STATE LOTTERY ADOPTIONS AS POLICY INNOVATIONS: AN EVENT HISTORY ANALYSIS

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Two types of explanations of state government innovation have been proposed: internal determinants *models (which posit that the factors causing a state government to innovate are political, economic, and social characteristics of a state) and* regional diffusion *models (which point toward the role of policy adoptions by neighboring states in prompting a state to adopt). We show that the two are conceptually compatible, relying on Mohr's theory of organizational innovation. Then we develop and test a unified explanation of state lottery adoptions reflecting both internal and regional influences. The empirical results provide a great degree of support for Mohr's theory. For the empirical analysis, we rely on* event history analysis, *a form of pooled cross-sectional time series analysis, which we believe may be useful in a wide variety of subfields of political science. Event history analysis may be able to explain important forms of political behavior (by individuals, organizations, or governments) even if they occur only rarely.*

Innovation by state governments has been a major topic of research by political scientists for two decades. Walker (1969) began the effort with his seminal study of the innovativeness of states across 88 programs. Gray's (1973) influential study of state innovation in the areas of civil rights, welfare, and education and Grupp and Richards's (1975) important study of policy diffusion in a wide variety of policy areas soon followed. Numerous other studies of state innovation have been published in the 1970s and 1980s, yielding insights into the determinants of innovativeness in a variety of policy areas. These include studies of innovation in juvenile corrections (Downs 1976), technology (Menzel and Feller 1977), consumer affairs (Sigelman and Smith 1980), energy (Regens 1980), tort law (Canon and Baum 1981), judicial administration (Glick 1981), and human services (Sigelman, Roeder, and Sigelman 1981). But while expanding the scope of policy areas subject to innovation analysis, the research since 1975 has not led to major advances in our conceptualization of state innovation or our empirical approach to its investigation; the same basic approaches have simply been applied in new policy contexts.

A state government innovation has been defined as a "program or policy which is new to [the state] adopting it" (Walker 1969, 881), and the central research question about state innovation is, What causes a government to adopt a new program or policy? We claim that two fundamental answers have been offered. *Internal determinants* models posit that the factors leading a state government to innovate are political, economic, and social characteristics internal to the state (Berry 1987). *Regional diffusion* models emphasize the influence of nearby states, assuming that states emulate their neighbors when confronted with policy problems.[1]

A critical conceptual weakness in the state innovation literature is the segregation of these two types of explanations. Internal determinants models typically specify no role for regional influence (e.g., Downs 1976; Regens 1980), while regional diffusion models generally assume that internal state characteristics have no effect (e.g., Grupp and Richards 1975; Light 1978). Even when both models have been investigated within a single study, their analyses have been kept distinct, with internal determinants models cast as analyses of the determinants or correlates of policy innovation and regional diffusion models framed as analyses of policy emulation or diffusion (e.g., Canon and Baum 1981; Gray 1973; Walker 1969). The separate treatment of the two models in the literature indicates a failure to recognize that regional diffusion is not a separate topic from innovation but, instead, one possible explanation for innovation.

Furthermore, neither a pure regional diffusion model nor a pure internal determinants model is a plausible explanation of state innovation in isolation. It is unrealistic to assume that a state blindly emulates its neighbors' policies without its public officials being influenced by the political and economic environment of their own state. It is also implausible to presume that states are totally insulated from influence by neighboring states, given the context of federalism, active national associations of state officials, and media attention on state innovations. Furthermore, the regional diffusion and internal determinants models can be unified theoretically without doing violence to either explanation. We show that both internal and regional influences on a state's likelihood of innovation can be predicted based on Mohr's (1969, 111) theory that the propensity to innovate is a function of "the motivation to innovate, the strength of obstacles against innovation, and the availability of resources for overcoming such obstacles."

We also offer a general empirical approach to studying innovation that allows for a test of a unified theory of state innovation reflecting both internal and regional effects and illustrate it with an analysis of state lottery adoptions. Our model of state lottery adoptions will be tested using pooled cross-sectional time series data, via *event history analysis*, a technique rarely used in political science but more common in other social and biological sciences.[2] We chose the lottery for illustration primarily because states have adopted it relatively recently (New Hampshire in 1964 was the first), thereby confining the period of analysis to years when data for the factors hypothesized to influence innovation are readily available. But also, no state has adopted a personal income tax or a general sales tax since 1976; in the 1980s, the lottery has become the most popular vehicle for adding a new means of "revenue enhancement" to state tax systems.[3]

Existing Approaches for Studying State Innovation

Testing Internal Determinants Explanations

Two very similar strategies have been used to test internal determinants models of state innovation. Both involve cross-sectional analysis in which the independent variables are state political, social, and economic characteristics. What differs is the dependent variable. In one set of studies, it is the year a policy was adopted (Canon and Baum 1981; Glick 1981; Gray 1973; Walker 1969);[4] while in the other set, it is whether a state has adopted a policy by a specified date or not (Filer, Moak, and Uze 1988; Glick 1981; Regens 1980).

Both strategies have serious drawbacks. The weaknesses inherent in using *cross-sectional* analysis for making inferences about the nature of state policy-making *processes* (Gray 1976) are applicable to both. But apart from this general limitation, the choice of a year for measuring the independent variables is problematic when adoptions by states, as is typical, are spread over several decades. Since a cause must precede its effect, the only logical alternative is to use data for characteristics of states from the time a policy was first adopted. However, this can mean that later adoptions are being "explained" with characteristics of states several decades ago. Nor do these strategies allow us to assess the effects of state characteristics that vary substantially from year to year. For example, the hypothesis that "popular" policies tend to be adopted primarily in election years could not be tested with either of these cross-sectional strategies.

Testing Regional Diffusion Explanations

Three approaches have been tried for testing regional diffusion models. Walker (1969) uses factor analysis to discover clusters of states having similar orders of adoption for a variety of policies and then assesses whether states in the same cluster are in the same region of the country (see also Canon and Baum 1981). Of course, this approach is possible only when one examines several policies. Moreover, the failure of clusters to conform to regional contours could be due to a set of policies diffusing from different "starting states," thereby resulting in different orders of adoption for different policies, even if each policy had indeed diffused regionally.

A second strategy has been to assess the relationship between adoptions by states and previous adoptions by their neighbors. Crain (1966) and Lutz (1986) both examine whether adoptions occur more frequently in jurisdictions with neighbors that have already adopted than in jurisdictions with no such neighbors. The key shortcoming of this approach is that one must assume that adoption of a policy by two neighboring states in close time sequence is evidence of regional influence, even though adoptions by neighbors at similar points in time may also result from the operation of similar internal factors in neighboring states.

A final strategy involves surveys of state officials (e.g., Freeman 1985; Grupp and Richards 1975; Light 1978; Menzel and Feller 1977). Officials are asked what states are leaders in a particular policy area or which officials in other states they consult for advice, and diffusion patterns are discerned from the responses. If we assume that officials' responses are accurate, this strategy can identify "true" regional influence as distinct from similarly timed adoptions by neighbors. But when state adoptions occur over many years, it is impractical to interview all officials immediately after their states adopt policies. And surveying officials in all states at the time a study is performed is inadequate, as the officials responsible for policy formulation in early-adopting states are likely to be gone or to have untrustworthy memories.

The Approach of This Study

We conceive of a program or policy adoption by a state as an event that may or may not occur in any given time period. Then the fundamental research question is, For any state, what determines the probability that the adoption event will occur during the time period?

Event history analysis (EHA) can be employed to answer this question.

In event history analysis, the goal is to explain a qualitative change (an "event") that occurs in the behavior of an individual at a particular point in time. (In our description of EHA, we will call the unit of analysis an "individual" even though in some research applications, the actual unit may be an organization, a state, a nation, or some other collective.) The data for analysis, called an event history, is a longitudinal record showing whether and when the event was experienced by a sample of individuals during a period of observation. In a *discrete time* model—the kind to be used in this study—the period of analysis is divided into a set of distinct units (e.g., years). But there are also *continuous time* EHA models that assume that the time of an event occurrence is measured exactly (Tuma and Hannan 1984). A critical concept in EHA is the *risk set,* which is the set of individuals in the sample that are "at risk" of event occurrence (i.e., have a chance of experiencing the event) at a particular time. When the event under analysis is one that an individual can*not* repeat (e.g., death), the size of the risk set will decrease over time as individuals in the sample experience the event.[5] Indeed, when observations are annual, the size of the risk set is decreased at the end of each year by the number who experienced the event that year.

The variable to be explained in discrete time EHA is called the *hazard rate* and is defined as the probability $P_{i,t}$ that an individual i will experience the event during a particular time period t, given that the individual is "at risk" at that time. The hazard rate is then presumed to be determined by a set of independent variables. Of course, the hazard rate, being a probability, is an *unobserved* variable. The *observed* dependent variable for estimating effects in EHA is a dummy variable that is scored one for each case when an individual experiences the event, zero otherwise. The dichotomous nature of this variable makes probit or logit the preferable estimation technique.

Since most individual government programs can only be adopted once by a given jurisdiction, in applying event history analysis to the study of state policy innovation analysts will typically be dealing with nonrepeatable events. Thus, the *conceptual* dependent variable or hazard rate would be the probability of a state's adopting a policy during a particular period, given that it has not already adopted it in a previous period. While in theory the time unit under consideration can be quite short, data constraints (which typically will preclude more-than-annual observations for many independent variables) make a calendar *year* a sensible choice. It is reasonable to assume that no state is "at risk" of adopting a given program until after at least one state has given it serious consideration. And given the practical difficulty of determining precisely when the first serious consideration occurred, in most applications it would be appropriate to assume that no state is at risk of adopting prior to the year of adoption by the first state. The data set for analysis would then be pooled cross-sectional time series, in which the cases are "state-years." More precisely, the data would consist of one observation per state for each year the state is at risk of adopting, that is, for each year in which the state had not adopted prior to the beginning of the year. The observed dependent variable would be a dummy variable indicating whether a state adopts the policy in a given year.

Event history analysis has several critical advantages over the standard methodologies for innovation research reviewed above. First, unlike the extant methods, it is suitable for testing a unified theory of state innovation incorporating both internal determinants and regional influences. For such a test, some independent variables in the EHA equation would be internal characteristics of states, while others would reflect the adoption behavior of nearby states. Furthermore, including both regional and internal influences in the same model guards against mistaking a spurious relationship between states' years of adoptions and those of their neighbors (actually due to the operation of similar internal characteristics in neighboring states) as evidence of regional diffusion. Presumably, if the relationship were spurious, the estimated effects of terms representing the behavior of nearby states would diminish to near zero in the EHA equation, as these regional effects would be appropriately "controlled" for the impacts of internal characteristics.

Moreover, unlike the traditional cross-sectional methods for testing internal determinants models, EHA can assess the effects on the probability of adoption of characteristics of states that vary substantially from year to year, as annual longitudinal variation is incorporated in the data set. Also, and again unlike cross-sectional methods, the "pooled" nature of our data allows the dependent variable to be affected by independent variables with the right time property. It is not necessary to assume that a state adopting a program recently is affected by what its characteristics were when the first state adopted the program perhaps decades ago.

Finally, the use of EHA to study state innovation should dramatically increase the substantive relevance of research findings in the literature. The traditional approaches are capable of predicting only (1) whether a particular type of state should have adopted a policy prior to a specified date or not, or (2) the timing of a state's adoption relative to adoptions by other states. But EHA is equipped to yield more interesting conclusions. In particular, EHA can predict the probability that a particular type of state will adopt a policy during a particular year.

The extremely limited variance typically present in the adopt-versus-not-adopt-in-a-given-year observed dependent variable may have deterred others who considered using a pooled cross-sectional time series approach for studying innovation. Since most programs can be adopted only once by each state and the years of adoption by different states can be spread over several decades, in a pooled data set consisting of cases "at risk" of adoption, the percentage of cases scored *adopt* can be less than 5%. While this may appear to be an almost insurmountable obstacle to fruitful empirical research the very low variance for the dependent variable in our lottery adoption analysis, as we will see, does not thwart our ability to conduct meaningful empirical research. Even though lottery adoptions are quite unusual events, we can study empirically the factors that lead states to adopt them.

A Unified Theory of State Innovation: Incorporating Internal and Regional Influences

Mohr's (1969) analysis of organizational innovation provides a foundation for building a theory that integrates the internal determinants and regional diffusion models of state innovation. Mohr (1969, 114) argues persuasively that the probability of innovation is inversely related to the strength of obstacles to innovation and directly related to (1) the motivation to innovate, and (2) the availability of resources for overcoming obstacles. He further hypothesizes that the motivation to innovate interacts with both the strength of obstacles and the amount of resources available in influencing the chances of adoption (p. 123). In particular, "when the obstacles are relatively great, and the resources small," even a high level of motivation should not produce innovation. But as obstacles diminish and resources rise, the impact of motivation on the probability of innovation should increase. Conversely, when there is little motivation to innovate, the level of resources and the strength of obstacles are unlikely to have much effect on the probability of innovation, as without sufficient motivation the probability of innovation should be uniformly low. But as motivation to innovate increases, the influence of both resource availability and the strength of obstacles should grow.

It is clear that numerous internal determinants of innovation in a state can be conceived as reflecting the motivation of politicians to innovate, the obstacles they face, or the resources available to overcome these obstacles. The issue is whether regional influences are consistent with Mohr's theory, as we maintain. Elazar (1972) claims that state policy makers tend to view nearby states as "experimental laboratories" for policies. The consequences of adopting a new program can be very difficult to predict; information about effects of the program in a similar state can help overcome the uncertainty. Thus, policy adoptions by nearby states provide a critical resource (information) for overcoming an obstacle (uncertainty) to innovation. Furthermore, with a policy unpopular with the electorate, it should be easier for politicians to justify its adoption to voters if it has first been adopted by nearby states. Thus, again, the presence of previously adopting nearby states becomes a resource useful for overcoming an obstacle to innovation (in this case, negative public opinion). With a policy that is generally popular with voters, the existence of previously adopting nearby states should intensify internal political pressures to adopt, as voters see a popular policy in place in nearby states and want it in their state as well. Consequently, as a greater number of nearby states adopt a popular policy, the motivation of a state's politicians to adopt is heightened. Hence, regional influences on state innovation are fully predictable based on Mohr's theory.

This insight suggests that a unified theory of the causes of state innovation, relying on both internal and regional influences, can be developed. Indeed, the recognition that previously adopting nearby states can be a resource for overcoming obstacles to innovation—combined with Mohr's hypothesis that "level of resources" interacts with "motivation to innovate" in influencing the probability of innovation—suggests that the strength of regional influences on a state's probability of innovation should vary depending on the internal environment in a state. If so, both *pure* internal determinants and regional diffusion models would not only be incomplete explanations of state innovation, but the failure to incorporate either of these sources of influence (internal or regional) in a theory of state innovation may actually prevent the discovery of empirical support for the other. In the next section, we use Mohr's theory to develop an explanation for the adoption of state lotteries (1) reflecting both internal and regional influences on the probability of innovation and (2) specifying how the two should interact.

An Explanation of State Lottery Adoptions

Our model assumes that the probability that a state without a lottery will adopt one in a given year is determined by both the state's internal characteristics and the previous pattern of lottery adoptions by nearby states. Research about state *tax* innovation (principally Hansen 1983) is useful in theorizing about the determinants of lottery adoptions, as factors that create the need for increased revenues can prompt the adoption of either a lottery or a new sales or income tax. But hypotheses about the determinants of (sales or income) tax adoptions cannot be translated to a study of the lottery without careful consideration of their applicability. While lotteries and taxes are both revenue collection mechanisms, they have fundamental differences that affect the politics of their adoption. First, while citizen payments of sales and income taxes are mandatory, participation in lotteries is strictly voluntary. And this difference is likely responsible for a second: in contrast to voter antipathy to new sales and income taxes, new state lotteries tend to be quite popular with state electorates (Mikesell and Zorn 1986).

Hypotheses Concerning the Motivation To Innovate

Both economic and political conditions can be expected to affect the motivation of state political officials to adopt a lottery. The most important economic determinant of motivation should be the short-term fiscal health of a state's government. Hansen (1983, 150) finds that states do not adopt sales and income taxes during prosperous times. But during periods of financial hardship, both tax adoptions and tax increases are more likely (see also Mikesell 1978). Hansen believes that this is true because an economic crisis reduces the political risks to public officials of adopting a new (mandatory) tax. Of course, sales and income taxes are uniformly unpopular with state electorates. Even though there are not the same political risks when adopting the generally popular lottery, budget shortfalls should still increase the motivation of politicians to seek new revenues by adopting a lottery.

HYPOTHESIS 1. *The worse the fiscal health of a state's government—that is, the greater its expenditures relative to its revenues—the more likely it is to adopt a lottery.*

The most critical aspect of the *political* environment determining the motivation of public officials to adopt a lottery should be the proximity of state elections. Tufte (1978; see also Kiewiet and McCubbins 1985) maintains that politicians have incentives to adopt new policies at times within the election cycle that are most advantageous politically. Since increases in sales and income taxes face substantial popular opposition, new mandatory taxes should be likeliest to be enacted in the year following elections, thereby giving the public the maximum amount of time to forget the government's unpopular action before the next election. But the general popularity of the lottery among state electorates makes it likely that elected officials perceive that adopting a lottery in an election year would enhance their chances for reelection. To simplify the analysis, we focus on elections for governor, ignoring the effects of legislative elections; this choice is supported by Bingham, Hawkins and Hebert (1978), who contend that governors have been more active than legislatures in defining state taxation agendas.

HYPOTHESIS 2. *For all states a lottery is most likely to be adopted in an election year. In states with more than two years between gubernatorial elections, adoption is least likely in the year immediately following an election.*

Moreover, we expect the natures of the political and economic environments to interact in influencing the probability of a lottery adoption. When a state's treasury is fiscally healthy, public officials are unlikely to adopt a lottery even if it is an election year. But if a state is in poor fiscal health, whether a lottery is adopted or not should be more strongly influenced by the proximity of elections. During an election year, a lottery may seem like the ideal solution to politicians, but in a year following an election, politicians may prefer to rely on relatively unpopular actions (like cutting spending or increasing mandatory taxes), thereby reserving the lottery option for a situation in which a fiscal crisis occurs during an election year. According to this view, both poor fiscal health and being in an election year are necessary conditions for adopting a lottery.

HYPOTHESIS 3. *The poorer the fiscal health of a state's government, the stronger the effect of elections on the probability that the state will adopt a lottery. Similarly, the fiscal health of a state should have a stronger impact on the probability of adoption in an election year than in a year after an election.*[6]

Hypotheses Concerning the Obstacles to Innovation

Two potential obstacles to adopting a lottery are (1) organized constituencies opposed to a lottery and (2) a state population with insufficient financial resources to support a lottery adequately. In particular, a low level of personal income in a state can be viewed as an obstacle to a successful lottery. While state lotteries are generally regressive in their incidence (Suits 1977), lottery participation rates are still highest among middle- and upper-income levels (Mikesell and Zorn 1986, 315). Therefore, the lower the average income in a state, the greater should be the concern by public officials that a lottery will be unsuccessful in raising revenues.

HYPOTHESIS 4. *The lower the level of personal income in a state, the lower the probability that the state will adopt a lottery.*[7]

State officials concerned about reelection must also be sensitive to any strongly held beliefs against the lottery among the electorate. The overall popularity of the lottery masks intense resistance to the lottery on moral grounds by religious fundamentalists. Studies have found that membership in fundamentalist religions is a determinant of (1) the restrictiveness of liquor and gambling regulations in the states (Fairbanks 1977) and (2) outcomes of referenda on liquor, gambling, and Sunday business issues (Meier and Morgan 1980). It also makes sense that the larger the percentage of a state's population that adheres to fundamentalist religions (which view gambling as sinful) the less likely the state is to adopt a lottery, as a large fundamentalist population increases the potential political costs to government officials of supporting a lottery.

HYPOTHESIS 5. *The greater the proportion of a state's population adhering to fundamentalist religions, the lower the probability that the state will adopt a lottery.*

But as we have seen, Mohr (1969) asserts that the strength of obstacles to innovation interacts with the motivation to innovate in influencing the probability of adoption: the greater the level of motivation, the greater the effect of "strength of obstacles" on "likelihood of innovation." In our analysis fiscal health and election proximity are presumed to be the principal determinants of the motivation to innovate, and fundamentalist opposition and low personal income are the obstacles.

HYPOTHESIS 6. *The effect of religious fundamentalism as an obstacle to lottery adoption is greater in an election year and when a state's fiscal health is poor than in a year after an election and when fiscal health is stronger.*

HYPOTHESIS 7. *The effect of low personal income as an obstacle to lottery adoption is greater in an election year and when a state's fiscal health is poor than in a year after an election and when fiscal health is stronger.*

Hypotheses Concerning Resources for Overcoming Obstacles

Two kinds of political resources are expected to help state officials overcome obstacles to adopting a lottery: unified party control of government and previous adoptions by nearby states. Susan Hansen (1983, 153–54) hypothesizes that states in which the governorship and both houses of the legislature are controlled by the same political party are more likely to adopt a tax than states in which governmental institutions are under divided party control, regardless of which party is in power. This is because a unified government can better avoid the "roadblocks" resulting from the need for compromise between two parties. The need for a unified government may be greater when considering the adoption of a controversial mandatory tax than when contemplating adopting a more popular lottery. But Hansen's logic seems applicable to the case of lottery adoptions as well, as unified governments should be more capable than divided governments of achieving the necessary consensus on the specific nature of a lottery (e.g., whether the revenues generated are to go into a state's "general fund" or be earmarked for a particular public service).[8]

HYPOTHESIS 8. *When a single political party controls the governorship and both houses of the legislature, the probability that the state will adopt a lottery is greater than when the government is under divided party control.*

We argue above that previous adoptions by nearby states can also provide an important resource for overcoming obstacles to innovation, as such adoptions yield important information about a policy's effects. The logic supporting this proposition is applicable in the case of the lottery, thereby suggesting that the probability of a lottery adoption increases as a greater number of nearby states adopt it. But specifying this hypothesis requires us to be more precise about the meaning of a "nearby" state. The literature suggests several possibilities.

First, the states could be divided into predesignated regions with the hypothesis that a state's probability of adopting a lottery increases as the number of states in its region that have previously adopted it gets larger. But this approach has significant weaknesses. The variety of different regional demarcations in the literature, with different numbers of regional clusters and different groupings of states within these clusters (see esp. Sharkansky 1970) illustrates the difficulty of justifying any particular demarcation. While one might introduce a theoretical argument in support of one demarcation or another (e.g., Elazar 1972), the choice of how to define regional clusters remains largely arbitrary. Furthermore, whenever predesignated regions with fixed boundaries are defined, some states that border each other necessarily wind up in different regions. So in testing a regional influence hypothesis, the impact of some neighboring states would inevitably be ignored.

A second conception of regional influence would involve both predesignated regions and predesignated leader states within those regions. We would hypothesize that a state's probability of adopting a lottery increases after one or more states with a reputation as a leader within its region adopt it. This definition is consistent with research that has found that there are states to which the other states in a region look most frequently for innovative ideas (Grupp and Richards 1975; Menzel and Feller 1977). This conception of regional diffusion is most attractive when there are reliable data about which states are perceived by public officials to be regional leaders in a policy area. Unfortunately, we have no such data for lotteries.

The conception of regional influence used in this study defines "nearby" states as immediate neighbors (i.e., states that share a boundary). The advantage of this definition is that we are not required to assign states to predesignated regions arbitrarily. Instead, all of a state's neighbors that have previously adopted a lottery are assumed to be influential in promoting innovation. Indeed, a conception of regional influence that focuses on *immediate* neighbors seems especially appropriate in the case of the lottery. When a state adopts a lottery and a neighboring state does not have one, people living near the border in the neighboring state can cross the border to purchase tickets. This places pressure on state officials to adopt a lottery to try to keep a state's own "tax base" from being taxed by a neighbor.

HYPOTHESIS 9. *The probability that a state will adopt a lottery is positively related to the number of states that border it that have already adopted.*

Mohr (1969) also argues that the availability of resources for overcoming obstacles to innovation interacts with the motivation to innovate in determining the probability of adoption. When the level of motivation to innovate is high, the effect of "resource availability" on "likelihood of innovation" is stronger than when motivation to innovate is low.

HYPOTHESIS 10. *The effect of unified political party control in overcoming obstacles to lottery adoption is greater in an election year and when a state's fiscal health is poor than in a year after an election and when fiscal health is stronger.*

HYPOTHESIS 11. *The effect of previously adopting neighboring states in overcoming obstacles to lottery adoption is greater in an election year and when a state's fiscal health is poor than in a year after an election and when fiscal health is stronger.*

An Event History Analysis Model of Lottery Adoption

These 11 hypotheses combine to suggest the following EHA model:

$$\begin{aligned}\text{ADOPT}_{i,t} = \Phi\,(&b_1\text{FISCAL}_{i,t-1}\\ &+ b_2\text{PARTY}_{i,t} + b_3\text{ELECT1}_{i,t}\\ &+ b_4\text{ELECT2}_{i,t} + b_5\text{INCOME}_{i,t-1}\\ &+ b_6\text{RELIGION}_{i,t-1}\\ &+ b_7\text{NEIGHBORS}_{i,t}) \qquad (1)\end{aligned}$$

where the conceptual dependent variable or hazard rate $\text{ADOPT}_{i,t}$ is the probability that state i will adopt a lottery in year t, given that the state has not adopted a lottery prior to year t, and Φ denotes the cumulative normal distribution function. Thus, equation 1 takes the form of a probit model.[9] $\text{ADOPT}_{i,t}$ is measured with a dummy variable equaling one if state i adopts a lottery in year t, zero otherwise.

In the equation, $\text{FISCAL}_{i,t-1}$ denotes the fiscal health of a state's government in the previous year. To control for size differences across states, fiscal health is measured by the ratio of total-state-revenue-minus-total-state-spending to total spending. Several independent variables—including FISCAL—are measured in the *previous* year, since legislative sessions typically begin in January so that legislators must often make policy based on the prior year's fiscal and economic data. Moreover, if revenue and expenditure data from the same year that a lottery adoption occurred were used to measure FISCAL, the adoption might generate revenues that would go into the calculation of FISCAL. To make certain that FISCAL may cause ADOPT, but ADOPT may not affect FISCAL, FISCAL must be "lagged" behind ADOPT. (For more specific descriptions of the indicators for the independent variables in equation 1, see the Appendix.)

$\text{INCOME}_{i,t-1}$ represents personal income, as measured by real per capita income, in state i in the previous year. RELIGION is the proportion of a state's population adhering to fundamentalist religions. PARTY is the degree to which a single political party controls the institutions of state government; it is operationalized with a dichotomous variable distinguishing situations in which the governor and the two legislative houses are controlled by the same party from situations in which there is split control (see Hansen 1983). $\text{NEIGHBORS}_{i\,t}$, the term reflecting regional influence, denotes the number of previously adopting neighboring states, that is, the number of states sharing a border with state i that had adopted a lottery prior to year t. Equation 1 was also estimated using an alternative measure of NEIGHBORS, the *percentage* of states sharing a border that had previously adopted a lottery. The resulting coefficient estimates are quite similar to those based on number of previous adopters.

Finally, two dummy variables are included to specify the election cycle hypothesis: ELECT1, which equals one in the year of a gubernatorial election, zero otherwise; and ELECT2, which equals one if it is neither the year of an election nor the year after an election, zero otherwise. Our hypotheses predict that the coefficients for FISCAL and RELIGION will be negative, and that those for PARTY, INCOME, NEIGHBORS, ELECT1 and ELECT2 will be positive. Furthermore, we predict that the coefficient for ELECT1 should be greater than that for ELECT2. This would mean that in states with four-year gubernatorial terms—the modal length among states—the probability of a lottery adoption is highest in an election year, lowest in a year immediately following an election, and in between these two values in other years.

Empirical Analysis of the Model of State Lottery Adoption

The first task in testing an EHA model is defining the risk set. Because our model specifies effects by neighboring states, the sample is confined to the forty-eight continental U.S. states. Since the lottery was not adopted by any state until New Hampshire did so in 1964, we confine the analysis to observations from 1964 and later. Once a state adopts a lottery, it is no longer at risk of adopting. But states not adopting the lottery prior to the last year represented in our data set, 1986, are presumed to remain at risk of adopting through 1986. So the data set includes a varying number of observations for the states. The time series for the dependent variable for New Hampshire consists of a single 1 in 1964. The dependent variable time series for each of the remaining adopting states consists of a series of 0s beginning in 1964 and ending in the year before the state adopted the lottery, followed by a single 1 in the year of adoption. Finally, for a state not adopting the lottery by 1986, the time series for the dependent variable has no variation; it is a series of 0s starting in 1965 and ending in 1986.[10]

Equation 1 is estimated with pooled cross-sectional time series probit, and the resulting maximum likelihood estimates (MLEs) are presented in Table 1, column 1. Overall, the support for the model is exceedingly strong. Despite the fact that lottery adoptions are quite rare, with only 3% of the observations in our sample scored as adoptions, nearly all hypotheses receive support. These include Hypotheses 1 and 2 about "motivation" factors. The negative coefficient for FISCAL confirms that as expected, a decline in a state's fiscal health increases the probability of its adopting a lottery. But the political climate also matters. The fact that the coefficients for ELECT1 and ELECT2 are both positive, while the former is larger, implies that lottery adoptions are most likely in election years and least likely in years immediately after elections. In states with a gubernatorial election every four years the probability of a lottery adoption is highest in an election year,

Table 1. Probit Maximum Likelihood Estimates for Event History Analysis Model of Lottery Adoption

Independent Variables	With PARTY (1) Maximum Likelihood Estimate	With PARTY (1) t-ratio	Without PARTY (2) Maximum Likelihood Estimate	Without PARTY (2) t-ratio
$ELECT1_{i,t}$	.82*	2.34	.79*	2.31
$ELECT2_{i,t}$	.59*	1.71	.56*	1.68
$INCOME_{i,t-1}$	.023***	3.34	.23***	3.33
$FISCAL_{i,t-1}$	-1.69	-1.30	-1.82	-1.44
$PARTY_{i,t}$	-.40*	-1.83	—	—
$RELIGION_{i,t-1}$	-.034*	-2.11	-.035*	-2.23
$NEIGHBORS_{i,t}$	.27***	2.86	.25**	2.78
Intercept	-4.51***	-5.46	-4.62***	-5.64
Number of cases[a]	857		901	
Percentage of cases scored as adoption	.031		.029	
−2(Log-likelihood ratio)[b]	60.73***		57.37***	
Estimated R squared[c]	.48		.44	

Note: All significance tests are one-tailed except for those of intercepts, which are two-tailed.

[a]The sample for estimation in column 1 excludes Minnesota and Nebraska in years in which they had nonpartisan legislatures, as PARTY is not defined for such cases.

[b]Minus 2 multiplied by the log-likelihood ratio is distributed as chi-square (with seven degrees of freedom in column 1, and six degrees of freedom in column 2).

[c]R-squared as reported by the McKelvey-Zavonia probit package; see Aldrich and Nelson (1984, 57–59) for a description of this measure.

*$p < .05$.
**$p < .01$.
***$p < .001$.

decreases in the following year, and then increases again for the next two years as an election gets closer but not to as high a level as during an election year. This finding suggests that politicians do seek to adopt popular policies during election years, when the accompanying electoral rewards should be at their maximum.

Hypotheses 4 and 5 concerning obstacles to innovation are also confirmed. The positive coefficient estimate for INCOME (significant at the .001 level) is consistent with the proposition that politicians perceive low state personal income as an obstacle to a successful lottery. As predicted, the lower the level of per capita income, the lower the probability of a lottery adoption. Moreover, state officials seem to be influenced by opposition to the lottery on religious grounds. The likelihood of a lottery adoption decreases as the share of a state's population adhering to fundamentalist religions (RELIGION) increases.

There is mixed empirical evidence about the hypotheses concerning availability of resources. The regional influence proposition (Hypothesis 9) receives strong support. The positive and statistically significant coefficient estimate for NEIGHBORS suggests that the probability that a state will adopt a lottery increases as the number of its neighbors that have previously adopted it grows, even when the effects of "internal" characteristics have been controlled.

But Hypothesis 8—which predicts that governments controlled by a single political party are more likely to adopt a lottery than those under split control—fails to receive support. Indeed, the opposite relationship seems to hold. Governments under split control are more likely to adopt than those that are unified. As we have noted, Hansen (1983) postulates that unified governments are more likely to adopt sales and income taxes than divided governments. We extended that logic to the case of the lottery. But it may be that unified governments, when motivated to increase state revenues, seek to capitalize on their monopoly control over the institutions of government to achieve a *substantial* tax increase by either adopting a new sales or income tax or raising existing tax rates. If, in contrast, divided governments lack the political resources to increase unpopular mandatory taxes and must instead settle for a less controversial lottery adoption, this might account for our finding that divided governments are more likely to adopt a lottery than unified governments.

A great advantage of event history analysis for state innovation research is that the coefficient estimates it generates can be used to calculate predicted probabilities that a state with specified characteristics will adopt a policy in any given year. These predicted probabilities can offer analysts powerful substantive conclusions—not available from traditional cross-sectional approaches to innovation research—about the magnitudes of effects of the factors determining adoption likelihood. Moreover, an analysis of such predicted probabilities allows researchers to assess the nature of interactions among the determinants of adoption probability.[11]

Table 2 presents predicted probabilities of a lottery adoption (derived from probit MLEs) for hypothetical states with differing characteristics. To enhance the interpretability of the predicted probabilities, we deleted the unified government variable (PARTY) from the EHA model and calculated the probabilities associated with this revised model. (The MLEs for the equation excluding PARTY are in Table 1, column 2.) We deleted party because (1) its MLE is fairly strong but in a direction contrary to that hypothesized and (2) since it is dichotomous, it would have to be fixed at one of its two extremes (rather than a "central" value) when calculating predicted probabilities, thereby magnifying its effect.

Each grouping (of three or seven lines) in Table 2 shows the change in the predicted probability of a lottery adoption that results when one independent variable is changed from one extreme to another while the remaining independent variables are held constant at specified values. (For ease of viewing, the values of variables that are "changing" are denoted in the table in italics, while values of variables being held constant are in roman type.) These predicted probabilities permit us to assess the hypotheses predicting interaction among the factors influencing the probability of a lottery adoption.[12]

Hypothesis 3 receives support from the first section of Table 2. The predicted probabilities show that the effect of elections on the probability of a lottery adoption does depend on the fiscal health of the state. The top half of the first section shows that the impact of elections is very small when fiscal health is exceptionally good and the other determinants of adoption probability are at "central" or "moderate" values. In particular, in a hypothetical state with (1) no lottery, (2) very good fiscal health, (3) a gubernatorial election every four years, (4) per capita income and percentage fundamentalist population at their average values across cases in the sample, and (5) two neighboring states that have previously adopted a lottery, the expected probability of a lottery adoption decreases only slightly from .028 in an election year to .003 the year after (for a probability difference of .025).[13] But as fiscal health deteriorates, the effect of elections intensifies. As seen in the bottom half of the first section, a hypothetical state that is in very poor fiscal health but

Table 2. Predicted Probabilities of Lottery Adoption for Hypothetical States with Gubernatorial Elections Every Four Years*

Hypothetical Conditions	FISCAL	Year in Election Cycle	INCOME	NEIGHBORS	RELIGION	Probability of Adoption of a Lottery in a Year
Amount elections vary with fiscal health						
Excellent fiscal health	.01	*election year*	89.5	2	17.6	.028
	.01	*postelection year*	89.5	2	17.6	.003
	.01	*other two years*	89.5	2	17.6	.016
Poor fiscal health	-.20	*election year*	89.5	2	17.6	.063
	-.20	*postelection year*	89.5	2	17.6	.010
	-.20	*other two years*	89.5	2	17.6	.039
Amount fiscal health varies with the proximity of elections						
Postelection year	*-.20*	postelection year	89.5	2	17.6	.010
	-.09	postelection year	89.5	2	17.6	.006
	.01	postelection year	89.5	2	17.6	003
Election year	*-.20*	election year	89.5	2	17.6	.063
	-.09	election year	89.5	2	17.6	.042
	.01	election year	89.5	2	17.6	.027
Amount religious fundamentalism varies with the motivation to innovate						
Postelection year, moderate fiscal health	-.09	postelection year	89.5	2	*.7*	.026
	-.09	postelection year	89.5	2	*17.6*	.006
	-.09	postelection year	89.5	2	*34.4*	.001
Election year, moderate fiscal health	-.09	election year	89.5	2	*.7*	.125
	-.09	election year	89.5	2	*17.6*	.042
	-.09	election year	89.5	2	*34.4*	.010
Election year, poor fiscal health	-.20	election year	89.5		*.7*	.171
	-.20	election year	89.5	2	*17.6*	.063
	-.20	election year	89.5	2	*34.4*	.017
Amount personal income varies with the motivation to innovate						
Postelection year, moderate fiscal health	-.09	postelection year	*41.3*	2	17.6	.000
	-.09	postelection year	*89.5*	2	17.6	.006
	-.09	postelection year	*135.9*	2	17.6	.072
Election year, moderate fiscal health	-.09	election year	*41.3*	2	17.6	.002
	-.09	election year	*89.5*	2	17.6	.042
	-.09	election year	*135.9*	2	17.6	.249
Election year, poor fiscal health	-.20	election year	*41.3*	2	17.6	.004
	-.20	election year	*89.5*	2	17.6	.063
	-.20	election year	*135.9*	2	17.6	.317

Table 2 (continued)

Hypothetical Conditions	FISCAL	Year in Election Cycle	INCOME	NEIGHBORS	RELIGION	Probability of Adoption of a Lottery in a Year
Amount regional influence varies with the motivation to innovate						
Postelection year, moderate fiscal health	-.09	postelection year	89.5	*0*	17.6	.001
	-.09	postelection year	89.5	*1*	17.6	.003
	-.09	postelection year	89.5	*2*	17.6	.006
	-.09	postelection year	89.5	*3*	17.6	.012
	-.09	postelection year	89.5	*4*	17.6	.022
	-.09	postelection year	89.5	*5*	17.6	.039
	-.09	postelection year	89.5	*6*	17.6	.065
Election year, moderate fiscal health	-.09	election year	89.5	*0*	17.6	.013
	-.09	election year	89.5	*1*	17.6	.024
	-.09	election year	89.5	*2*	17.6	.042
	-.09	election year	89.5	*3*	17.6	.069
	-.09	election year	89.5	*4*	17.6	.110
	-.09	election year	89.5	*5*	17.6	.164
	-.90	election year	89.5	*6*	17.6	.234
Election year, poor fiscal health	-.20	election year	89.5	*0*	17.6	.021
	-.20	election year	89.5	*1*	17.6	.037
	-.20	election year	89.5	*2*	17.6	.063
	-.20	election year	89.5	*3*	17.6	.100
	-.20	election year	89.5	*4*	17.6	.152
	-.20	election year	89.5	*5*	17.6	.218
	-.20	election year	89.5	*6*	17.6	.300

Note: FISCAL = -.20, -.09, or .01 indicates state government fiscal health at the tenth percentile, mean, or ninetieth percentile, respectively, of the actual distribution of fiscal health scores among the cases in the sample. INCOME = 41.3, 89.5, or 135.9 indicates real per capita income at its lowest actual level, its mean level, or its highest level, respectively, among the cases in the sample. RELIGION = .7, 17.6, or 34.4 indicates a percentage of state population adhering to fundamentalist religions at its lowest actual level, its mean level, or its highest level (except for one outlier, Utah, at 75.9), respectively, among states in 1971. Only five states are bordered by seven or eight immediate neighbors; the predicted probability of adoption of a lottery for a state bordered by seven or eight previously adopting states is not calculated because for all but these five states, the existence of more than six previously adopting states is physically impossible.

*Based on Event History Analysis Probit MLEs in Table 1, column 2.

has "central" values on other variables, has a .053 (= .063 − .010) greater chance of adopting a lottery during an election year than in the year immediately after.

The interaction between fiscal health and election proximity is also evidenced in the second section of Table 2, which shows clearly that the effect of fiscal health is dependent on the proximity of elections. In the year after an election—and at "central values" for other independent variables—fiscal health is virtually unrelated to the probability of a tax adoption (see the top half of the second section). But in an election year, fiscal health has an effect, albeit small, on the chance of an adoption. The predicted likelihood of a lottery adoption increases by .036 (from .027 to .063) when a state government's fiscal health deteriorates from very good to very poor.

Moreover, as we hypothesized, the

fiscal health of a state's government and the proximity of elections appear to be important contextual motivation factors that determine how obstacles to innovation and resource availability impinge on the probability that a state will adopt a lottery. With respect to the interaction between motivation to innovate and obstacles to innovation, Hypotheses 6 and 7 both receive striking support. The effects of religious fundamentalism and low personal income as obstacles to lottery adoption increase as (1) a state's fiscal health deteriorates and (2) it gets closer to an election. In particular, when it is the year after a gubernatorial election and a state is in moderate fiscal health (and has central values for the other variables as well), the strength of religious fundamentalism has only a very slight impact on the probability of a lottery adoption (see the top third of the third section)[14] and personal income has a relatively small effect (see the top third of the fourth section). But when the same state in moderate fiscal health is in an election year, membership in fundamentalist religions has a stronger negative relationship to the chance of adoption (see the middle third of the third section), and per capita income has a stronger positive relationship (see the middle third of the fourth section). Finally, if it is an election year and a state is in very poor fiscal health, religious fundamentalism and personal income exert even stronger influences on the probability of a lottery adoption (see the bottom third of the third and fourth sections). For example, even a state in poor fiscal health during an election year is predicted to have virtually no chance (.004) of adopting a lottery if personal income is extremely low; but when income is very high, the probability increases to .317.

Finally, there is evidence that regional influence on the probability of a lottery adoption varies depending on the level of motivation to innovate, as predicted by Hypothesis 11.[15] When it is a year following an election and a state is in moderate fiscal health, the number of its neighbors having lotteries has only a slight effect on its probability of adoption; a state in the year after an election and moderate fiscal health with as many as four neighbors having lotteries has only a .021 (= .022 − .001) greater predicted probability of adoption than a state with no such neighbors (see the top third of the fifth section). But if fiscal health remains moderate and it is an election year, the effect of previously adopting neighbors on the likelihood of adoption is stronger (see the middle third of the fifth section). Finally, the bottom third of the fifth section shows that the effect of neighboring states is still stronger when a state is both in an election year and in poor fiscal health.

Conclusion

Our empirical analysis offers a great deal of support for our unified model of state lottery adoptions. There is evidence for both the internal determinants and regional diffusion models of state innovation, as both (1) internal political and economic characteristics of a state and (2) the number of previously adopting neighboring states are found to influence the probability of a lottery adoption. Also, these two dominant explanations of state innovation are in no sense inconsistent. We have seen that expectations of both internal and regional influences can be derived from Mohr's theory of innovation. And our study of lottery adoptions confirms all essential elements of Mohr's theory. The probability of state innovation is directly related to the motivation to innovate, inversely related to the strength of obstacles to innovation, and directly related to the availability of resources for overcoming these obstacles. Moreover, Mohr's assertion that these three critical determinants interact in their influence on the probability of innovation receives consistent support. One such interaction in the context of lottery adoptions is between the influences of (1) neighboring states, and (2) "internal" factors reflecting the motivation to innovate (i.e., fiscal health and election proximity). Neighboring states are found to have a stronger impact on the likelihood of a lottery adoption when the internal characteristics of a state are themselves favorable for innovation (e.g., poor fiscal health and an election year). This reinforces our claim that regional diffusion and internal determinants explanations of state innovation should not be analyzed in isolation; instead, unified models are needed.

Our study also has other implications for future political science research. First, our findings suggest that scholars of state innovation should not be deterred by the fact that they are almost always attempting to explain rare events. State lottery adoptions are very unusual events; only 3% of the cases in our sample are scored *adoption;* fully 97% of the cases are state-years in which no lottery was adopted. But despite this fact, we can explain quite well when and why lottery adoptions occur. While we cannot be certain that similar studies of innovation in other policy areas would be as successful, we believe our findings are sufficiently promising to encourage students of state innovation to undertake event history analyses of other types of policy adoptions.

With event history analysis, scholars can subject theories of state government innovation to a powerful test by assessing whether these theories can predict the probability that a particular type of state will adopt a particular policy in a particular year. We believe that such analyses can yield conclusions about the factors encouraging innovation with considerably greater substantive relevance than studies using methodologies dominant in the literature to date. Moreover, event history analysis has proven successful for testing (and supporting) a theory of innovation assuming that both a state's internal characteristics and nearby states influence the probability of a policy adoption. The methodologies used in previous innovation research have precluded empirical evidence for this expectation.

Finally, we hope that our success in using event history analysis to explain state adoptions of lotteries will encourage scholars in other subfields of political science to consider EHA's potential as an empirical tool. With it one might study a wide range of political events and in doing so take advantage of both temporal and cross-sectional variation in political behavior. Moreover, even when the event analyzed occurs only rarely, event history analysis has proven capable (in this study at least) of generating meaningful empirical results. This suggests that political scientists might be able to use EHA to undertake rigorous empirical testing of explanations of events generally considered too rare to be studied using multivariate analysis. For example, at the individual level, one might test explanations for a variety of forms of relatively rare political activity, such as engaging in protest activity or switching party identification. Students of international relations might use EHA to study such events as wars or treaties, and comparativists might test explanations of the conditions under which military coups are likely to occur.

Appendix

The Dependent Variable

The dates of lottery adoptions by states provides the information necessary to measure ADOPT in equation 1. The following states had adopted a lottery by 1986: New Hampshire 1964; New York 1967; New Jersey 1971; Massachusetts, Michigan, and Pennsylvania 1972; Maryland 1973; Illinois, Maine, Ohio, and Rhode Island 1974; Delaware 1975; Vermont 1978; Arizona 1981; Connecticut and Washington 1982; Colorado 1983; California, Missouri, Oregon, and West Virginia 1984; Iowa 1985; Florida, Idaho, Kansas, Montana, and South Dakota 1986.

Indicators Used To Measure Independent Variables

Fiscal Health (FISCAL). Ratio of total-state-revenue-minus-total-state-spending to total state spending.

Degree to Which Single Party Controls Institutions of Government (PARTY). A dichotomous variable taking the value one if the governor and both legislative houses are controlled by the same party, zero otherwise. It cannot be measured for Minnesota and Nebraska in years with nonpartisan legislatures, so these cases are deleted from analyses involving PARTY.

Proximity to Elections. ELECT1 is a dichotomous variable taking the value one in the year of a gubernatorial election, zero otherwise. ELECT2 is a dichotomous variable taking the value one if it is neither an election year nor the year after an election, zero otherwise.

Personal Income (INCOME). State per capita income divided by the implicit price deflator for personal consumption expenditures, to convert per capita income to "constant" 1982 dollars.

Previous Adoptions by Neighbors (NEIGHBORS). Number of neighboring states that have adopted the lottery prior to the year of measurement. States are assumed to be neighbors of all states that share a border. (In addition, the pairs New Jersey and Maryland, and Massachusetts and Maine are treated as neighbors). The following lists the 48 states and their neighbors: Alabama has for neighbors MS, TN, GA, FL; Arizona has CA, NV, UT, CO, NM; Arkansas has LA, TX, OK, MO, KY, TN, MS; California has OR, NV, AZ; Colorado has NM, AZ, UT, WY, NE, KS, OK; Connecticut has NY, MA, RI; Delaware has MD, PA, NJ; Florida has AL, GA; Georgia has FL, AL, TN, NC, SC; Idaho has WA, OR, NV, UT, WY, MT; Illinois has WI, IA, MO, KY, IN, MI; Indiana has KY, IL, MI, OH; Iowa has MO, NE, SD, MN, WI, IL; Kansas has OK, CO, NE, MO; Kentucky has TN, AR, MO, IL, IN, OH, WV, VA; Louisiana has TX, AR, MS; Maine has NH, MA; Maryland has VA, WV, PA, DE, NJ; Massachusetts has RI, CT, NY, VT, NH, ME; Michigan has WI, IL, IN, OH; Minnesota has ND, SD, IA, WI, MI; Mississippi has LA, AR, TN, AL; Missouri has AR, OK, KS, NE, IA, IL, KY, TN; Montana has ID, WY, SD, ND; Nebraska has KS, CO, WY, SD, IA, MO; Nevada has CA, OR, ID, UT, AZ; New Hampshire has MA, VT, ME; New Jersey has DE, PA, NY, MD; New Mexico has AZ, UT, CO, OK, TX; New York has PA, NJ, CT, MA, VT; North Carolina has SC, GA, TN, VA; North Dakota has SD, MT, MN; Ohio has KY, IN, MI, PA, WV; Oklahoma has TX, NM, CO, KS, MO, AR; Oregon has CA, NV, ID, WA; Pennsylvania has DE, MD, WV, OH, NY, NJ; Rhode Island has CT, MA; South Carolina has GA, NC; South Dakota has ND, NE, WY, MT, MN, IA; Tennessee has NC, GA, AL, MS, AR, MO, KY, VA; Texas has NM, OK, AR, LA; Utah has AZ, NV, ID, WY, CO, NM; Vermont has NH, MA, NY; Virginia has NC, TN, KY, WV, MD; Washington has OR, ID; West Virginia has VA, KY, OH, PA, MD; Wisconsin has MN, IA. IL, MI; Wyoming has CO, UT, ID, MT, SD, NE.

Religious Fundamentalism (RELIGION). Percentage of state population adhering to fundamentalist religions in 1971. Since data are available only for 1971, we must assume that the percentage fundamentalist population is stable within states for the period 1964–85.

Data Sources: FISCAL: *Statistical Abstract of the United States States,* selected years. PARTY: gubernatorial data through 1984 from Congressional Quarterly, *Guide to U.S. Elections,* 2d edition (1985); legislative data through 1984 from data set graciously provided by James Garand of Louisiana State University; data for 1985 and 1986 from Council of State Governments, *State Elective Officials and the Legislatures* and *The Book of the States.* ELECT1 and ELECT2: data through 1984 from Congressional Quarterly, *Guide to U.S. Elections;* data for 1985 and 1986 from Council of State Governments, *The Book of the States.* INCOME: data through 1984 from James Garand; data for 1985 from *Statistical Abstract of the United States;* implicit price deflator from *CITIBASE* (maintained by the Economics Department of Citibank). RELIGION: data from Douglas Johnson, Paul Picard, and Bernard Quinn, *Churches and Church Membership in the United States* (Washington: Glenmary Research Center 1974).

Notes

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1. A variant of this explanation suggests that both nearby and distant states are relevant. Gray's (1973) government interaction model assumes that policies diffuse across states as a result of free interaction of officials from states that have already adopted with officials from states that have not yet adopted (see also Feller and Menzel 1978).

2. Allison (1984) and Tuma and Hannan (1984) present and cite numerous examples of research explaining the occurrence of events as diverse as a job change, a bankruptcy, a hospitalization, or a death.

3. However, in no state has the lottery proven capable of generating a large proportion of a state's revenue; all lotteries yield less than 5% of a state's general revenues from its own sources (Mikesell and Zorn 1986).

4. More precisely, these studies have used (1) some linear transformation of the year of adoption or (2) the order of adoption by states.

5. However, event history analysis can also be used when the event in question *can* be repeated by an individual (e.g., moving one's residence), in which case the size of the risk set is stable over time.

6. For many policies, we would also expect that the ideological orientation of government officials may influence their motivation to adopt a policy and consequently that the political party controlling a state's government would affect the probability of adoption. But with the lottery we do not expect that governments controlled by Democratic parties should be more (or less) likely to adopt than those controlled by Republican parties. This is because a lottery is likely to induce a mixed ideological response from both conservatives and liberals. For example, for liberal politicians the fact that a lottery will generate revenues that can be spent to increase public services may be offset by the highly regressive nature of its incidence (Suits 1977). Similarly, conservative politicians may see the lottery as a way of avoiding the need to increase a mandatory sales or income tax but be concerned about government promotion of gambling. Thus, there is little reason to include the party in control in a model of state lottery adoption.

7. Two quite different lines of reasoning also support this hypothesis. First, Wagner's Law (Wagner 1877) suggests that many public services (e.g., parks) are perceived as "luxury goods"; they are not consumed when personal income is low but are increasingly demanded as incomes rise and individuals' private needs are fulfilled (see also Berry and Lowery 1987; Mann 1980, 50–52). Assuming this is true, the demand for government services and hence the need for government revenues should increase with personal affluence, thereby enhancing the probability of a lottery adoption. Second, Filer, Moak, and Uze (1988) contend that states with a high proportion of their population in poverty should be less likely than wealthier states to adopt a lottery, since legislators representing poor districts should oppose a regressive lottery that would disproportionately tax their constituents.

8. For a discussion of the variation across state lotteries on this and other dimensions, see Mikesell and Zorn 1986.

9. Aldrich and Nelson (1984, 31–35) explain the role of the cumulative normal distribution in the probit model.

10. An alternative specification of equation 1 would be:

$$\text{ADOPT}_{i,t} = \Phi(b_1\text{FISCAL}_{i,t-1} + b_2\text{PARTY}_{i,t} + b_3\text{ELECT1}_{i,t} + b_4\text{ELECT2}_{i,t} + b_5\text{INCOME}_{i,t-1} + b_6\text{RELIGION}_{i,t-1} + b_7 D_{i,t}\text{NEIGHBORS})_{i,t},$$

where $D_{i,t}$ equals zero if the year, t, is 1964 and one if t is 1965 or later. This formulation restricts the effect of neighboring states to 1965 and after, assuming on logical grounds that previously adopting neighboring states could not have been responsible for the first state's adoption of the lottery in 1964. But since, in our data set, $\text{NEIGHBORS}_{i,t}$ (and hence $[D_{i,t}]$ $[\text{NEIGHBORS}_{i,t}]$) equals zero for all states in 1964, equation 1 and the equation in this note yield identical coefficient estimates.

11. The reliance on a probit specification for our model makes it so that our hypotheses predicting interaction are not fully distinct from hypotheses about coefficients for individual independent variables in equation 1. As long as the coefficients for the independent variables are nonzero, some interaction among the independent variables in influencing the probability of adoption is guaranteed.

12. In the probit model of equation 1, the independent variables are assumed to be linearly and additively related to an unmeasured continuous interval-level variable that might be conceived as the *inclination* to adopt a lottery. Thus, the interactions we find among independent variables are interactions in influencing the probability of adoption (constrained to be within the range from zero to one) rather than the inclination to adopt, which is unconstrained with respect to maximum and minimum.

13. For a justification of the precise values at which the independent variables are set (e.g., the value for FISCAL that represents "very good" fiscal health), see the notes to Table 2.

14. A state in the year after an election with moderate fiscal health and a very small fundamentalist population has only a .025 (= .026 − .001) greater probability of adoption than a state with a very large fundamentalist population.

15. We do not even attempt to assess Hypothesis 10, since Hypothesis 8—also about the effect of unified control of government—is disconfirmed.

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