu: \alpha - ec(1 + \gamma)$

This gives four equations and four unknowns. Solving (1) yields

$$\lambda = w_1 - ec(1 + \gamma) - \mu \gamma c$$

Substituting into (2) and solving means

$$\mu = \frac{w_2 - \gamma w_1}{c(1 - \gamma^2)} - e$$

By symmetry, we have

$$\lambda = \frac{w_1 - \gamma w_2}{c(1 - \gamma^2)} - e$$

Substituting into (3), we have

$$r\alpha\sigma^2 = \frac{w_1 - \gamma w_2}{c(1 - \gamma^2)} - \frac{w_2 - \gamma w_1}{c(1 - \gamma^2)} - 2e$$

which implies

$$ec(1 + \gamma) = \frac{w_1 + w_2 - (1 + \gamma)r\alpha\sigma^2c}{2}$$

Substituting into (4) gives

$$\alpha = \frac{w_1 + w_2 - (1 + \gamma)r\alpha\sigma^2c}{2}$$

Solving for α , we have

$$\alpha^* = \frac{w_1 + w_2}{2 + (1 + \gamma)r\alpha\sigma^2c}$$

The first part of the proposition is obtained by substituting for w_1 and w_2 . The second part of the proposition is obtained by noting that if $(z - x_1^2)o_1 + (z - x_2^2)o_2 < 0$, then α^* will be negative which violates the assumption that incentives are non-negative. ■

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