Risk Taking and Reelection: Does Federalism Promote Innovation?
Author(s): Susan Rose-Ackerman
Source: The Journal of Legal Studies, Vol. 9, No. 3 (Jun., 1980), pp. 593-616
Published by: The University of Chicago Press
Stable URL: http://www.jstor.org/stable/724006
Accessed: 17/01/2009 15:54

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RISK TAKING AND REELECTION: DOES FEDERALISM PROMOTE INNOVATION?

SUSAN ROSE-ACKERMAN*

I. INTRODUCTION

Politicians must take risks if they hope to be reelected. They must make decisions on the basis of imperfect information about voters' preferences and challengers' behavior. They must commit resources to projects with uncertain outcomes. Some projects are technologically certain but politically uncertain. Repairing potholes is a simple task, but a politician with scarce funds must calculate the uncertain electoral consequences of repairing one neighborhood's potholes sooner than another's. For other projects, both kinds of uncertainty are important. Politicians who spend tax funds to develop new ways to combat juvenile delinquency face the uncertainty inherent in all innovative activity. They cannot know just what results the project will generate, and, in addition, they are not sure how voters will react to whatever results are produced. Their attempts to innovate may even backfire, if, for example, the youths in the project organize for radical political activity. In some cases political choice may also be affected by the voters' attitudes toward risk. For example, if the politician commits government funds to projects that will not produce results until after the next election, then voters' risk preferences may enter the politician's calculations. In deciding how to vote, citizens may judge candidates not only on the expected value of their promises but on the riskiness of their platforms as well.

This paper considers the relationship between government structure and risk taking. I contrast the behavior of politicians in a centralized system with that of elected officials in a decentralized multiple government regime. After these polar cases are examined, I consider the "federal" case where the interactions of national and local decision makers determine the kind and quantity of innovative activity. Throughout the paper governments are assumed to be representative democracies, each controlled by a single politician who seeks to maximize his or her probability of reelection under condi-

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tions of uncertainty. After introducing the basic model in Part II, Part III analyzes the politician's choice of short-term projects that pay off before the election. Although insecure incumbents may gain from sponsoring risky projects, secure incumbents are likely to behave as if they were "risk averse" even if their underlying preferences are risk neutral. In a multiple government system the overall incentive to take risks is reduced if the politician hopes to free ride on the activities of other governments.

Part IV models a government's choice of long-term projects that pay off after the election. If voters have a wide range of risk preferences, politicians are likely to satisfy the preferences of those close to the population median. Since the riskiness of the government's "portfolio" is a pure public good to voters, politicians' choices will not reflect the preferences of the minority of voters willing to accept large risks. Furthermore, if the credibility of politicians is low, they may be unable to convince voters that a search for new ideas is actually occurring. Rather than searching for new ideas in an effective way, they may instead sponsor projects that aid key individuals or groups. This last possibility implies that innovative work will be inefficiently performed and will emphasize "demonstration" projects of little long-term value.

These conclusions are not fundamentally changed when the complexities of a multiple government system are introduced. First, although some voters may be "risk lovers," they are unlikely to concentrate in a single jurisdiction. Moving costs and the link between housing choice and political jurisdiction prevent sorting by risk preferences. Second, politicians' choices will depend upon their knowledge of other jurisdictions' actions. If they ignore other governments, wasteful duplication can occur. If they hope to benefit from other governments' activities, few risky projects may be undertaken. Those that are carried out may be structured so that it is difficult for others to copy the results.

Part V introduces a two-level "federal" system. Here, the hope of running for higher office may give low-level politicians an incentive to search for new ways of doing things and increase the competitiveness of state and local politics. These incentives are likely to be insufficient goads to innovation, however, and the paper concludes by examining the value of federally administered prizes or subsidies. While some policy improvements are possible, low-level governments remain flawed mechanisms to rely on in the search for new ideas. The reelection motive, the lack of sorting by risk preferences, external effects, and the impact of migration combine to prevent many searches from being carried out and to bias those projects that are undertaken. If state and local governments are supposed to be "laboratories," then my model predicts that few useful experiments will be carried out in them.1

1 "It is one of the happy incidents of the federal system that a single courageous state may, if
The limitations of my modeling effort should, however, be recognized. First, the motivation of politicians is very simple. Elected officials only care about reelection and will not accept a reduced probability of reelection in exchange for an increase in income or policies that satisfy personal beliefs. Second, the government has a very simple structure. There is no multi-member legislature, and a single elected official controls government policy. Third, the bureaucracy plays a passive role. Although professionals such as agronomists, highway engineers, educators, and social workers obviously help determine the options available to the political system, their behavior is not explicitly modeled. Nevertheless, by stressing one aspect of the political environment, the biases of elected officials can be articulated and some contrasts between risky "investment" in the public and private sectors clarified.

Moreover, the model can be used to help direct future empirical work—which, thus far, has lacked a solid theoretical base. Such research as exists, however, is broadly consistent with my rather pessimistic conclusions. Recently, the National Science Foundation sponsored a series of studies on the use of new products and processes by state and local governments. These studies covered a wide range of innovations from computer-based land use models to Dial-a-Bus plans. The National Science Foundation research...
indicates that the private sector is the main source of new product innovations used by governments. Innovations in computer software originate under both federal and private sponsorship, and process innovations are frequently developed in response to federal funding. With the exception of some research on agriculture, highways, and public health, few new ideas appear to have been generated by innovative activity financed directly by lower-level governments.

II. THE BASIC MODEL

Consider a government system with a single elected policy maker who is only concerned with retaining office. Elections occur at prespecified times, several years apart, and the voting population is constant. The incumbent faces a single opponent and must obtain at least 50 percent of the vote to win. The politician is risk neutral and must decide what kind of risks to take in order to maximize his probability of reelection. The analysis turns on two factors: the information available to politicians when they make decisions and the information available to voters when politicians seek reelection. In the first model, the politician must choose among projects that will pay off before the election so that voters can evaluate the results. In the second model, projects pay off after the election so that both voters and politicians must guess the ultimate outcome.

The politician must decide how much tax money to spend on search activity that may result in a more efficient way of producing a pure public good. The good, x, is valued by voters directly. There is no problem of

L. Perry & Kenneth L. Kraemer, Diffusion and Adoption of Computer Applications Software in Local Government: Final Report (1978) (unpublished manuscript, Univ. of Calif., at Irvine, Public Policy Research Organization and Graduate School of Administration). Those innovations ranged from the computerization of birth and death records, to traffic light control, to the development of sophisticated urban land use and housing models. Irwin Feller, Donald Menzel, & Alfred Engel, Diffusion of Technology in State Mission-Oriented Agencies (1974) (unpublished manuscript, Penn. State Univ., Inst. for Research on Human Resources), studied the adoption of impact attenuators and transportation modeling by state highway departments and of automatic telemetry and air pollution modeling by air pollution agencies. Lambright and his colleagues in Syracuse Research Corp., supra note 2, examined a range of innovations introduced in Rochester and Syracuse, New York. Among others, they included Rochester's "Project Unique": a package of "nine innovative, programmatic components designed to address the problems of reducing racial imbalance in the Rochester city schools and improving urban education in a declining city" (id. at 16); Syracuse's School Resource and Information Program (SRIP) which used police officers in the schools as a solution to disruption (id. at 17); Dial-a-Bus (id. at 21 & 22); a computerized property assessment system (id. at 21), and several new kinds of fire-fighting equipment. Richard D. Bingham, The Diffusion of Innovation among Local Governments, 13 Urban Affairs Q. 223 (1977), concentrated his analysis on local government innovations in computer software, individualized instruction in elementary schools, and product innovations such as the use of prefabricated components in public housing and theft detection systems in public libraries.
linking $x$ to the achievement of some general goal. Innovation affects the efficiency with which $x$ is produced, not its quality. With no innovation, no $x$ is produced. The output of a risky project is a level of $v$, which represents the output of $x$ per dollar of input. Each project, $j$, is described by a distribution of $v$, a total per capita tax cost, $z_j$, and a time of payoff, $t_R$. Once the project has produced results, the politician chooses the level of $x$ and per capita taxes ($x/\mu n$ where $n =$ population) that will maximize his probability of reelection, $\theta$. No benefits can be given to individual voters to make up for an unpopular project choice. The politician can pick a budget and a distribution of $v$ from a feasible set of projects but cannot directly influence the organization of the project or the options available. Thus the model is consistent with the view that innovative work is dominated by professional norms and practices. The politician must accept the set of projects as exogenously given by those who will actually carry out the projects.

Since the time of payoff is only important insofar as it relates to the time of the election, it will simplify the exposition to assume that projects can only pay off at either $t_1$ or $t_2$ and that $t_1 < \hat{t} < t_2$, where $\hat{t}$ is the date of the election. Either politicians must choose among a set of short-run projects with $t_R = t_1$, or they must commit themselves to projects with $t_R = t_2$ that will not get underway until after the election. For short-term projects voters know the actual value of $v$ when they go to the polls. For long-term projects they only know the distribution of $v$. I assume that there is no informational asymmetry for long-term projects. Both politicians and voters have the same beliefs about the distribution of $v$.

The levels of $v$ and $z$ enter the voters' utility functions, but it is votes not voters' utility that matter to the incumbent. Thus I must make some assumptions about the way actual or expected utility levels are translated into votes. If the project pays off before the election, I assume that the politician is judged on the basis of his past performance. Voters judge the incumbent on the basis of what he (and chance) actually produce, not on the basis of his choice of project ex ante. For a given tax bill, the higher the realized level of $v$, the higher is every voter's probability of voting for the incumbent. If the risky activity will pay off after the election, then a challenger can promise to undertake a different project to obtain support. A voter chooses the politi-

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7 See Richard R. Nelson, The Moon and the Ghetto (1977), for a discussion of innovation in government which stresses the often tenuous link between outputs and goals. I have assumed away the difficulties raised by his analysis.

8 Thus I assume that $x$ is produced at a constant unit cost of $1/v$.

9 In defining these terms I have neglected to put taxes and the level of the public goods in present value terms. One can, of course, express these variables as the discounted present value of net benefits at election time. Although this would be more formally correct, it would add nothing to my analysis. Therefore, I omit discount factors. A fuller analysis which treated $t_R$ as a variable would, however, need to introduce discounting.
cian who promises him the highest level of satisfaction taking into account both z and the distribution of v.

To assess the return on risky projects, the politician must calculate the expected benefits to voters. Consider, first, a project that pays off before the next election. To simplify the discussion, suppose that all voters place the same value on v and z. Let \( m(v,z) \) be a voter's net benefit at election time if a project produces v with a tax bill of z, and let \( g_j(m) \) be the distribution of m. The level of m will be negative if the project is unsuccessful and will be positive when the productivity gain is worth more to voters than the tax bill. The level of m, however, cannot be directly associated with a person's vote. Instead, the incumbent politician can only estimate the probability that each individual will vote for him if m prevails. The politician is uncertain about this probability both because he does not know people's preferences with certainty and because he is unsure about how the electoral challenger will respond. Although people value m equally, this does not imply that they all are equally likely to support the incumbent once m is known. Voters can place different values on other aspects of the incumbent's administration and may weight the level of m differently in making their voting decisions.

For any realized level of m the politician can then calculate \( p(m) \), the probability that he will win the election (i.e., \( p(m) \) is the probability that he obtains more than half the votes). His overall probability of winning given \( g_j(m) \) is then

\[
\theta_j = \int_{-\infty}^{+\infty} p(m) g_j(m) \, dm.
\]

In order to concentrate on the "riskiness" of various \( g_j \) distributions, I assume that all of them have zero mean (\( \bar{m} = 0 \)). If the mean is actually realized, then the politician's probability of reelection is \( p(\bar{m}) \). Since \( \bar{m} = 0 \), \( p(\bar{m}) \) can be interpreted as the politician's probability of winning if he avoids the class of risky projects altogether. Other elements of his administration influence voters' behavior, but their impact is independent of his choice of \( g_j \).

Now consider a politician who must choose one of a set of projects that do not get underway until after the election, and will not pay off until \( t_2 \). Everyone has the same income and values x and z equally, but they have different tolerances for risk. To keep the exposition simple, suppose that the marginal utility of x is constant and equal for everyone. Thus utility can be expressed as a function of a variable w where w depends on the level of v and z, and is essentially the sum of after-tax income and the level of x multiplied by the marginal utility of x.\(^{10}\) Suppose that voters can be ranked unambigu-

\(^{10}\) Of course, a formal expression for w would have to be written in terms of the discounted present values of the variables at time \( t_1 \).
ously in terms of their preferences for a reduction in risk relative to increases in \( w \). The absolute level of \( w \) does not affect the ranking. In particular, I assume that everyone has a utility function with constant relative risk aversion, \( U_i(w) = (1-a_i)w^{1-a_i} (a_i > 0, a_i \neq 1) \), for \( i = 1, \ldots, n \). I can label the individuals so that \( a_1 \leq a_2 \leq \ldots \leq a_n \). Thus those with large indexes are the most risk averse. Each risky project is described by its distribution, \( f_j(w) \).

For long-run projects, I assume that each individual’s probability of voting for the incumbent, \( p^i \), is either 0 or 1 depending upon the challenger’s choice of \( f_j(w) \). An individual will vote for the incumbent if and only if his choice of \( f_j(w) \) is preferred by the voter to the challenger's choice.

“Riskiness,” however, is an ambiguous concept. While the most familiar way of measuring uncertainty is by calculating the variance of a distribution around its mean, this approach fails to measure the “riskiness” of many distributions in a fully satisfactory way. In fact, there are at least three ways of comparing the “riskiness” of two probability distributions of a random variable which have the same expected value. The first looks at the choices of “risk averse” individuals, defined as those with utility functions that are concave and increasing in terms of the random variable. Here one distribution, \( f_1(s) \), of a random variable, \( s \), is less risky than another, \( f_2(s) \), whenever \( f_1(s) \) is preferred to \( f_2(s) \) by everyone with utility functions that are concave and increasing in \( s \). The other approaches concentrate on characteristics of the distributions themselves. One tries to measure the “noise” of a distribution in a way that does not require one to calculate the variance. The second considers the frequency with which the random variable takes on high or low values that are “far away” from the mean. Thus if \( f_2(s) \) has “more weight in its tails” than \( f_1(s) \), it is considered more risky.

Fortunately, Rothschild and Stiglitz have shown that these three approaches to risk yield equivalent riskiness rankings of distributions. They establish that a risk averse individual will prefer \( f_1(s) \) to \( f_2(s) \) if and only if the other two conditions also hold. This can be written formally as: An individual with a utility function that is concave and increasing in \( s \) will prefer \( f_1(s) \) to \( f_2(s) \) if and only if,

\[
\int_b^s [F_1(s) - F_2(s)] \, ds \leq 0 \text{ for all } b, \hat{s} \leq b \leq \hat{s},
\]


12 In particular, given three random variables, \( X, Y, \) and \( Z \) suppose that \( Y \) has the same distribution as \( X + Z \) and that \( Z \) has the property that \( E(Z/X) = 0 \) for all \( X \). Then we can say that “\( Y \) is equal to \( X \) plus some noise.” Id. at 225-26.

13 Id. Their result was also proved at about the same time by Josef Hadar & William R. Russell, Rules for Ordering Uncertain Prospects, 59 Am. Econ. Rev. 25 (1969); and G. Hanoch & Haim Levy, The Efficiency Analysis of Choices Involving Risk, 36 Rev. Econ. Stud. 335 (1969).
To interpret (1), I shall introduce the notion of a "mean-preserving spread."\(^{14}\) A mean-preserving spread changes a distribution by removing some weight close to the mean of a distribution and placing it near the tails without altering the mean. The inequality in (1) then implies that \(f_2(s)\) is more risky than \(f_1(s)\) if it can be obtained from \(f_1(s)\) through a series of such mean-preserving spreads.\(^{15}\) Figure 1 gives an example. The smooth solid

\[ F_1(s) = \int_{\tilde{s}}^{s} f_1(s) \, ds, \]
\[ F_2(s) = \int_{\tilde{s}}^{s} f_2(s) \, ds. \]

---

\(^{14}\) Anthony B. Atkinson, On the Measurement of Inequality, 2 J. Econ. Theory 244 (1970), provides an accessible interpretation of (1). He shows that (1) is equivalent to the condition that the Lorenz curve of \(f_1\) is "inside" the Lorenz curve of \(f_2\). The only difficulty with (1) is a technical one. Rothschild & Stiglitz, supra note 11, have proved their results only for distributions with finite end points. Therefore, to use (1) I will have to "chop" off the distributions of \(m\) and \(w\) at some finite but large positive and negative numbers. This is not an important limitation here. Rothschild and Stiglitz argue that the proof of their result for distributions with infinite limits "requires the solution of a host of delicate convergence problems of little economic interest." Id. at 227.

\(^{15}\) Id.
line is some \( f_1(s) \), and the notched line is some \( f_2(s) \) that has been obtained from \( f_1(s) \) through a mean-preserving spread. Clearly, \( f_1(s) \) is less risky than \( f_2(s) \) according to (1).

Throughout this paper when I state that a distribution \( f_1(s) \) is less risky than another distribution \( f_2(s) \), I will mean that condition (1) holds. Having defined "risk," we can now model the way a politician will deal with it in his attempts to maximize his chance of reelection.

III. RESULTS AVAILABLE BEFORE THE ELECTION

A. Monolithic Government

To model the relationship between risk and reelection in the short-run case, assume that \( p(m) \) is an increasing function of \( m \), and that, given \( m = 0 \), all projects can be ranked unambiguously using (1). Suppose that the level of \( m \) is important to voters so that \( p(m) \) equals or approaches zero if \( m \) is very small and approaches one as \( m \) becomes large. A risk neutral person with a utility function defined over \( m \) would be indifferent between all projects, and a risk averse person would choose the project with the highest ranking. The politician, however, does not value \( m \) directly. Therefore, even though I have assumed that he is risk neutral, he will not generally be indifferent between the probability distributions of alternative projects, \( g_j(m) \). His choice of \( g_j(m) \) depends upon the shape of \( p(m) \). If \( p(m) \) is concave as well as increasing, then, following the result in (1), the risk neutral politician behaves like an individual with a risk averse utility function defined over \( m \). He chooses the project with the smallest level of "risk."

There is, however, no a priori reason to suspect that the function, \( p(m) \), relating reelection probabilities to levels of project success, is always concave. Instead, assume that when \( m \) is very low or very high, an increase in \( m \) has little impact on \( p(m) \). At intermediate levels of \( m \), however, a small increase in \( m \) can have an important impact on the probability of winning. This functional form implies an s-shaped curve that is convex for all \( m \) less than some limiting value, \( m = M \), and concave for all higher values. Since \( p(m) \) is convex for all \( m \) less than \( M \), the politician may prefer distributions that are more "risky" to some that are less "risky" according to the criteria in (1). No specific results are possible, however, until we put more structure on the problem.\(^{16}\)

\(^{16}\) Consider a case in which \( g_j(m) \) has a very simple form. Either \( m \) equals \( m_1 \) or \( -m_1 \) and

\[
g(j) = g(-m_1) = \frac{1}{2}.\]

The probability of winning function is s-shaped with

\[
p(m) = e^{-\frac{2(M-m)}{m+m_1}},\]

for \( m > m \), where \( m < 0 \) and, \( m \) is the point where \( p(m) = 0 \). Therefore \( \theta = \frac{1}{2} \left[ e^{-\frac{2(M-m_1)}{m+m_1}} + e^{-\frac{2(M-m_1)}{m-m_1}} \right], \) and
Consider then a simple case in which one of the uncertain elements has been eliminated. Suppose that for any \( m \), including \( m = 0 \), the actual vote proportion is known with certainty. If it exceeds one-half, \( p = 1 \); if it is less than one-half, \( p = 0 \) (let \( p = 1 \), if the vote is a tie). Then locate \( m^* \) where the incumbent obtains one-half the vote.\(^{17}\) In that case \( \theta_j = \int_{m^*}^{\bar{m}} g_j(m) \, dm = 1 - G(m^*) \), where \( \bar{m} \) is the maximum possible \( m \). The politician then prefers \( g_1(m) \) to \( g_2(m) \) if and only if:

\[
G_1(m^*) - G_2(m^*) < 0. \tag{2}
\]

Obviously, this is a different criterion for ranking than is given by (1). Nevertheless, the result in (1) will help us interpret (2). Suppose that \( g_1 \) and \( g_2 \) are different from each other both above and below the mean. Thus \( G_1(m) = G_2(m) \) for some \( m < 0 \) and for some \( m > 0 \). Therefore, if \( g_2 \) is "riskier" than \( g_1 \) in terms of (1), then \( G_2(m) > G_1(m) \) for some \( m < 0 \) and \( G_2(m) \) for some \( m > 0 \). In particular, if the distribution of \( m \) is normal, \( G_2(m) > G_1(m) \) for all \( m < 0 \) and \( G_2(m) < G_1(m) \) for all \( m \) greater than zero.\(^{18}\) Thus

\[
\frac{d\theta}{dm_1} = (M - \bar{m}) \left[ \frac{e^{-2(M-\bar{m})}}{(-\bar{m} + m_1)^2} - \frac{e^{-2(M-\bar{m})}}{(-\bar{m} - m_1)^2} \right] \gg 0.
\]

Thus \( \frac{d\theta}{dm_1} \gg 0 \), as

\[
\frac{2m_1(M - \bar{m})}{(-\bar{m} - m_1)(-\bar{m} + m_1)} \gg \ln(-\bar{m} + m_1) - \ln(-\bar{m} - m_1).
\]

Suppose, for example, that \( \bar{m} = -1 \) and \( m_1 = .5 \), then \( \ln(.5) - \ln(1.5) \cong 1.33 (M + 1) \) or \(-.18 \cong M \). Thus \( d\theta/dm_1 > 0 \) for \( M > -18 \), and \( d\theta/dm_1 < 0 \) for \( M < -18 \). If \( M = -18 \), \( p(\bar{m}) = .194 \). Therefore, for all \( p(\bar{m}) < .194 \), the politician prefers a project with \( m_1 > .5 \) to one with \( m_1 = .5 \). For these values of \( \bar{m} \) and \( m_1 \), he prefers high risk to low risk projects if his probability of winning is less than 20% when \( m = \bar{m} = 0 \).

\(^{17}\) This discussion assumes that such an \( m^* \) exists and is unique. If the actual vote proportion never falls below or rises above one-half, the problem is trivial. If it equals one-half over a range of \( m \), then let \( m^* \) be the smallest \( m \) in this range.

\(^{18}\) The cumulative distribution of \( m \), if \( g_j(m) \) is normal with mean zero, is:

\[
G_j(m) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-\frac{1}{2}d^2} \, dy.
\]

Assume \( \sigma_2 > \sigma_1 \), then \( G_1(m) \cong G_2(m) \)

as

\[
\frac{m}{\sigma_1} \cong \frac{m}{\sigma_2},
\]

or as

\[
\sigma_2 m \cong \sigma_1 m.
\]

If \( m > 0 \), \( G_1(m) > G_2(m) \).

If \( m < 0 \), \( G_1(m) < G_2(m) \).
if the politician is secure so $p(0) = 1$, then for some $m^*$ he prefers the less “risky” alternative using the Rothschild-Stiglitz criterion of risk (i.e., $g_1$ dominates $g_2$). If it were possible, he would like to avoid risk taking altogether. Alternatively, if he is insecure, so $p(0) = 0$, then for some $m^*$ he prefers the more “risky” alternative ($g_2$ dominates $g_1$). For a normal distribution these conditions hold for all $m^*$ given $p(0)$. Figure 2 illustrates this result

![Figure 2](image)

under the assumption that the $g_j(m)$ are normal with mean zero and variances $\sigma_j^2$. Assume that if no risks are taken, $p(0) = 1$. Then $m^*_1 < 0$, and $\theta = 1 - G(m^*)$ is larger the smaller is $\sigma_j^2$. However, when $p(0) = 0$, $m^*_2 > 0$ and the chance of winning, $\theta$, increases as $\sigma_j^2$ increases up to some limiting $\theta < 1$. The incumbent prefers risky projects to safer projects with the same mean. In short, if projects will pay off before the next election, an incumbent whose popularity is low and who faces stiff electoral competition may have a greater incentive to carry out risky projects than one whose expected proportion of the vote is high.

B. Multiple Government

I now consider how political risk taking changes with the introduction of a multiple government system. I assume that each local politician takes account of the choices of politicians in other jurisdictions and tries to benefit from their choices. Politicians, however, ignore the possibility of interjurisdictional migration.

Assume that $x$ is a “local” public good that is restricted to residents of a
given jurisdiction. There are no interjurisdictional spillovers and no individualized benefits available to anyone in or out of the jurisdiction. New ideas which increase the efficiency of $x$'s production, however, are pure public goods to the nation as a whole. If one government completes a successful project, all other governments can costlessly copy their idea without compensating the government which carried out the project.

Suppose that each politician knows the distribution chosen by every other government and that he makes his own choice under the assumption that politicians elsewhere will not react to his choice. Furthermore, suppose that the politician can costlessly import any productivity improvement discovered by another jurisdiction. Voters are better off the higher the net benefits to them of government activity as a whole. However, they only reward the incumbent politician if his draw from the distribution is high relative to the other governments' results. If it is low relative to others, voters penalize him for wasting money on innovation. The incumbent is judged on the basis of the actual draws from the distributions. Voters penalize or reward him for chance events but do not reward him for benefits originating outside of the jurisdiction.

Let $v_1$ be the highest level of output per dollar of input available at time $t_1$ from other governments. The politician does not know $v_1$ when he makes his own choice but he does know its distribution, $h(v_1)$. Let $v_2$ be the level of $v$ generated by the politician's choice. As in the monolithic case, each choice of a distribution is associated with some $z$ so that we can concentrate on $g_j(m_2)$, where $m_2$ is a function of $z$ and of the distribution of $v_2$. Since copying costs nothing, we can associate with every $v_1$ a level of $m^*_2$ (where $v^*_2 > v_1$) that makes the state's voters equally well off. To simplify, suppose that the marginal utility of $v$ is constant and can be expressed in dollars. Then $m^*_2 = v_1$. Thus given $h(v_1)$, the politician can calculate the probability that $m_2 > v_1$ for every $v_1$, and estimate how this result will be translated into votes. Even if the underlying distributions of $m_2$ can be ranked by (1), the distribution of $(m_2 - v_1)$ may not be capable of such a ranking. Even a person with a risk averse utility function defined over $(m_2 - v_1)$ might be unable to classify the distributions as more or less risky. In that case we can say nothing specific about the behavior of politicians. Suppose, however, that the distributions of $(m_2 - v_1)$ can be classified according to (1). Then the

\[ m^*_2 = v_1. \]

\[ m_2 = v_2 - \beta z. \]
discussion in the monolithic government case can be immediately generalized with an appropriate change in units. Although risk averse voters can rank projects according to (1), politicians will not necessarily follow this ranking in making their own choices. Under some plausible conditions, a politician with a good chance of winning will not spend taxpayers' money on the search for productivity improvements. Another with little chance of winning may put funds into risky projects. Here, however, the distribution of other governments' returns influences both the ranking and the net benefits of projects. The better other governments are expected to do, the less incentive any politician has to initiate projects.20

C. Conclusion

The positive models in this section permit some normative conclusions about political risk taking. In the monolithic government case, the timing of elections several years apart means that politicians can embark on public projects with risks that are too high or too low for most of the population. Voters only evaluate the incumbent once every several years, and they then only judge his results, not his promises. Therefore, an insecure incumbent may be willing to risk imposing large costs on the populace in the hope that he will be rewarded if a high level of $m$ results. Conversely, a secure incumbent may value a high level of $m$ less highly than the citizenry and so be unwilling to take chances that most people would support.

In a multiple government system, citizens in each jurisdiction would underinvest in those risky activities that provide spillovers to other governments. Letting citizens choose $g_j(m)$ directly will generally produce too little risk taking from the point of view of society as a whole. This problem of underinvestment may be exacerbated if most state politicians are secure. In contrast, a system of state governments that produces hotly contested elections can yield nationwide benefits if short-term projects with important interjurisdictional spillovers help raise an incumbent's reelection probability. The practical implications of this result will not be large, however,

20 Although the possibility of copying from others will reduce the incentive to innovate, multiplicity may have a salutary effect on search activity if we introduce a third kind of uncertainty. Suppose that for any project $j$, politicians have different beliefs about the distribution of $v$. Even if all politicians have concave and increasing $p$ functions they may rank projects differently. Therefore, a multiple government system could lead to a variety of search activities if these perceptual differences dominate the incentive to be a free rider. (I am grateful to Bernard Wasow for suggesting this possibility.) Of course, the politician in a monolithic government might also underestimate risks. Therefore, this observation assumes that a distribution of perceptions exists and that any individual incumbent has an equal chance of having any set of perceptions about the distributions of $v$. Therefore, the more politicians there are, the greater the chance that at least one of them will believe that a very risky project is actually very conservative.
unless politicians can easily locate such projects. Since state and local elections are generally only two to four years apart, the available projects may all be narrowly defined with little risk associated with them. Politicians may need time to fail or succeed dramatically. An insecure politician may be unable to find projects that are both risky and promise quick results.

IV. RESULTS EXPECTED AFTER THE ELECTION

A. A Monolithic Government

In the previous case the voters' attitudes toward risk did not affect the politicians' choices. Since the result of the search for productivity improvements was known before voters went to the polls, I only needed to specify the way \( m \) was translated into a probability of winning. When projects are more long-term, however, voters' risk preferences are a key influence on the politician's choices. Suppose that the incumbent must choose between a number of projects with different levels of uncertainty as defined by (1), and that he chooses the distribution of \( w \) in a way that maximizes his probability of reelection, \( \theta \). Each voter has a preferred distribution of \( w \) that maximizes his utility, but only one such point can be chosen by the politician.

In modeling the incumbent's choice, the role of the electoral challenger is critical. Suppose that once the incumbent announces \( f_0(w) \), the challenger can make a counteroffer in a way that minimizes \( \theta \). Voters compare the incumbent's plans with the challenger's counteroffer. If the counteroffer is better, \( p_i = 0 \). If it is not, \( p_i = 1 \). The median voter's choice maximizes \( \theta \). Suppose that the incumbent knows everyone's risk preference, \( a_1, \ldots, a_n \).

Then the median is found by locating \( a_i \) where \( i = \frac{n + 1}{2} \). 21

Given this calculus, the incumbent is unlikely to choose very risky projects. 22 Even if some voters are willing to accept high levels of risk, projects

21 For the median voter theorem to hold there must be an odd number of voters or a continuum of voters. If people are ranked \( a_1 \geq a_2 \geq \ldots \geq a_n \) for \( i = 1, \ldots, n \), then the median voter has index \( \frac{n + 1}{2} \). See Amartya Sen, Collective Choice and Social Welfare 161-72 (1970).

22 In contrast to the cases considered in the text, the incumbent may be able to choose between long-run and short-run projects. He can ask whether \( \theta \) is maximized by having the project pay off before or after the next election. The answer depends upon the voters' attitudes toward risk, their discount rate, and the probability distribution of returns. The more risk averse the population, the more likely it is that the politician will choose projects, with the same level of risk, that will pay off before the election. In the calculation of \( \theta \) the possibility of low actual returns is outweighed by voters' dislike of uncertainty. It seems reasonable to suppose, however, that, given a distribution of \( v \), a large probability of an early payoff (low \( t_n \) is more expensive than a small probability. Speed requires additional resources. The incumbent thus maximizes \( \theta \) given an opportunity locus defined in terms of \( z \), the voters' rate of discount, the distribution of \( v \), and the distribution of \( t_n \).
cannot be tailored to suit their tastes without losing the votes of the more risk averse. Nevertheless, if the politician can choose a package of projects with different risk characteristics, he may include some projects with high means and risk levels and still make a conservative overall choice. His ability to do this, however, depends upon there being projects whose outcomes are not positively correlated.\textsuperscript{23}

B. \textit{Multiple Governments}

I turn now to consider the choice of long-term projects under alternative multiple government models. I continue to assume, as I did in the short-run case, that $x$ is a "local" public good restricted to residents of the producing jurisdiction. The models differ in the assumptions they make about the interjurisdictional mobility of citizens, about the transferability of new ideas and about politicians' attempts to free ride on the search activities of other governments.

1. \textit{Costly Migration}

If $f_j(w)$ were the only determinant of location, and if migration were free and diffusion costless, local politicians would have few options open to them. Everyone would move out of a jurisdiction that sponsored innovative activity, all hoping to benefit from the new ideas without paying the costs. No new ideas would be produced.

The addition of frictions and costs that would impair the working of a private competitive product market may now improve the prospects for local government risk taking. The results will not be "optimal" in any sense, but, at least, some chance taking will occur. Consider, then, a more realistic world in which location choice is determined by many factors, and both the migration of people and the diffusion of ideas are costly. We now ask whether some communities will specialize in risky search activities with high expected values while others choose projects with low risks and low expected returns. In the private sector such specialization is common. Some firms take many chances while others choose only safe activities.\textsuperscript{24} Investors are usu-

\textsuperscript{23} Kenneth Arrow, Discounting and Public Investment Criteria, in Water Research 13 (Allen V. Kneese & Stephen C. Smith eds. 1966), argues that the central government should be risk neutral in allocating funds. His argument turns on the assumption that project outcomes are not positively correlated.

\textsuperscript{24} For studies which document these differences see Edwin Mansfield \textit{et al.}, The Production and Application of New Industrial Technology (1977); and John E. Tilton, International Diffusion of Technology: The Case of Semi-Conductors 15-18, 56-63 (Brookings Institution, 1971). In a study of the chemical industry, Mansfield and his coauthors conclude that "there are very large differences among firms in the probability of technical completion, the probability of commercialization (given technical completion), and the probability of economic success (given commercialization) of their R & D projects. Even in the same industry, these probabilities can
ally able to distinguish quite well between firms and select their stock holdings accordingly. Buying stock is not tied to any other decision. A purchaser of Ford Motor Company stock need not buy its cars, work in its plants, or live in Michigan. Thus the riskiness of a company's choices can be a major determinant of investment choices. Investors can sort themselves out among companies depending upon their risk preferences or can choose a portfolio of stocks which, as a group, is tailored to their preferences. So long as firms do not make enough costly mistakes to bankrupt themselves, some can specialize in very risky projects and obtain investment support from people who like to gamble or who mix this investment with others that promise a more stable return.

Many of the conditions which allow firms to specialize are not present in the public sector. Voters cannot easily sort themselves out among governments on the basis of each one's willingness to take risks. First, moving is costly. Although there are transaction costs in buying and selling stock, they are nowhere near as large for most people as the cost of changing location.25 Second, people cannot diversify. They must choose a single state in which to reside. Third, in choosing a place to live, a person is not simply making a choice about the jurisdiction's innovation strategy. Current public service levels, commuting time, and environmental conditions are all linked together. Since in realistic situations this lumpiness will reduce the number of choices available, a voter may seek to change policy within his current jurisdiction instead of moving.

The net result of these factors is that state and local governments are likely to contain a heterogeneous mixture of people classified on the basis of their willingness to take risks to improve public services. The issue then becomes one of specifying the ones whose preferences will prevail. If the proportion of risk lovers in the population is quite small, and if each jurisdiction contains that proportion, then little interjurisdictional specialization is likely.26

Let us assume, then, that the population in each community has the same characteristics as the total population so that the \( a_i \) of the median voter in each locality is the same as the \( a_i \) of the nation's median voter. To take an

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25 The only mitigating factor in the United States is that a tax must be paid on realized capital gains in the stock market while a person can sell an old house and buy a new one at the same or higher price without paying any capital gains tax.

26 It is possible, however, that preferences for risk are associated with other personal characteristics like income or age that do have an impact on location. If, for example, high-income people are more willing to have their politicians take chances than low-income people, then sorting by income could produce some interjurisdictional specialization.
extreme case, suppose that both voters and politicians assume that the population of their jurisdiction is fixed and believe that they live in the only local jurisdiction planning to take risks. The politician's problem is thus identical to that of an incumbent in a monolithic system except that his jurisdiction has a smaller population. Therefore, the tax price of any risky project is higher than in a unitary system. Thus \( \bar{w} \), the mean level of \( w \), falls for every project. In each community majority rule determines the outcome, and the choice of the median voter prevails (i.e., the voter with the median level of \( a_i \) is decisive). Since voters are risk averse, the median voter is likely to choose a project with both a higher level of risk and a lower level of \( \bar{w} \). Figure 3
illustrates this for a typical median voter. The axes measure the mean, $\bar{w}$, and a project's riskiness ranking in terms of $(1), n$. The lines labeled $S_1$ and $S_2$ are the opportunity loci facing the individual in two different communities where the underlying distributions of $r$ are identical but where $n_1 > n_2$. The curves $U_1$ and $U_2$ are two of the individual's indifference curves. The voter chooses point $A$ if $S_1$ holds and $B$ if $S_2$ holds. In this example, the mean falls and the riskiness of the preferred project increases when population falls.

A second factor, however, may bias risk taking downward. Recall that the politician in a unitary government might choose a number of individual projects with high levels of risk so long as the outcomes were not positively correlated. In a small government such a diversification policy may be impossible if there are scale economies in carrying out projects. Thus the projects chosen may all be ones with risk levels close to the average.

Another bias against risk taking appears when we look at the multiple government system as a whole. Since we have assumed that each local government acts as if it were the only community taking chances, a good deal of overlap can occur. Given my characterization of risk-taking activity as an attempt to improve the efficiency of $x$'s production, the isolated choices of each government will generally produce inefficient choices. If the actual results are uncorrelated, the nationwide level of risk taking will be lower than that chosen by any individual jurisdiction, and lower than that preferred by the nation's median voter. Even though each median voter seems to be choosing more risk, $r_B > r_A$, this is an incorrect measure of the risks borne by society. The correct measure of the distribution of $v$ is the distribution of $\max_k v_k$, where $k$ is an index of jurisdictions. This distribution has less risk associated with it than the distribution of any individual $v_k$. To calculate the net benefits, of course, we would also have to associate each distribution of $\max_k v_k$ with the costs of carrying out projects and of making one government's idea available for use elsewhere.

Assume, finally, that politicians and voters are not myopic. They expect the population of their jurisdiction to be unaffected by the choice of $f(f(w))$, but they realize that their jurisdiction can, at a cost, copy results developed elsewhere. Governments that would have sponsored some risky projects, if they believed they were isolated from outside influences, may now wait for others' results in an attempt to save money. This free rider problem has

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27 Vernon Ruttan, Bureaucratic Productivity: The Case of Agricultural Research 9-10 (1978) (Staff Paper P78-16, Univ. of Minn., Dep't of Agricultural & Applied Econ.), argues that this may be one reason for the underinvestment in agricultural research as measured by the rate of return to such spending. Robert Evenson & Finis Welch, The Impact and Pervasiveness of Crop and Livestock Improvement Research in U.S. Agriculture (1978) (unpublished manuscript), estimate that a state captures roughly one-third of the benefits of crop improvement research and one-sixth of the benefits of livestock research.
long been recognized by students of private research spending and is frequently used to justify patent laws and government subsidies. It has not, however, been well recognized by those who see states as "laboratories" for social experiment. While states, like firms, can sometimes protect their innovations through the patent laws, the outcome of a risky project is often an organizational or methodological change that cannot be patented. With low cost diffusion and no higher level subsidies, few differential benefits exist and not many risks are likely to be taken. Even citizens who are willing to accept high levels of risk in return for high expected values have no reason to support a local government that spends large amounts of money on risky projects.

2. Costless Migration

Suppose now that migration costs nothing and that $f_j(\omega)$ is the only determinant of location choice. Diffusion, however, is costly and can be affected by the way a politician designs a project. Even here it does not necessarily follow that politicians will specialize in providing different risk-expected-return combinations.

If all successful projects result in productivity improvements, a community which innovates has improved its position relative to all other communities. Thus if innovations take time for others to copy, the incumbent expects some net immigration of voters from other communities. Their immigration lowers tax bills and induces more migration. Unsuccessful projects lead to outmigration to communities with high levels of $v$. The incumbent must, therefore, decide whether he wants to encourage these possible population shifts. He can do this by carrying out projects in a way that makes copying difficult and by seeking results that will bring in additional people. Since our model does not incorporate congestion and externalities, the jurisdiction's own population is better off at any given $x$, the larger its population. Migrants, however, vote as well as pay taxes, and their expected political preferences affect current political choices.

Migration can occur either before or after the election. If it occurs before

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28 The addition of a housing market will dampen migration through an increase in housing prices in the innovating jurisdiction, but will not necessarily produce a stable result. See Susan Rose-Ackerman, Market Models of Local Government: Exit, Voting, and the Land Market, 6 J. Urban Econ. 319 (1979), for the difficulties of proving the existence of a stable equilibrium in multigovernment models.

29 If a housing market were added, benefits to the existing population would depend upon the extent to which public service benefits are capitalized into housing values (see David Pines & Yoram Weiss, Land Improvement Projects and Land Values, 3 J. Urban Econ. 1 (1976); and Susan Rose-Ackerman, On the Distribution of Public Program Benefits between Landlords and Tenants, 4 J. Envt'l Econ. & Management 150 (1977)) and upon whether residents are renters or owners.
the election, the incumbent must try to make a choice consistent with the preferences of the median voter after migration has occurred. The "riskiness" of his choice may be greater or less than his choice with no migration, and it may poorly reflect the preferences of the majority of original residents. If it occurs after the election, the preferences of migrants have no direct impact on the politician's choices. They do, however, have an indirect effect. The jurisdiction's voters now have a more complex choice problem. Each $f_j(w)$ is associated not only with a set of possible productivity improvements, but also with a particular future set of voters. An individual's ranking of projects depends, in part, upon his estimate of the number of migrants and their preferences. Even if a community presently has a median voter who is relatively willing to take risks, it may refuse to search for new ways of producing $x$, if the migrants who arrive in response to this search activity will change the voting balance in the community. No simple median voter result may hold since projects can now be classified along two dimensions.30

Those with preferences close to the community's median will want to retain their decisive position. Therefore, they will not want their town to make a choice that distinguishes them from the rest of the world and attracts either high or low $a_i$ voters. In contrast, those with high or low preferences for risk will support projects expected to lead to a shift in community population in favor of people like themselves. They will accept some population loss and higher taxes, if it is balanced by a favorable shift in public choices.31 Unless one or another group of fringe voters can manage to control political choices, politicians have no reason to want to differentiate their risk-return choices from those of other communities. The only clear result is that politicians will want to prevent the diffusion of their own new ideas. The possibility of migration gives each politician a direct incentive to keep as many of the benefits of innovation as possible within his own jurisdiction.

C. Individualized Benefits Possible

Up to the present point, I have assumed that voters knew what they were getting. For long-run projects, uncertainty existed, but voters and politicians agreed on the characteristics of distributions of $v$. Suppose, however, that

30 See Gerald H. Kramer, On a Class of Equilibrium Conditions for Majority Rule, 41 Econometrica 285 (1973); and C. R. Plott, A Notion of Equilibrium and Its Possibility under Majority Rule, 62 Am. Econ. Rev. 787 (1967), for demonstrations of the proposition that voting cycles are likely to arise in a multidimensional policy space. In other words, majority rule will not produce a unique outcome.

31 If the town contains some families who plan to migrate for job and family related reasons this will also affect the results. Future outmigrants will vote against expenditures on jurisdiction-specific research unless they are homeowners who expect the benefits of research to be capitalized into property values.
politicians have more information than voters about the characteristics of risky projects and that it is costly for voters to find out what is really going on. Then, instead of monitoring risky projects, voters may discount all statements made by incumbents. Suppose, further, that projects can provide jobs, contracts, and special services to individuals. These benefits have no uncertainty associated with them, but can lower the mean and increase the riskiness of projects. If voters do not believe the politician's claims, however, then the provision of individualized benefits is relatively costless. No one puts much faith in the politician's statements in any case. Thus instead of trying to persuade voters of the quality of their search activities, elected officials may design projects to provide individualized benefits.

Of course, a general lack of credibility will bias the politician against sponsoring any uncertain activities. Only the possibility of aiding key supporters and campaign contributors may encourage him to initiate some projects. The incumbent may then claim credit for being interested in "innovation" but make few claims about the project's ultimate worth. Instead he will stress activities that aid particular individuals. One way to do this is to concentrate on projects that put unemployed capital and labor to work. Alternatively, there can be a bias toward "demonstration" projects. Dramatic failures and successes will be observable, but it may be impossible to understand why an idea failed or succeeded. A demonstration may be mainly a way to provide an especially high level of resources to one neighborhood or group, while excluding others. Thus a lack of credibility may lead politicians to sponsor either short-run, low-risk projects that will pay off before the election or longer run projects that provide tangible, individualized outputs even if they fail to produce usable ideas. A challenger will have difficulty countering these individualized benefits with the promise that he will evaluate all programs after he takes office. Those who obtain individualized benefits from a poorly operating program can be expected to oppose evaluation attempts and continue to vote for the incumbent. Those who would end up with individualized benefits after completion of an evaluation will not know who they are ex ante, and will distrust the challenger's promises anyway.

In actual applications the bias toward individualized benefits may be combined with a bias toward projects tailored to conditions in particular jurisdictions. One way to avoid spillovers is to spend money on individuals and groups rather than on general public service improvement. The possibility of interjurisdictional migration may determine who is targeted to receive help. Existing residents with high levels of $p^i$ and low migration costs may be aided by "demonstration" projects while those with low $p^i$ and low migration costs may be differentially hurt. Similarly, projects can be designed to attract immigrants who are likely to vote for the incumbent with-
out imposing obvious costs on existing supporters. The incumbent may favor demonstration projects closely tied to the peculiarities of his jurisdiction, and will not wish to distinguish between the particular characteristics of his jurisdiction and the general aspects of the problem. His choice of topics and of project design will be biased against obtaining generalizable results.\(^{32}\)

V. Innovation and Federal Structure

Neither of our simple contrasting models, then, describes a world with strong incentives for innovative risk taking. Unless the incumbent is very insecure and has a choice of short-term projects, he is unlikely to sponsor risky undertakings. While some incumbents in a decentralized system will probably wish to take a chance on some long-term projects, it seems unlikely that voters who like risk will cluster together in a few jurisdictions. The question, then, is whether a more complex two-level system can improve matters.

Some possibilities are quite straightforward. Recall that one reason why secure politicians chose low-risk projects was the relatively low level of electoral benefit associated with a major success. In a federal system, this may no longer be true. Even though the governor of Alabama cannot run for governor of California as a result of his success in Alabama, he can run for the U.S. Senate or the presidency or be appointed to a high federal post.\(^{33}\) Similarly, if the central government is controlled by the same party as the state, the downside risk can be reduced since the defeated politician can be appointed to a job in the federal bureaucracy. These two features taken together are likely to reduce the conservative bias of politicians. Of course, behavior will differ across jurisdictions because of different preferences for risk and for a job with the central government. So long as diffusion costs are low, however, the objective is not to have everyone search for new ways to do things, but only to have projects going on in a substantial number of jurisdictions which produce ideas that can be used elsewhere.

Another way in which federalism may encourage innovation at lower levels is by increasing the attractiveness of low-level elected office. A local election may produce more challengers and more competition if the winner can try for higher office. Since we have argued that political competition can encourage risk taking under some circumstances, federalism may produce a search for new ideas simply by generating a more competitive low-level

\(^{32}\) Perry & Kraemer, supra note 6, in discussing innovations in computer software note that “Local agencies tend to design computer applications to fit local conditions rather than to be generalizable because frequently there are no special incentives to design for transfer.” Id. at 81.

\(^{33}\) For example, Arnold Howitt, Mayors and Policy Innovation (1977) (Discussion Paper D77-13, Harvard Univ., Dep't of City & Regional Planning), expects “ambition for higher office to lead to a greater interest in innovative behavior than might otherwise be the case.” Id. at 81.
political system. The other explanations for risk aversion, however, would seem to be little affected by federal structure per se. Risk sorting of voters remains unlikely, and the small size of lower level governments reduces diversification options.

Finally, federalism may have an impact on the kind of projects that are performed. A politician interested in higher office has an incentive to produce results that will be useful outside his jurisdiction. He also has less reason to favor powerful local groups unless they will help push him into national politics. One issue of importance is the overlap in issues between the two offices. If the holder of the higher office must deal with some of the same problems as the holder of the lower office, then the ambitious politician can be expected to emphasize those issues and neglect the rest. If there is little overlap, a reputation for being competent and progressive is the most that can be achieved.

Beyond these rather weak effects, however, a federal structure can encourage innovation by lower level governments only if it is self-consciously exploited by politicians in the central government who can profit by claiming credit for a successful "innovation policy." Such a policy might take any one of a number of forms. The most familiar is the award of grants to low-level governments on the condition that they carry out a search for new ways of doing things. The difficulty with schemes of this kind is that local jurisdictions may be "too cautious" and use the federal funds to both raise the mean and reduce the risk of projects. They will not take account of the potential benefits to the nation from a portfolio of high risk projects. If the best result obtained by any jurisdiction can be adopted by all of them, then the central government will want to encourage local jurisdiction to choose risky projects.

Linking grants to the level of risk, however, is unlikely to be successful. In realistic applications, uncertainty will depend, in part, upon the way a government organizes research and chooses projects. The riskiness of a project, measured in terms of the Rothschild-Stiglitz criterion in (1), conflates both the underlying technological uncertainty of a project and the care with which it is carried out. Therefore, if the central government favors projects with high "riskiness" rankings, it may obtain slipshod and incompetent work.

However, there is a more innovative way to encourage low-level governments to search for new ways of doing things. The central government might institute a system of prizes awarded to governments after they have

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34 Id.

35 See Robert E. Evenson & Yoav Kislev, Agricultural Research and Productivity 150 (1975). They point out that "the expected value of the largest observation in a sample is an increasing function of the variance of the population sampled."
come up with new ideas. Prizes could be a function of a jurisdiction's own activities or could be awarded only if the jurisdiction happened to generate the best project. A full analysis of prize schemes is beyond the scope of this paper, but a few observations are possible. Prizes appear to dominate grants as a way to control the content of projects. Activities which might qualify for grants can be denied prizes if their results are not easily transferable to other jurisdictions or duplicate work done elsewhere. Political favoritism may also be more difficult for central government officials if the quality of the work undertaken is easier to assess ex post than ex ante. Furthermore, projects that provide an inefficiently high level of individualized benefits would be unlikely to qualify for a prize although they might have obtained a federal subsidy ex ante. Prizes, however, have their own difficulties. Although they have the advantage of increasing the benefits of success, unlike ex ante grants, they do nothing to reduce the costs of failure. Thus they may have little impact on secure incumbents who must decide whether to sponsor short-term projects that will pay off before the next election. Similarly, if citizens are very risk averse, prize systems may not generate many long-term projects since they may increase both the means and the risks facing low-level governments.

In spite of the potential of subsidy or prize systems, these policies will often be inferior to a change in the locus of risky activity. Instead of inducing state and local politicians to sponsor innovative projects, it may often be cheaper and easier for the central government to contract with private firms or use federal agencies.

More generally, the positive models of government presented here point to difficulties with familiar normative justifications for government intervention. First, while there are obviously externalities involved in the search for new ways of doing things, it does not follow that a democratic government will intervene effectively to internalize them. Second, while decentralization may bring government “closer” to the people, it can also create additional disincentives for innovative activity because of spillovers and the lack of sorting by risk preferences. Nor is the difficulty easily solved by an appeal to the federal government. After all, central government policy is also made by elected representatives whose own desire for reelection will help determine the actions they favor. Absent appropriate compensatory measures, there is no a priori reason to suppose that supporting the decentralized search for new ideas is the way to win national elections.