Theories of the
Policy Process

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Innovation and Diffusion Models in Policy Research

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Although most actions by governments are incremental in that they marginally modify existing programs or practices, and much research about policymaking seeks to explain why it tends to be incremental, ultimately every government program can be traced back to some nonincremental *innovation*.[1] Thus, one cannot claim to understand policymaking unless one can explain the process through which governments adopt new programs. Recognizing this, public policy scholars have conducted extensive inquiry into policy innovation.

When people speak of innovation in common parlance, they usually refer to the introduction of something *new*. But when should a government program be termed "new?" The dominant practice in the policy innovation literature is to define an innovation as a program that is new to the government adopting it (Walker 1969, p. 881). This means that a governmental jurisdiction can innovate by adopting a program that numerous other jurisdictions established many years ago. By embracing this definition, students of policy innovation explicitly choose not to study policy *invention*—the process through which *original* policy ideas are conceived. To flesh out the distinction via illustration, a single policy *invention* can prompt numerous American states to *innovate*, some many years after the others.

This chapter will review the dominant theories of government innovation in the public policy literature. However, we will see that these theories borrow heavily from ones developed to explain innovative behavior by *individuals*: for example, teachers using a new method of instruction (studied by education scholars), farmers adopting hybrid seeds and fertilizers (studied by rural sociologists), and consumers purchasing new products (studied by marketing scholars).[2] We will

also see that theories of government innovation share many commonalities with models that seek to explain *organizational* innovation.

Some studies of government innovation have been cross-national, investigating how nations develop new programs and how such programs have diffused across countries (Heclo 1974; Collier and Messick 1975; Brown et al. 1979; Tolbert and Zucker 1983; Kraemer, Gurbaxani, and King 1992; Simmons 2000; Simmons and Elkins 2004; Weyland 2004; Brooks 2005; Gilardi 2005; Meseguer 2005a, 2005b). Other studies have focused on innovation by local or regional governments within the United States (Aiken and Alford 1970; Crain 1966; Bingham 1977; Midlarsky 1978; Lubell et al. 2002) or regional governments in other nations (Ito 2001). But the vast majority of empirical research on government innovation has examined policymaking by the American states. Because of this, we will devote our primary attention to state-level research. Although most models of policy innovation we describe can be extended to national and local governments, some of these models hinge at least partially on the competitive nature of states within a federal system and thus must be modified when applied to local or regional governments within a unitary system, or to nations in an international system or an organization like the European Economic Community.

Despite the extensive number of studies of state government innovation, at a general level, there are two principal forms of explanation for the adoption of a new program by a state: *internal determinants* and *diffusion* models (Berry and Berry 1990). Internal determinants models posit that the factors leading a jurisdiction to innovate are political, economic, or social characteristics internal to the state. In these models, states are not conceived as being influenced by the actions of other states. In contrast, diffusion models are inherently intergovernmental; they view state adoptions of policies as emulations of previous adoptions by other states. Both types of models were introduced to political scientists in Walker's (1969) seminal study of state government innovation across a wide range of policy areas.[3]

This chapter begins with separate discussions of the central features of internal determinants and diffusion models. We then turn to the methodologies that have been used to test them. Although most scholars have acknowledged that few policy adoptions can be explained purely as a function of (1) internal determinants (with no diffusion effects) or (2) policy diffusion (with no impact by internal factors), most *empirical* research conducted before 1990 focused on one type of process or the other. At the time of their introduction during the late 1960s and early 1970s, the "single-explanation" methodologies developed were highly creative approaches using state-of-the-art quantitative techniques. However, more recent research has shown that these traditional methodologies are severely flawed (Berry 1994b). In 1990, Berry and Berry presented a model of state lottery adoptions reflecting the simultaneous effects of both internal determinants and policy diffusion on state adoption behavior and employed event history analysis to test their model. In the last decade and a

half, this approach has been emulated and extended in dozens of studies (see the Appendix).

DIFFUSION MODELS

Rogers (1983, p. 5) defines diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system." Students of state policy innovation positing diffusion models conceive of the governments of the fifty American states as a social system and maintain that the pattern of adoption of state policy results from states emulating the behavior of other states. Various alternative diffusion models have been developed (each of which will be discussed below), with the primary difference being the "channels" of communication and influence assumed to exist. However, we would argue that all these models hypothesize that states emulate each other for one of three basic reasons.

First, states *learn* from one another as they borrow innovations perceived as successful elsewhere. Relying on the classic model of *incremental* decisionmaking (Lindblom 1965; Simon 1947), Walker (1969) hypothesizes that state policymakers faced with complex problems seek decisionmaking shortcuts (see also Glick and Hays 1991; Mooney and Lee 1995). Lindblom (1965) maintains that one critical method of simplification is to restrict consideration to only those alternatives that are marginally different from the status quo. Walker argues that another simplification method is to choose alternatives that, although not minor modifications of current policy, have been pursued and proven effective or promising in other states. In essence, by showing how emulation of other states' innovations can be an aid in simplifying complex decisions, policy diffusion theorists have demonstrated how the adoption of *non*incremental policies can be consistent with the logic underlying incrementalism.[4]

Second, states *compete* with each other: they emulate policies of other states to achieve an economic advantage over other states or avoid being disadvantaged. For instance, states may decrease welfare benefits to match the levels of their neighbors to prevent becoming a "welfare magnet" for the poor (Peterson and Rom 1990; Volden 2002; Berry, Fording, and Hanson 2003; Bailey and Rom 2004; Berry and Baybeck 2005). Similarly, a state may adopt a lottery to reduce the incentive for its own citizens living near a boundary to cross the border to play in another state's game (Berry and Berry 1990; Berry and Baybeck 2005). In a final example, states may adopt economic development incentive programs already present in other states to prevent an exodus of businesses from the state (Gray 1994).[5]

Third, Walker (1969, p. 891) argues that, despite the autonomy that states possess in a federal system, there is pressure on all states to conform to nationally or regionally accepted standards. Such pressure leads states to adopt programs that

have already been widely adopted by other states. Sometimes the pressure is what DiMaggio and Powell (1983) label "coercive," when federal mandates give state governments little choice. In other cases, there is "normative" pressure on state officials to adopt the best practices in other states. State officials tend to be socialized into shared norms by common professional training (such as the master's in public administration degree) and by interaction in professional associations (e.g., the National Emergency Management Association).

As we review the various diffusion models developed in the policy innovation literature, each focusing on a different channel of communication and influence across government jurisdictions, we will see that each model relies on one or more of these three reasons to justify why states emulate other states when making public policy. We begin with the two models most commonly proposed in the literature—the national interaction model and the regional diffusion model—and finish with several other models positing different channels of influence.

The National Interaction Model

This model assumes a national communication network among state officials regarding public-sector programs in which officials learn about programs from their peers in other states. It presumes that officials from states that have already adopted a program interact freely and mix thoroughly with officials from states that have not yet adopted it, and that each contact by a not-yet-adopting state with a previous adopter provides an additional stimulus for the former to adopt. The probability that a state will adopt a program is thus proportional to the number of interactions its officials have had with officials of already-adopting states (Gray 1973a). There are, indeed, formal institutional arrangements that encourage the thorough mixing of states. Chief among these are various associations of state officials that allow individuals with similar positions across the fifty states to meet periodically in national conferences. These include associations of elected "generalist" officials such as the National Governors' Association and the National Conference of State Legislatures, each of which have numerous committees on specific policy areas, as well as organizations of functionalist officials such as the National Association of General Service Administrators.

This learning model was developed and formalized by communication theorists analyzing the diffusion of an innovation through a social system (assumed to be of fixed size) consisting of individuals. In equation form, the model can be expressed as

$$\Delta N_t = N_t - N_{t-1} = bN_{t-1}[L - N_{t-1}]. \text{ [Equation 1]}$$

In this model, L is the proportion of individuals in the social system that are potential adopters (a value assumed to remain constant over time), and serves as

a ceiling on possible adoptions. If every person in the system is unconstrained and may adopt, L equals one. N_t is the cumulative proportion of adopters in the social system at the end of time period t, N_{t-1} is the cumulative proportion at the end of the previous period, and thus ΔN_t is the proportion of new adopters during period t.[6] With some algebraic manipulation, the terms in Equation 1 can be rearranged to yield

$$N_t = (bL + 1)N_{t-1} - bN^2_{t-1}. \text{ [Equation 2]}$$

Then, since Equation 2 is linear, given data on the timing of adoptions by all potential adopters, the parameters b and L can be estimated by regressing N_t on N_{t-1} and N^2_{t-1}.[7]

When the cumulative proportion of adopters is graphed against time, Equation 1 yields an S-shaped curve, like that reflected in Figure 8.1. Early in the diffusion process, adoptions occur relatively infrequently. The rate of adoptions then increases dramatically but begins to taper off again as the pool of potential adopters becomes small.

In an important early effort to enhance the theoretical precision of state government innovation research and explain states' adoptions of new policies with a
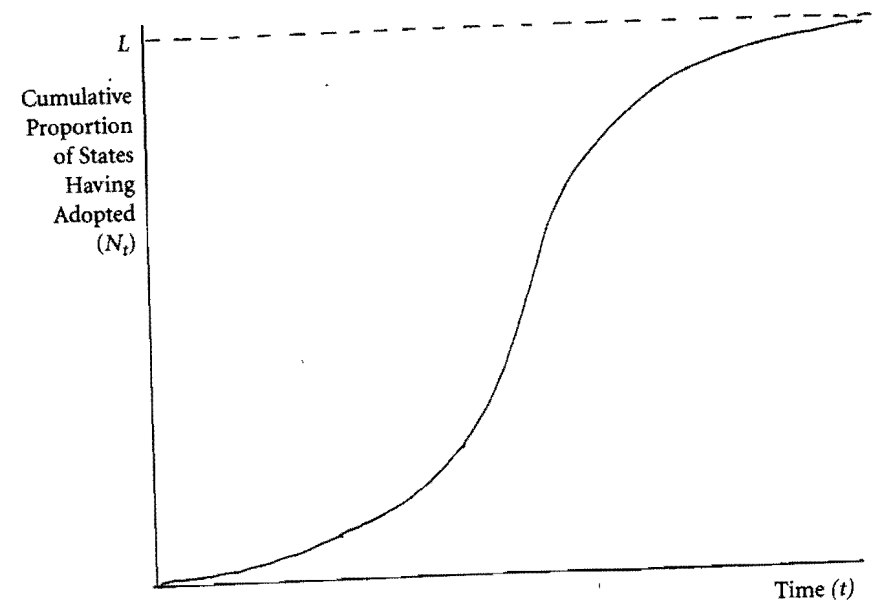

FIGURE 8.1   S-Shaped Curve Consistent with National Interaction Model (Equation 1)

widely applicable general theory of innovation, Virginia Gray (1973a; see also Menzel and Feller 1977; Glick and Hays 1991) employs Equation 2, assuming that the social system is the community of American states. Setting the time period as the calendar year, her regression analyses show that adoptions of several state policies—including Aid to Families with Dependent Children, education policies, and civil rights laws—fit the equation very closely. But several factors limit the utility of the national interaction model—as traditionally conceived in Equations 1 and 2—for students of government innovation.

First, the model assumes that, during any time period, all potential adopters that have not yet adopted are equally likely to do so; the only variable influencing the probability that a potential adopter will adopt during any time period is the cumulative number of adopters prior to that period. Indeed, the model treats all potential adopters as totally undifferentiated actors who interact "randomly," that is, who are equally likely to have contact with all other members of the social system. Thus, the theory is well suited for when the social system is a large society of individuals and the scholarly interest is in a macro-level description of the diffusion process. While certainly in any society friendships and work and family relations guarantee that an individual's interactions with other members of the society are nonrandom, when studying the diffusion of a new consumer product through a large society, for instance, it may suffice to employ a model assuming random interaction. But when studying the diffusion of a policy through the fifty states, it seems less reasonable to treat the states as undifferentiated units; we know that Mississippi differs in many ways from New York, and our theory should probably take some of these differences into account. It is also likely that contacts between officials from different states are patterned rather than random.[8] It makes sense, for example, that politicians and bureaucrats in New York will have more contact with their counterparts in New Jersey than with officials in Mississippi.

Recently, the logic underlying the national interaction model has been modified to reflect a recognition that the professional associations encouraging interaction among state officials involve some states more than others, thereby prompting probabilities of policy adoption that vary across states. For example, Balla (2001) hypothesizes that states whose insurance commissioners sat on a committee of the National Association of Insurance Commissioners with jurisdiction over the regulation of HMOs were more likely than others to adopt model legislation proposed by the committee, due to the greater centrality of commissioners in the informational networks surrounding the proposed legislation.

The Regional Diffusion Model

Whereas the national interaction model assumes that states interact with each other on a national basis, the regional diffusion model posits that states are influenced

primarily by those states geographically proximate. Most of these models assume that states are influenced exclusively by those states with which they share a border; as such, we call them *neighbor* models. Specifically, these models hypothesize that the probability that a state will adopt a policy is positively related to the number (or proportion) of states bordering it that have already adopted it (e.g., Berry and Berry 1990; Mintrom 1997; Balla 2001). Other models, which we term *fixed-region* models, assume that the nation is divided into multiple regions (of contiguous states) and that states tend to emulate the policies of other states within the same region (e.g., Mooney and Lee 1995).

Both learning and competition can be the basis for assuming that diffusion channels are regional in nature. States are more likely to learn from nearby states than from those far away because states can more easily "analogize" to proximate states, which tend to share economic and social problems and have environments similar enough so that policy actions may have similar effects (Mooney and Lee 1995; Elazar 1972). However, it is when policy adoptions are attempts to compete with other states that the likelihood of regionally focused, rather than nationally based, diffusion seems greatest. Because of constraints on the mobility of most individuals and firms, states are more likely to compete with nearby states than with those far away. For example, states worried about losing revenue—especially those with large population centers near a border—are likely to be very concerned about whether their immediate neighbors have lotteries but unconcerned about remote states. Similarly, states fearful of becoming a welfare magnet may make immediate responses to policy changes by neighbors with large concentrations of poor people near their borders but may pay no attention to policy adjustments in far-away states (Berry and Baybeck 2005).

Although fixed-region and neighbor models are similar in that their emphasis is on the emulation of nearby states, the models are subtly different in their specified channels of influence. Fixed-region models presume (if only implicitly) that all states within the same region experience the same channels of influence. In contrast, neighbor models—by avoiding fixed regional groupings of states and instead pointing to the influence of all bordering states—assume that each state has a unique set of reference states for cues on public-sector innovations. Although one can discern policies where a neighbor model makes more sense than a fixed-region formulation (e.g., in the case of lottery adoptions), and vice versa, neither pure model is entirely realistic. Fixed-region models imply implausibly that some states—those bordering another region—are completely unaffected by some of their neighbors. Neighbor models assume that states that are close but share no border (e.g., Vermont and Maine) have no influence on one another. A more realistic regional diffusion model might assume that states are influenced most by their neighbors but also by other states that are nearby. One simple specification consistent with this assumption is that the level of influence of one state over another is proportional to the distance between the two states.

Leader-Laggard Models

Leader-laggard models assume that certain states are pioneers in the adoption of a policy, and that other states emulate these leaders (Walker 1969, p. 893). Most often, scholars presume that leadership is regional, with states taking cues from one or more pioneer states within their geographical region (Walker 1969, 1973; Grupp and Richards 1975; Foster 1978). This model can be modified easily, however, to reflect the notion of national leaders: states that, when they adopt a new program, increase the likelihood that other states, regardless of their geographical location, will adopt. Leader-laggard models are consistent with the presumption that, in any policy area, some states' personnel are more highly regarded by their peers than other states' and that policymakers are more likely to turn to these states for cues.[9] As such, these models assume that states emulate other states in a *learning* process rather than because of interstate competition or a general pressure to conform.[10]

Although there are certainly strong reasons to expect leader states to emerge, thus forming the groundwork for leader-laggard diffusion, such models are often flawed by their failure to identify a priori (1) the states (or even types of states) that are expected to be pioneers, and (2) the predicted order of adoption of the states expected to follow. Indeed, without an a priori theoretical prediction of which state(s) will lead and the order in which the remaining states will follow, a leader-laggard model is virtually nontestable; any adoption pattern will involve some state (which ex-post-facto could be designated the pioneer) adopting a policy first and other states adopting afterward.

One leader-laggard model that clearly specifies the channels of diffusion is the *hierarchical* model developed by Collier and Messick (1975). Studying the pattern of social security adoptions by nations around the world, these authors hypothesize that the pioneers in social security were highly (economically) developed nations and that social security programs diffused down a hierarchy of nations from most developed to least developed.[11] Such an hypothesis specifies (in a testable fashion) the characteristics of leaders (high economic development) and a clear ordering of successive adoptions (from most-developed to least-developed countries). But note that, though the hierarchical model specifically posits diffusion of a policy across jurisdictions, its empirical prediction of a strong relationship between economic development and earliness of adoption is indistinguishable from that of an internal determinants model, which assumes no influence of states on one another and, instead, posits that the sole determinant of the propensity of a state to adopt is its level of development.

Isomorphism Models

Some have argued that a state is most likely to take cues about adopting a new policy from other states that are similar, as these states provide the best information about the nature of the policy and the likely consequences of adopting it.[12] Sometimes this may lead to regional diffusion, as nearby states tend to be similar

in a variety of ways. But states share similarities with states that are not geographically proximate. Grossback, Nicholson-Crotty, and Peterson (2004; see also Nicholson-Crotty 2004) stress especially the importance of ideological similarity, proposing that the effect of a policy adoption by a state will be greatest on states that are the most ideologically similar (on a liberal-conservative continuum). But Volden (2006) finds that policies diffuse based on a wide range of "political, demographic and budgetary similarities across states." Weyland (2004, p. 256) concludes that policies diffuse along "channels of cultural commonality and historic connection" among nations in Latin America, and Brooks (2005, p. 281) expects policies to diffuse within "peer groups [of nations], organized on the basis of shared geopolitical and economic characteristics."

Vertical Influence Models

The vertical influence model sees states as emulating not the policies of other states—as part of a "horizontal" diffusion process—but, instead, the policies of the national government. One might view this model as conceptually similar to a leader-laggard model, which specifies that there is a single pioneer state; in effect, the national government serves the same role as a state-level pioneer. To the extent that states emulate the national government as a result of a learning process, the similarity between models is indeed quite strong; the national government is analogous to a widely respected leader state. But the reasons states are influenced by the national government to adopt policies extend beyond learning. In some cases, the national government can simply mandate certain activities by states (e.g., the National Voter Registration Act, which required states to allow people to register to vote at the same time they register their motor vehicles). Although one might label such a process diffusion, it is a highly uninteresting form of diffusion, as nearly all state discretion is eliminated by national-level fiat. A more interesting theoretical process results when states retain discretion but the national government provides incentives for the adoption of a policy by states. Typically, there are financial incentives resulting from a federal grant-in-aid program, as in the case of Medicaid and associated administration provisions. In another example, Derthick (1970) shows how the Social Security Act of 1935 shaped state welfare programs through the AFDC grant to the states. Moreover, Welch and Thompson (1980) find that policies for which the federal government offers incentives diffuse faster than "state preserve" policies (see also Brown 1975; Soss et al. 2001; Allen, Pettus and Haider-Markel 2004).[13]

INTERNAL DETERMINANTS MODELS

Internal determinants models presume that the factors causing a state to adopt a new program or policy are political, economic, and social characteristics of the state. Thus, in their pure form, these models preclude diffusion effects in which a state is influenced by the actions of other states or the national government.

Certainly, once a policy is adopted by one state, it is extremely unlikely that another state's adoption would be *completely* independent from the previous one. Unless the two states arrived at the same (or very similar) policy via a highly improbable coincidence, at a minimum there must have been a diffusion from one state to the other of the *idea* for the policy. Thus, we believe that internal determinants models must acknowledge that, when a state adopts a policy new to the American states, media coverage and institutionalized channels of communication among state officials make it likely that knowledge of the policy spreads to other states.[14] However, such models assume that, once a state is aware of the policy, the internal characteristics of the state are what determine if and when an adoption will occur, rather than pressure created by other states' adoptions or explicit evaluations of the impacts of the policy in earlier-adopting states.

The Choice of a Dependent Variable

One important theoretical issue in the construction of internal determinants models is how the dependent variable—the propensity of a state to adopt a policy or a set of policies—is defined. In research prior to the 1990s, most internal determinants models made the American state the unit of analysis and employed a dependent variable that assumes that, the earlier a state adopts, the greater its "innovativeness." Empirical analysis was cross-sectional, and the dependent variable was generally measured at the interval level by the year of adoption (or some linear transformation thereof) or at the ordinal level by the rank of a state when states are ordered by their time of adoption (Canon and Baum 1981; Glick 1981; Gray 1973a; Walker 1969). However, a dichotomous version of this variable, which indicates whether a state had adopted a policy by a specified date, was also used (Filer, Moak, and Uze 1988; Glick 1981; Regens 1980).

More recent research generally conceptualizes the propensity of a state to adopt a policy differently. The unit of analysis is still the American state but is now the state in a particular year. More precisely, the unit of analysis is the American state before it adopts the policy and, thus, still eligible to adopt in a particular year.[15] The dependent variable is the probability that a state eligible to adopt will do so during that year (e.g., Berry and Berry 1990, 1992; Hays and Glick 1997; Mintrom 1997). Empirical analysis is pooled (cross-sectional/time-series), where states are observed over multiple years.

One important distinction between the two dependent variables is that the *probability of adoption* is a concept that is (1) defined for each state at any point in time and (2) free to change over time, whereas the *earliness of adoption* takes on a single fixed value for each state, determined by the year it adopts. A second distinction is that, while the timing of a state's adoption relative to other states is fundamental to its score on the "earliness of adoption" variable, relative timing is not necessarily relevant to a determination of a state's propensity to adopt when a "probability of adoption" conception is utilized. A state adopting a policy decades

later than most other states is not necessarily deemed as having had a (stable) low propensity to adopt; it is possible that the state had a low probability for many years but that changing conditions led to an increased probability of adoption.

Although we are reluctant to declare either of these dependent variables—earliness of adoption or probability of adoption—as unambiguously the best one for internal determinants models, we believe that greater advances have come from models using the latter dependent variable, a position on which we will elaborate below. Furthermore, our discussion of the theory underlying internal determinants models in this section will emphasize conceptualizations in which the dependent variable is the probability of adoption.

When propensity to adopt is conceived of as the probability of adoption, the focus of research must be a single policy.[16] However, when studying the innovativeness of states as reflected by their earliness of adoption, attention can focus on either one policy or a set of policies. At one extreme are studies designed to explain states' adoptions of a single policy or program (e.g., Berry and Berry's [1990] analysis of the lottery, and Hays and Glick's [1997] research on state living wills). Other internal determinants models have focused on multiple policy instruments in a single issue area (e.g., Sigelman and Smith's [1980] research on consumer protection, covering twenty-eight different kinds of consumer legislation). At the other extreme is Walker's (1969) analysis of a state's innovativeness index, reflecting the earliness of adoption of a set of eighty-eight policies spanning a wide range of economic and social issue areas, and Savage's (1978) innovativeness measure based on sixty-nine policies.

Implicit in the Walker and Savage measures of innovativeness is that it is reasonable to conceive of a *general proclivity* of a state to innovate across a wide range of issue areas. Some are skeptical of this claim; in a classic exchange with Walker, Gray (1973a, 1973b) claims that states can be highly innovative in one program area but less innovative in others, thereby rendering any general innovativeness score useless. Of course, whether states are innovative generally and across a range of policy areas is an empirical question, and if the evidence is supportive, it is useful to develop models explaining generic innovativeness.

But even the variation already documented in state innovativeness across issue areas makes it obvious that, for any individual policy, the propensity of states to adopt the policy cannot be explained fully by a general proclivity to innovate (Gray 1973a). For this reason, even if generic innovativeness is a useful concept, we still ought not treat it as the *ultimate* dependent variable. A good alternative is to take the course of Mooney and Lee (1995), Hays and Glick (1997), and Soule and Earl (2001), who conceive of a state's general proclivity to innovative as just one of a set of independent variables that influences the probability that a state will adopt a particular policy. The idea is that states vary in their general receptivity to new ideas, and that this is one factor that accounts for their differential probabilities of adopting any specific program. The strength of the role played by general receptivity relative to other specific determinants of the probability of adoption is assessed empirically.

Hypotheses from Internal Determinants Models

Much of the theory underlying internal determinants models of state government innovation can be traced to research about the causes of innovativeness at the individual level. For example, a tremendous level of support has been generated for the proposition that persons with greater socioeconomic status—higher levels of education, income, and wealth—are more likely to innovate than persons with less status.[17] A high level of education provides individuals access to knowledge about innovative practices and an openness to new ideas. Many innovations cost money or involve financial risks for those who adopt them; greater income and wealth provide people the resources necessary to absorb these costs. Similar hypotheses have been developed about innovation in organizations. Organizations of greater size and with greater levels of "slack resources" are assumed to be more innovative than smaller organizations and those with fewer resources (Rogers 1983; Cyert and March 1963; Berry 1994a). In turn, Walker (1969, pp. 883–884) explicitly draws on these organizational-level propositions to support the hypothesis that larger, wealthier, and more economically developed states are more innovative.

Indeed, we can turn to the literature on organizational innovation for a framework useful for assessing the variety of internal determinants likely to influence the probability that states will innovate. Lawrence Mohr (1969, p. 114) proposes that the probability that an organization will innovate 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 the obstacles. This proposition suggests a valuable organizational device, since among the hypotheses frequently reflected in internal determinants models are those concerning the motivation to innovate, as well as the obstacles to innovation and the resources available to surmount them.

We will review these hypotheses, emphasizing those that seem to be applicable to a wide range of policies. However, we recognize that explaining the adoption of any specific policy is likely to require attention to a set of variables that are ad hoc from the point of view of innovation theory but critical given the character of the politics surrounding the issue area in question. For example, states with strong teacher unions are less likely to adopt school-choice reforms (Mintrom 1997), and states with large fundamentalist populations are less likely to adopt several policies considered immoral by many fundamentalists: state reforms (in the pre-Roe period) making abortions more accessible, and state lotteries (Mooney and Lee 1995; Berry and Berry 1990). A strong presence of religious fundamentalists in a state does not diminish the likelihood of adoptions of every policy, just those raising moral issues central to their religious beliefs.

An explanation of the adoption of any specific policy also is likely to require independent variables that are relevant not because they are determinants of the propensity of a state to adopt a new policy but because they influence the preferences of policymakers concerning the substantive issues raised by the new policy.

For instance, a legislator's response to a proposal for a new welfare program should be driven partially by the same factors determining the legislator's reaction to a proposal for an incremental change in existing welfare programs, such as increasing benefit levels. In another example, research by Berry and Berry (1992, 1994) on state tax policy finds that the factors explaining states' adoptions of new tax instruments are virtually identical to the variables accounting for decisions to increase the rates in existing taxes—despite the fact that the imposition of a tax new to a state can unambiguously be termed a policy innovation whereas an increase in the rate for an existing tax would probably be viewed as an incremental policy choice. What seems to drive the politics of taxation in the American states is the unpopularity of taxes, and this unpopularity affects both tax adoptions and tax increases.[18]

Our review of hypotheses from internal determinants theories of government innovation will emphasize variables that seem especially relevant for explaining the adoption of *new* programs. This means that we will not discuss a wide range of factors widely believed to influence both innovative and routine policymaking.[19] For example, citizen and elite ideology are frequently hypothesized to influence the adoption of many programs that reflect traditional liberal-conservative cleavages (e.g., Mooney and Lee 1995; Berry and Berry 1992; Sapat 2004). But their influence is not relevant to an understanding of policy innovation per se, because ideology is widely perceived to influence routine or incremental policy choices as well (Hill, Leighly and Andersson 1995; Clingermayer and Wood 1995).[20]

Factors Reflecting the Motivation to Innovate. Numerous scholars have hypothesized that problem severity is an important determinant of the motivation to innovate. Problem severity can influence the motivation of state officials to adopt a policy directly by clarifying the need for the policy, or indirectly by stimulating demand for the policy by societal groups. For instance, Allard (2004, p. 529) maintains that poor economic conditions contributed to the adoption of Mothers' Aid programs by increasing "demand and need for assistance." Similarly, Stream (1999) proposes that the rate of uninsurance among a state's population influences the likelihood that the state will adopt a set of health insurance reforms. Also, Mintrom and Vergari (1998, p. 135) argue that the greater the ratio of state education funding to local funding, the more likely that a state legislature will consider "systemic reform like school choice."

Social scientists often assume that the principal goal of elected officials is to win reelection (e.g., Mayhew 1974; Kiewiet and McCubbins 1985). Although this assumption suggests that elected officials should be responsive to public opinion when deciding whether to adopt a new policy, the response should vary with the level of electoral security of state officials: the more insecure they feel, (1) the more likely they are to adopt new policies that are popular with the electorate, and (2) the less likely they are to adopt new policies that are widely unpopular, or at least sufficiently unpopular with some segment of the electorate to be deemed

controversial. Two corollaries of this proposition have frequently been introduced in the state innovation literature. One relates to interparty competition. Walker (1969) argues that politicians anticipating closely contested elections are especially likely to embrace new programs to try to broaden their electoral support. Implicit in this hypothesis is that the new programs are popular with the public. In the case of unpopular programs (like the imposition of a new tax), electoral competition is likely to reduce the probability that a state's politicians will support the program.

Politicians' levels of electoral security also vary with the amount of time until their next election. Reasoning similar to the above suggests that the closer it is to the next statewide election, the more likely a state is to adopt a new popular program and the less likely it is to adopt an unpopular new policy or one that is highly controversial. This proposition has received support in the case of highly popular state lotteries (Berry and Berry 1990), very unpopular mandatory taxes (Mikesell 1978; Berry and Berry 1992), and controversial school choice initiatives (Mintrom 1997).

Obstacles to Innovation and the Resources Available to Overcome Them. Theories of individual and organizational innovation have stressed the importance of financial resources (i.e., wealth and income levels for individuals and "slack resources" for an organization) and other characteristics (e.g., a high level of education for an individual and large size for an organization) reflecting the capability of the potential adopter to innovate. Similar kinds of resources are often held to be critical for government innovation.

Some new government programs require major expenditures, and therefore the availability of financial resources is a prerequisite for adoption. Thus, one can hypothesize that the fiscal health of a state's government often has a positive impact on the propensity of a state to adopt a new policy (Allard 2004; Lowry 2005).[21] Analogous to the notion of highly capable individuals or organizations is the concept of states with strong governmental capacity. Walker (1969), Sigelman and Smith (1980), Andrews (2000), and McLendon, Heller and Young (2005) maintain that states having legislatures that give their members generous staff support and extensive research facilities should be more likely to adopt new policies than states with less professionalized legislatures, and Brooks (2005) posits that party fragmentation is inversely related to the likelihood of innovation.[22] Alternatively, it can be argued that the capacity of a state's economy to finance extensive public services is the ultimate determinant of the state's propensity to innovate (Daley and Garand 2005). Such capacity is reflected by several measures of economic development common in the literature, including per capita income, gross domestic product, and level of urbanization.

Walker (1969, p. 884) suggests that states with high levels of economic development have a greater probability of adopting even those policies which do not require large budgets (e.g., enabling legislation for zoning in cities or a state

council on the arts), partly due to their greater adaptivity and tolerance for change. Furthermore, Wagner (1877; see also Mann 1980; Berry and Lowery 1987) hypothesizes that economic development prompts increased demand for government services. Greater personal income by a state's citizens leads them to demand governmental services that might be considered luxuries when personal income is low. Similarly, greater urbanization and industrialization lead to social problems that often require "collective" governmental solutions (Hofferbert 1966).

Others have argued that, although adequate financial resources are a prerequisite for government innovation, individuals who advocate policy ideas and are willing to devote their energies to pushing these ideas can be critical to the adoption of a new policy. Most of the scholarly attention to the importance of so-called policy entrepreneurs, both inside and outside of government, has focused on their role in agenda setting (Kingdon 1984; Baumgartner and Jones 1993; Schneider, Teske and Mintrom 1995). But recently, Mintrom (1997; see also Mintrom and Vergari 1996) offers evidence of the importance of policy entrepreneurs in facilitating the adoption of school choice initiatives in the states.[23] Similarly, Sabatier and Jenkins-Smith (2006) argue that *advocacy coalitions*—coordinated groups of governmental officials, activists, journalists, researchers, and policy analysts—can be crucial in paving the way for policy adoptions.[24]

Indeed, several theorists, recognizing the rarity of government innovation, have argued that innovation can be expected to occur only in the unusual case wherein various independent conditions happen to occur simultaneously. Kingdon (1984, chap. 8) speaks of policy windows—rare periods of opportunity for innovation—that are created when a new political executive takes office, an important congressional committee chair changes hands, and/or some event or crisis generates an unusual level of public attention to some problem. He argues that policy entrepreneurs consciously wait for such windows of opportunity to press their policy demands. In their study of tax adoptions, Berry and Berry (1992; see also Hansen 1983) argue that taxes tend to be adopted when several unrelated political and fiscal conditions converge to create a rare "political opportunity"; for example, the presence of a fiscal crisis in government occurring when the next election is not near and when one or more neighboring states has recently adopted a new tax.

A UNIFIED MODEL OF STATE GOVERNMENT INNOVATION REFLECTING BOTH INTERNAL DETERMINANTS AND DIFFUSION

We propose that models of state government innovation should take the following general form:

$$ADOPT_{i,t} = f\,(MOTIVATION_{i,t},\,RESOURCES/OBSTACLES_{i,t},\,OTHER\text{-}POLICIES_{i,t},\,EXTERNAL_{i,t})\ \text{[Equation 3]}$$

The unit of analysis for this equation is the American state eligible to adopt a policy in a particular year (t). The dependent variable—$ADOPT_{i,t}$—is the probability that state i will adopt the policy in year t. $EXTERNAL_{i,t}$ denotes variables reflecting diffusion effects on state i at time t; thus, these variables would measure the behavior of other states (or the national or local governments) at time t, or in the recent past.

The remainder of the terms in the function f are internal determinants. $MOTI-VATION_{i,t}$ represents variables indicating the motivation of public officials in state i at time t to adopt the policy; these variables would include the severity of the problem motivating consideration of the policy, the character of public opinion and electoral competition in the state, and other ad hoc motivation factors. $RESOURCES/OBSTACLES_{i,t}$ denotes variables reflecting obstacles to innovation and the resources available for overcoming them. For many policies, the state's level of economic development and the professionalism of its legislature would be among the variables included. Factors indicating the presence (and skill) of interested policy entrepreneurs, or the strength of advocacy coalitions, in a state could also be included.[25] Finally, $OTHERPOLICIES_{i,t}$ is a set of dummy variables indicating the presence or absence in state i of other policies that have implications for the likelihood that the state will adopt the new policy.

The impacts of previous policy choices on the probability of adopting a new policy have virtually been ignored in the empirical literature on state government innovation, but we contend that models of policy innovation must recognize the effects of one policy choice on another. Mahajan and Peterson (1985, pp. 39–40) identify four types of "innovation interrelationships": innovations may be (1) independent, (2) complementary, (3) contingent, or (4) substitutes. This typology has relevance for explaining state policy adoptions.

If we are seeking to explain the adoption of policy B, and policy A is largely independent of B (in the sense that a state's probability of adopting B is unaffected by whether it has already adopted A), obviously we need not concern ourselves at all with policy A. But policies of the other three types are not so safely ignored. Sometimes two policies are complementary: the adoption of policy A increases the probability that a state will adopt policy B. For example, a state that has previously chosen to license one type of auxiliary medical practitioner (such as physician assistants) may have created a precedent that would make it more likely that advocates of licensing other auxiliary personnel (such as nurse practitioners) will be successful. If so, a model designed to explain state licensing of one type of medical practitioner should include an explanatory variable indicating whether a state has previously adopted licensing of some other type of auxiliary medical personnel.

Note that a positive relationship between the probability of adoption of policy B and the presence of policy A can exist without A and B being complementary if the relationship is spurious—resulting from both policies' adoptions being influenced by a common set of variables. For example, if the probability that a state

will adopt one type of welfare reform is positively related to the presence of another similar type of reform, yet that relationship is exclusively due to the fact that the same kinds of causal forces are at work in the adoption of both policies, the two welfare reforms should not be viewed as complementary. Only when the adoption of one policy changes conditions in a state so as to make the state more receptive to the other policy would we term the two policies complementary.[*]

Another possibility is that policy B's adoption is contingent on the previous adoption of policy A, in which case the probability that a state will adopt B is zero until the state adopts A. Brace and Barrilleaux (1995) present a theory of state policy reform designed to explain changes in existing programs in a variety of policy areas. The adoption of many of these policy changes is contingent on a state's previous adoption of the program being reformed. In this case, the units of analysis must exclude each state in all years prior to its adoption of the initial legislation.[26]

A final alternative is that policy A is a substitute for policy B. When A is an *exact* substitute for B, completely precluding the possibility of adopting B, the solution is to exclude from the units of analysis those state-years in which A is present. However, exact policy substitutes are rare; partial substitutes are more likely. In this case, the adoption of A does not preclude the adoption of B; it only reduces its likelihood. For instance, it may be that different "school-choice" plans currently being considered by states are partial substitutes. One possibility is that states create charter schools in an attempt to diminish the prospects that a more "radical" program—such as school vouchers—will be adopted. In this case, a state's previous adoption of a charter school program would lower the probability that the state would establish a voucher program.[27]

A recognition that some policies are substitutes suggests that we should also entertain models that involve more complex dependent variables than the probability that an individual policy will be adopted ($ADOPT$, in Equation 3). Sometimes it might be best to assume that a state makes a choice between multiple alternatives. For example, Berry and Berry (1992) studied the adoption of sales and income taxes separately, assuming for each that states without the tax may choose to adopt or not in any year. But it may more accurately reflect the process of decisionmaking to conceptualize states that have neither tax in any year as having three choices: adopt a sales tax, adopt an income tax, or adopt neither.[28]

Another way in which a conceptualization of a dependent variable can oversimplify reality is by failing to distinguish between what Glick and Hays (1991, p. 836; see also Downs and Mohr 1976) refer to as "superficial" and "deep" adoption. For example, two states might adopt an anti-discrimination program (in housing or the workplace), one of which is largely symbolic, whereas the other involves an extensive commitment of resources through investigatory and enforcement actions. Calling them both anti-discrimination programs and treating them as functionally equivalent may mask variation essential for understanding the innovation process at work.

Some of the variation in the "depth" of a policy adoption may be due to what Glick and Hays (1991; see also Clark 1985) call policy *reinvention*. Implicit in the notion of reinvention is a diffusion model, which justifies the states' emulation of other states' policies by an assumption that states learn from each other. This learning model is more sophisticated than those discussed above, however, because it assumes that states use information about the impacts of a policy in other states not only to assist them in deciding whether to adopt the policy but to help them refine the policy in light of the other states' experiences. In turn, early adopters can reform their policies to take advantage of the experiences of late adopters who passed a modified version of the initial policy.[29]

EARLY APPROACHES TO TESTING INTERNAL DETERMINANTS AND DIFFUSION MODELS

Prior to 1990, the literature on state government innovation was dominated by empirical research testing (1) internal determinants explanations that assume no diffusion occurs, or (2) diffusion models that assume no effects of internal determinants. Berry (1994b) argues that each of the three major models of government innovation—internal determinants, national interaction, and regional diffusion—is associated with a distinct methodology for empirical testing and explores the ability of these techniques to detect the true innovation process underlying policy adoptions. She does this by applying the methodologies to data generated from simulated innovation processes with known characteristics. Berry's results, which we summarize here, paint a very pessimistic picture of the ability of the traditional methodologies to help us understand state government innovation.[30]

Testing Internal Determinants Models

Internal determinants models were traditionally tested with cross-sectional regression (or probit or discriminant) analysis (e.g., Regens 1980; Glick 1981; Canon and Baum 1981; Filer, Moak, and Uze 1988). The dependent variable was a measure of how early a state adopted one or more policies (or whether or not some policy had been adopted by a certain date), whereas the independent variables were political and socioeconomic characteristics of the states.

Several problems with this cross-sectional regression strategy are immediately apparent. The first pertains to the year for observing independent variables. If one measures the independent variables in a year that is later than some states' adoptions, one winds up attempting to account for the behaviors of these states with variables measured after the behavior has occurred. Thus, the only logical alternative is to measure the independent variables in the year that the *first* state adopts (or some earlier year). But when adoptions of the policy are spread over many years, this approach requires an implausible assumption that late-adopting

states' behavior can be explained by the characteristics of those states many years prior. Moreover, the cross-sectional approach to testing an internal determinants model does not permit an assessment of the effects of variables that change substantially over time; each state is a single case in the analysis, having a fixed value for each independent variable. Finally, although the cross-sectional approach is suitable for testing an internal determinants model in which the propensity to adopt is defined as the "earliness of adoption," a cross-sectional model cannot be used if the dependent variable is conceptualized as the probability of adoption in a particular year.

In addition to these limitations, Berry finds that the cross-sectional approach to testing internal determinants models cannot be trusted to discern whether the adoptions of a policy by states are actually generated by internal determinants. She finds, for example, that simulated policy adoptions generated out of a *pure* regional diffusion process—with no impact at all by internal state characteristics—tend to exhibit evidence of internal determinants when a traditional cross-sectional model containing independent variables frequently used in the literature is estimated. The empirical problem is that states near each other tend to have similar values on many political and socioeconomic characteristics of states. Thus, policies that diffuse regionally—say by being passed to bordering states—tend to yield an order of adoption by states that correlates highly with these internal characteristics.

Testing the National Interaction Model

As noted earlier, the national interaction model was traditionally tested using time-series regression to estimate a model in the form of Equation 2. However, Berry finds that this regression approach cannot reliably discern whether a policy's adoptions are the result of national interaction. In particular, when data for simulated policy adoptions generated either (1) by a pure regional diffusion process, or (2) solely as a result of internal determinants are used to estimate Equation 2, the results often support the hypothesis that the policies spread via a national interaction process.

The empirical problem here is that, for any policy for which a graph of the cumulative proportion of states having adopted against time approximates an S-shape similar to Figure 8.1, the regression approach will generate support for the national interaction model. Unfortunately, this S-shape will result from *any* process that produces a period of infrequent adoptions followed by a period of more frequent adoptions (which is inevitably followed by a tapering off in the rate of adoptions as the number of remaining potential adopters declines). Policies that diffuse regionally can produce this adoption pattern. Even policies that are adopted as independent responses to internal state conditions can. Consider, for example, a policy that is most likely to be adopted by states with healthy economies; if a national economic boom cycle lifts the economies of all states,

adoptions by many states may be clumped together to produce a period of frequent adoptions sandwiched by periods with less frequent adoptions.

Testing Regional Diffusion Models

The classic approach to testing regional diffusion models was Walker's (1969; see also Canon and Baum 1981) factor analytic technique. Walker used factor analysis to isolate groupings of states that have similar orders of adoption for eighty-eight policies. He then observed that the groupings coincide with regional clusters of states, which he interpreted as empirical evidence for regional diffusion.

Berry simulates state adoptions of 144 policies, each diffusing regionally based on a pure neighbor model. When the data for these 144 policies are factor analyzed according to Walker's procedure, there is strong support for the regional diffusion proposition. Thus, Berry finds evidence that Walker's methodology correctly identifies neighbor-to-neighbor diffusion when it exists. Our hunch is that the methodology also successfully shows support for the regional diffusion hypothesis when employed with policies that diffuse via fixed-region diffusion. If we are correct, the good news would be that factor analysis reliably detects diffusion when it exists in either of two prototypic forms: neighbor to neighbor, or in fixed regions. But the bad news would be that the technique is not able to distinguish the two similar—but still distinct—types of regional diffusion. Even more disconcerting is that Berry finds that Walker's methodology yields support for the regional diffusion hypothesis when applied to simulated policies known to diffuse via a pure national interaction model with no regional element whatsoever. She also finds evidence that policy adoptions generated purely as a result of internal determinants can indicate the presence of regional diffusion when an alternative single-explanation methodology is used.[31]

TESTING A UNIFIED MODEL OF STATE GOVERNMENT INNOVATION REFLECTING BOTH INTERNAL DETERMINANTS AND DIFFUSION USING EVENT HISTORY ANALYSIS

State politics scholars have developed a number of explanations for the adoptions of new policies by the American states. These include both internal determinants models and a range of diffusion models pointing to the influence of states on one another. Dating back to early path-breaking studies on policy innovation and diffusion by Walker (1969) and Gray (1973a), scholars have recognized that these various models are not mutually exclusive, that a state may adopt a new policy in response to both conditions internal to the state and the actions of other states. Prior to 1990, however, when conducting empirical analysis, these same scholars ignored the nonexclusive nature of these explanations by analyzing them in isolation. Of course, analysts did not purposely misspecify their models; rather, the

arsenal of methods commonly used by social scientists prior to the 1990s did not permit proper specification.

Unfortunately, Berry's (1994b) simulation results show that the discipline's pre-1990 compartmentalized approach to testing the various explanations of government innovation calls into question the empirical evidence about these explanations from this era. Berry finds no evidence of "false negatives," that is, no reason to believe that the early tests for the presence of regional diffusion, national interaction, and the impact of internal determinants fail to discern these processes when they are present. But she does find a disturbing pattern of "false positives"—a tendency for the methodologies to *find* regional diffusion, national interaction, or the effect of internal determinants when no such influence actually exists. In 1990, Berry and Berry developed a model of the adoption of state lotteries taking the form of Equation 3, positing that a state's propensity to adopt a lottery is influenced by forces both internal and external to the states, and they tested it using event history analysis. In the next section, we summarize Berry and Berry's event history analysis model. Then we examine a variety of important refinements that other scholars have introduced as the literature has developed. Since 1990—but especially since the turn of the century—event history analysis has been employed across a wide variety of policy arenas to test a model of state innovation reflecting both internal determinants and interstate diffusion; the Appendix lists some of these studies.[32]

Berry and Berry's (1990) Event History Analysis Model

Event history analysis is an ideal methodology for estimating the coefficients of an innovation model taking the form of Equation 3 (Box-Steffensmeier and Jones 2004). In event history analysis, we conceive of a *risk set*, the states that (at any point in time) are at risk of adopting the policy in question. In a discrete-time model, the period of analysis is divided into a set of discrete time periods, typically years. The dependent variable—the probability that a state in the risk set will adopt during year *t*—is not directly observable. However, we can observe for each state in the risk set whether the state adopts the policy in the given year (typically coded 1) or not (scored 0). For policies that can be adopted by a state only once, states fall out of the risk set after they adopt the policy; thus, for each state that adopts during the period of analysis, the time-series for the dependent variable is a string of zeros followed by a single 1 in the year of adoption. Given data for the states in the risk set over a period of years, the event history model, having a dichotomous observed variable, can be estimated using logit or probit maximum likelihood techniques.[33]

The maximum likelihood estimates of the coefficients for the independent variables in the event history model offer information on the predicted impacts of these variables on the propensity of states in the risk set to adopt the policy. Using procedures common in the analysis of probit and logit results, the coefficient

estimates can, in turn, be used to generate predictions of the probability that a state with any specified combination of values on the independent variables will adopt the policy in a given year. Furthermore, one can estimate the change in the probability of adoption associated with a specified increase in the value of any independent variable when the remaining independent variables are held constant (Tomz, Wittenberg, and King 2003). Such estimated changes in probability yield easily interpretable estimates of the magnitude of the effect of the independent variable.

Berry and Berry (1990) employ event history analysis to test a model of state lottery adoptions. Their model includes internal determinants reflecting the motivation of politicians to adopt a lottery (e.g., the proximity to elections), the obstacles to innovation (e.g., the presence of a sizable population of religious fundamentalists), and the presence of resources for overcoming obstacles (e.g., whether there is unified political party control of government), as well as a variable specifying interstate diffusion—the number of previously adopting neighboring states.

Recent Refinements to Event History Modeling of State Policy Innovation

In event history studies of state policy innovation conducted since 1990, the inclusion among the independent variables of the number (or percentage) of contiguous states that have previously adopted a policy remains the most common specification of diffusion (e.g., Mintrom 1997; Hill 2000; Balla 2001; Allard 2004; Chamberlain and Haider-Markel 2005; Langer and Brace 2005; Allen 2005). But recent event history studies have specified several alternative forms of diffusion. Mooney and Lee (1995), Andrews (2000), and Allen, Pettus, and Haider-Markel (2004) have modeled fixed-region diffusion by defining regions of the country and including a measure of the percentage (or number) of states from a state's region that have previously adopted. Balla (2001) includes a measure of whether a state's insurance commissioner sat on a committee with jurisdiction over the regulation of HMOs in a model predicting the adoption of model legislation proposed by the committee. Allen, Pettus, and Haider-Markel's (2004) study of the adoption of truth-in-sentencing laws specifies vertical influence, with a variable indicating whether the national government had passed 1994 legislation creating financial incentives for states to adopt.

Event history analysis is flexible enough to model other forms of policy diffusion as well. Our earlier suggestion to allow for the greatest influence by i's neighbors, yet some influence by other nearby states (an effect that diminishes with the distance from i), can be operationalized by constructing a dummy variable for each state (1 if a state has adopted the policy, 0 if not) and taking a weighted average of these dummies across states, where the weights are proportional to the distance from state i. Leader-laggard diffusion can be modeled with a dummy variable

indicating whether state i's presumed "leader" has already adopted the policy. Even the thorough mixing of states assumed by the national interaction model can be specified in an event history model; the independent variables would include the percentage of the fifty states that has previously adopted the policy. However, we do not recommend this approach, preferring that scholars develop more realistic formulations of national interaction.

Although the above event history specifications of diffusion reflect a variety of channels of intergovernmental influence, empirical support for these specifications fail to shed light on the reasons one government emulates the actions of another. Two recent papers have sought to overcome this weakness of previous research by designing models to determine whether interstate diffusion is due to policy learning or economic competition. In a study of Indian gaming innovation, Boehmke and Witmer (2004) claim that *learning* should influence the signing by a state of its first Indian gaming compact, but not the subsequent expansion of these compacts. In contrast, *competition* should influence both the initial signing of a compact and ensuing expansion. Boehmke and Witmer use generalized event count regression to estimate models of the number of compacts signed by a state in a year, and they find evidence of both learning and competition. Berry and Baybeck (2005) argue that, if a state adopts a lottery due to policy learning, its response to neighboring states' adoptions will be the same regardless of the location of the state's population within its borders. If, however, the state adopts a lottery to prevent a loss of revenues when its residents cross state borders to play other states' lotteries (i.e., competition), its response to neighboring states' adoptions will vary depending on the distance of its residents from other states with lotteries (and, thus, the ease with which residents can travel to the other states). Berry and Baybeck use geographic information systems (GIS) software to measure the concern of state officials about residents going to other states to play the lottery based on the location of the state's population, and employ this variable in a model of state lottery adoption to assess the presence of economic competition. Their empirical analysis shows that the diffusion of the lottery occurs due to competition rather than policy learning.

Our general model of state innovation—Equation 3—includes a set of variables ($OTHERPOLICIES_{i, t}$) indicating the presence or absence of other policies influencing the likelihood that a state will adopt the new policy, but early applications of event history analysis did not incorporate this aspect of Equation 3. Several recent studies have tested models incorporating the impacts of other policies. Balla's (2001) analysis of the adoption of the HMO Model Act includes a variable indicating whether a state had previously adopted another model act complementary to the HMO legislation. Soule and Earl (2001) test whether the propensity of a state to adopt a hate crime law is influenced by whether the state had adopted other hate crime legislation.

Berry and Berry's (1990, 1992, 1994) initial applications of event history analysis to the study of state policy innovation assumed that the probability of

adoption is constant over time. Yet, it is unlikely that the true policy process occurring in states conforms to this assumption. For instance, the pressure to adopt a new policy—and hence the probability of adoption—can increase gradually over time as coalitions designed to promote the policy are built. Similarly, when intense efforts to secure adoption of a policy fail in a year, the probability of adoption may be reduced the year following as advocates of the policy tire of the battle and decide to marshal their resources for the future. More recent studies have allowed the probability of adoption to vary over time (i.e., have allowed for "duration dependence") using strategies suggested by Beck, Katz, and Tucker (1998) and Buckley and Westerland (2004); they include dummy variables for time periods, or a time counter (or some transformation of time—e.g., the natural logarithm or cubic smoothing splines) among the independent variables.

The vast majority of event history innovation studies have confined their attention to a nonrepeatable event—the adoption of a policy or program that can occur only once—so that, after a state adopts, it is no longer at risk of adoption. Jones and Branton (2005) note that event history analysis is also applicable to modeling state innovation when multiple policies can be adopted, so that states remain at risk for adoption after their first adoption. Berry and Berry (1992) offer an example of this form of repeated-event event history analysis in their study of state tax innovation, in which the observed dependent variable is a dichotomous indicator of whether *any* new tax is adopted in a year. Boehmke and Witmer (2004) specify an innovation model in which multiple events (e.g., a state signing an Indian gaming compact) may occur in the same year and estimate it with generalized event count regression. This alternative to event history analysis is appropriate when it is reasonable to assume that variation in the number of adoptions in a year yields substantively meaningful information about the "extent" or "degree" of adoption.

Volden (2006) recently introduced directed-dyad event history analysis into the study of state policy innovation. In traditional event history analysis, the unit of analysis is the state-year, and each state is included in the dataset during each year it is at risk of adopting the policy. With directed-dyad event history analysis, the unit of analysis is the dyad-year—where a dyad refers to a pair of states—and the dependent variable measures whether one state in the pair emulates the policy of the other state. As a consequence, directed-dyad event history analysis can be enormously valuable in tracing the way a policy diffuses from one state to another.

CONCLUSION

Over the last three decades, social scientists have proposed numerous theories to explain policy adoptions by the American states. These theories include internal determinants explanations and a variety of diffusion models that point to cross-state channels of influence. When cast in isolation, these theories are drastically oversimplified models of policy innovation. Prior to 1990 these models were

tested individually, using techniques prone to result in deceptive conclusions (Berry 1994b). However, the logic of internal determinants models and the various diffusion explanations are not incompatible. In the last decade and a half, scholars have developed models that allow for the simultaneous impacts of internal political, economic, and social characteristics of states as well as multiple channels of regional and national cross-state influence—and then tested these models using event history analysis. (The Appendix lists numerous studies of policy adoptions by American states that have developed and tested such models.)

Furthermore, since the turn of the century, policy scholars have developed similar models to explain policy adoptions by other types of governments. Some have examined subnational governments in the United States and abroad (Lubell et al.'s [2002] study of local watershed partnerships; Hoyman and Weinberg's [2006] research on county governments in North Carolina; Ito's [2001] analysis of Japanese prefects). There have also been numerous applications by comparativists seeking to explain the diffusion of economic liberalization across nation states in Latin America (Meseguer 2004; Jordana and Levi-Faur 2005), western Europe (Gilardi 2005), or the world (Simmons 2000; Simmons and Elkins 2004; Brooks 2005; Way 2005). This recent work illustrates the wide applicability of a model taking the form of Equation 3. In this essay, we propose a framework for analysis to guide the further development and refinement of such models.

Nevertheless, even achieving the greatest imaginable success in the development and testing of innovation models taking the form of Equation 3 would not yield a satisfactory theory of the *overall* policymaking process. This may distinguish our proposed approach to policy innovation and diffusion research from some of the other theoretical approaches discussed in this volume, especially the Advocacy Coalition Framework (ACF) (Sabatier and Jenkins-Smith 2006). By proposing that innovation models take the form of Equation 3, we are recommending that scholars de-emphasize the global concept of innovativeness on a wide range of policies and focus attention on explaining the propensity of states to adopt *specific* policies and programs. Though we believe that explanations for adoptions must recognize the complexity of the policy process (the importance of intergovernmental influences and the key roles played by policy activists inside and outside of government), our focus is inherently more narrow than the ACF's focus on the comprehensive analysis of policy subsystems.

Is our narrow focus an advantage or disadvantage? The debate will only be settled as scholars conduct research about policymaking at varied levels of generality and we see what insights the different approaches yield. But we would note that the complexity faced by students of policymaking is not unique. For instance, there is no widely accepted general theory of the political behavior of individual citizens. It would be difficult to argue that an individual's vote choice in a single election (whether to vote and, if so, for whom) is a discrete event independent from a larger longitudinal process of attitude development in which ideology,

partisan identification, candidate evaluations, and specific issue positions change. Yet this recognition does not prevent scholars from investigating the factors that influence vote choice by doing research on specific individual elections. Similarly, the fact that discrete policy adoption events by states are not independent from a larger longitudinal and intergovernmental process of policymaking should not deter us from studying discrete policy adoptions as a vehicle for understanding the broader process.

When models in the form of Equation 3 are tested, they are capable of answering important questions about the conditions that promote and impede the adoption of new government policies. For example, those interested in the impact of electoral security on the policymaking behavior of public officials learn from Berry and Berry's (1992) analysis of state tax innovation that, when other independent variables are held constant at central values within their distributions, the probability that a state will adopt a gasoline tax is only .03 during a gubernatorial election year but grows to .42 in the year immediately following an election.[34] When accompanied by similar findings regarding the adoption of other types of taxes, this is powerful evidence that elected officials establish their tax policies with an eye toward electoral security. Moreover, the specific empirical finding about probabilities of adoption offers an easily interpretable measure of the *strength* of the effect of politicians' electoral security on state tax policy.

We do recognize that the data requirements for our approach to innovation research are substantial. Testing a model in the form of Equation 3 requires pooled data; independent variables must be observed for each state in each year during the period of analysis. Data collection is especially challenging when the independent variables go beyond aggregate state characteristics to include the nature and behavior of policy entrepreneurs, interest groups, and advocacy coalitions. However, research by Mintrom (1997) shows that the collection costs are not insurmountable. Moreover, the Appendix shows that the hurdle imposed by the need for pooled data has been overcome by many scholars using event history analysis and analyzing dozens of different polices and programs.

When key concepts central to one's theory of government innovation cannot be observed for all states over a period of years, what should be done? Berry's simulation results show clearly that a return to the more traditional research strategies is unacceptable. Although the traditional methodologies (cross-sectional analysis to test internal determinants models, time-series regression to test national interaction models, and factor analysis to test regional diffusion models) are less demanding in their need for data, they yield untrustworthy empirical results. When it is not feasible to measure important variables for as many units as pooled state data analysis requires, the only reasonable alternative is to sacrifice the benefits available from large-sample quantitative research for the gains secured by intensive analysis of a small number of cases via case studies or small-sample comparative designs. The theories need not change—only the approach to empirical testing.

NOTES

1. For a review of the literature on incremental decisionmaking, see Berry (1990).

2. Rogers (1983, chap. 2) discusses numerous examples of research on innovation at the individual level.

3. Walker calls what we term his "internal determinants model" an analysis of the "correlates of innovation."

4. Richard Rose (1993) refers to learning as "lesson-drawing." For a provocative discussion of the role of learning in the diffusion of social policy across Western nations, see Heclo (1974).

5. Whether firms do indeed move in response to various financial incentives and poor people actually move in search of greater welfare benefits are empirical issues. But note that state officials may *perceive* that such behaviors occur and make policy choices for this reason, even if the behaviors do not occur.

6. Since ΔN_t denotes the proportion of new adopters during time period t and $L - N_{t-1}$ is the proportion of potential adopters who have not adopted by the beginning of time period t, bN_{t-1} must represent the proportion of remaining potential adopters that actually adopt in time period t. Alternatively, bN_{t-1} can be viewed as the probability that an individual who has not yet adopted prior to time period t will do so during t. Those familiar with calculus should note that Equation 1 can be cast in continuous terms by defining $N(t)$ as the cumulative number of adopters at time t, defining L as the total number of potential adopters, and specifying (see Mahajan and Peterson 1985) that $dN(t)/dt = bN(t-1) [L - N(t)]$.

7. Since there is no "constant" term in Equation 2, the model predicts that the regression intercept is zero.

8. Gray (1973b) recognizes that the national interaction model's assumption of a thorough mixing of states is unrealistic, but she adopts a position of methodological nominalism (Friedman 1953), arguing that the essential issue is not whether the assumption is realistic but whether it sufficiently approximates reality to be useful for explanation.

9. This "inequality of esteem" across states was observed by Grupp and Richards (1975) in their survey of upper-level state administrators.

10. Volden (2006) posits that successful policies are more likely to diffuse across states than ones that have failed. This proposition relies on logic similar to the leader-laggard model. Presumably, highly esteemed states are perceived as the ones most likely to adopt successful policies.

11. Hierarchical models—based on population rather than economic development—originated in geographers' theories of the diffusion of product and cultural innovations among individuals. The models predicted that such innovations tend to flow from more populated cities to less populated rural areas (Hagerstrand 1967; Blaikie 1978).

12. This reasoning parallels individual-level diffusion models that assume people are most likely to emulate the innovations of persons who share common beliefs, education, and social status (Rogers 1983, pp. 274–275).

13. Implicitly presenting an alternative vertical influence model that reverses the standard direction of influence, Nathan (1989, pp. 16–17) points out that various national New Deal programs were copies of 1930s state-level programs. Rockefeller (1968) and Boeckelman (1992) also use historical evidence to support the claim that the federal government uses states as learning laboratories.

14. Rogers (1983, p. 20) views *knowledge* as the first stage in the "innovation decision-process."

15. Using the traditional terminology of event history analysis, the unit of analysis is the American state *at risk* of adopting.

16. This is also true of diffusion models, which by their very nature focus on the spread of a single policy.

17. For a review of the research on the determinants of individual innovativeness, see Rogers (1983, pp. 251–263).

18. Taxation may be unique in this regard. Adopting a new tax instrument may be closer to routine policymaking than adopting most other major new policies, since most proposals for new policies face the difficult task of finding a spot on a crowded governmental agenda; governments' need for revenue gives the issue of tax policy a permanent place on the agenda.

19. For a review of a variety of factors found to influence state public policy outputs in cross-sectional quantitative studies, see Blomquist's (2006) chapter in this volume.

20. Moreover, the effect of ideology on innovation varies across policies. For example, a high level of liberalism should promote the adoption of new social welfare initiatives but impede the adoption of conservative criminal justice programs inconsistent with liberal ideology.

21. Brooks (2005) advances a similar proposition in a cross-national study of pension privatization. Yet, for some policies, it is actually *poor* fiscal health that contributes to an increase in the likelihood of adoption. Such situations have occurred with state taxes (Berry and Berry 1992) and industrial policies designed to attract new business to a state (Gray and Lowery 1990). For conceptual and operational definitions of "fiscal health," see Reeves (1986), Ladd and Yinger (1989), and Berry and Berry (1990).

22. Similarly, Sapat (2004) hypothesizes that the level of administrative professionalism influences the probability of adoption of environmental policy innovations by state administrative agencies, and Kim and Gerber (2005) propose that the capacity of a state public utility commission—as reflected by the amount of discretion granted to the commission—influences its probability of adopting regulatory reforms.

23. Note also Allen's (2005) study of the impact of non-economically focused interest groups on the adoption of state animal cruelty felony laws, Soule and Earl's (2001) research on the impact of the presence of the Anti-Defamation League in a state on the prospects for adoption of hate crime legislation, and Allard's (2004) analysis of the impact of women's group activities on the adoption of state Mothers' Aid programs in the early 1900s.

24. The character and activities of advocacy coalitions—which are presumed to consist of numerous individuals across the American states—might be conceived as factors

influencing state government innovation that are neither purely "internal" nor "external" to states.

25. Some might argue that it is not feasible to measure accurately the presence or strength of entrepreneurs and advocacy coalitions when doing a fifty-state analysis. But Mintrom (1997) develops such measures for school-choice entrepreneurs in the American states.

26. Mintrom (1997) exhibits similar reasoning by constructing an equation predicting the probability that a state will *consider* a school choice proposal, and then a second equation predicting the probability that a state considering the proposal will actually *adopt* it. In our terminology, Mintrom assumes that policy adoption is contingent on preliminary policy consideration.

27. An alternative proposition is that a charter school program and a school voucher policy are complementary: when a state adopts one type of school choice reform, the political environment is changed, and the state becomes more amenable to other school-choice initiatives. Presumably, empirical analysis could resolve these competing hypotheses.

28. Innovation processes that allow for a choice among three or more policies can be specified using a multinomial logit model (Greene 1993) or a variant of a Cox duration model (Jones and Branton 2005).

29. Models that allow for variation across states and over time, not only in the probability of adoption of a policy but also in the content of the policy, are beyond the bounds of the framework for research reflected in Equation 3.

30. The rest of this section draws extensively from Berry's (1994b) results.

31. The method is an event history model (like those described in the next section of this paper) with a single independent variable: the number of bordering states that have previously adopted.

32. The high level of recent activity in this subfield is reflected in the fact that thirty-three of the forty-two articles listed in the Appendix had not yet been published when we were preparing this paper for the first edition of this volume in 1997.

33. For a more detailed discussion of event history analysis, see Box-Steffensmeier and Jones (2004), Allison (1984), and Buckley and Westerland (2004).

34. The period of analysis is historical: 1919–1929.

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Appendix

Published Studies Using EHA to Test a Model of Innovation Reflecting Both Internal Determinants and Intergovernmental Diffusion

Berry and Berry (1990): lotteries
Berry and Berry (1992): taxes
Alm, McKee, and Skidmore (1993): lotteries
Berry (1994a): strategic planning by state agencies
Berry and Berry (1994): tax rate increases
Caudill et al. (1995): lotteries
Mooney and Lee (1995): abortion regulation reform
Hays and Glick (1997): living will laws
Mintrom (1997): school choice
Grattet, Jenness, and Curry (1998): state hate crime laws
Mintrom and Vergari (1998): school choice
Brace, Hall and Langer (1999): whether state supreme court hears a challenge to a state statute on abortion access or funding
Erekson et al. (1999): lotteries
Pierce and Miller (1999): lotteries
Andrews (2000): electricity sector regulatory reforms
Hill (2000): grandparent visitation rights statutes
Mooney and Lee (2000): death penalty reform
*Simmons (2000): acceptance of International Monetary Fund rules (Article VIII) by nations
Balla (2001): Health Maintenance Organization Model Act
Haider-Markel (2001): bans on same-sex marriage
*Ito (2001): various laws enacted by Japanese prefectural governments relating to the environment, freedom of information, and citizens with disabilities
Mooney (2001): lotteries, tax adoptions
Soule and Earl (2001): hate crime laws
Hill and Klarner (2002): direct democracy reforms
Ka and Teske (2002): electricity deregulation
*Lubell et al. (2002): local watershed partnerships
Satterthwaite (2002): managed care in Medicaid programs
Wong and Shen (2002): charter school legislation
Rosenson (2003): authorization of independent state legislative ethics commissions
Allard (2004): mothers' aid programs
Allen, Pettus, and Haider-Markel (2004): truth-in-sentencing laws

(continues)

(continued)

Boehmke and Witmer (2004): the signing of Indian gaming compacts

Buckley and Westerland (2004): lotteries

Grossback, Nicholson-Crotty, and Peterson (2004): lotteries, academic bankruptcy laws, sentencing guidelines

*Meseguer (2004): privatization in Latin American countries

Nicholson-Crotty (2004): corrections privatization

Sapat (2004): environmental policy innovations by state administrative agencies

*Simmons and Elkins (2004): adoption of economic liberalization policies by International Monetary Fund nations

Allen (2005): animal cruelty felony laws

Berry and Baybeck (2005): lotteries

*Brooks (2005): nations' adoptions of pension privatization

Chamberlain and Haider-Markel (2005): laws against the use of frivolous liens

*Gilardi (2005): creation of independent regulatory agencies in western European nations

Jones and Branton (2005): restrictive abortion laws, obscenity laws

*Jordana and Levi-Faur (2005): creation of regulatory agencies in Latin American nations

Kim and Gerber (2005): telephone regulation reform

Langer and Brace (2005): restrictive abortion laws; death penalty

McLendon, Heller, and Young (2005): higher education reforms

Preuhs (2005): English only laws

*Way (2005): financial system liberalization by nations

Bali and Silver (2006): electoral reform

*Hoyman and Weinberg (2006): prison sitings in rural North Carolina counties

Miller (2006): Medicaid nursing facility reimbursement reform

Volden (2006): Children's Health Insurance Program

Note: Unless otherwise indicated, a study analyzes the adoption of a policy or program by American states via legislation. Studies denoted with an asterisk (*) analyze adoptions of policies by governments other than American states (nations, local or regional governments in the United States, or subnational governments in other nations).

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The Policy Process and Large-N Comparative Studies

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The behavioral revolution brought several changes to American political science. One intended change within the field of comparative politics was to supplement or replace the traditional area-studies approach that featured thick descriptions of governments with multiple-unit studies of political systems and their operations and effects (Mayer 1989, p. 28). A related goal for political science generally was to focus research on public policy, shifting from descriptions of political institutions to analyses of their products.

Beginning in the early 1960s, political scientists pursuing both these aims began the subfield of comparative policy studies. Through the study of political systems and their policy products, these colleagues hoped to advance our understanding of comparative politics by examining the similarities and differences in the operation and effects of systems, and our understanding of the public policy process by finding the commonalities and differences among systems that might offer clues about how policies are generated and changed (Mayer 1989, pp. 43–49). Hopes were highest that such progress would come from studies involving a large number of cases and employing sophisticated data analysis techniques.

More than forty years have passed since the beginning of publications in comparative policy studies, conceived of as a disciplinary subfield. This chapter assesses the contribution of some of the work in that subfield to our understanding of the policy process, particularly, what we have learned about the policy process from large-*N* (twenty cases or more) comparative studies.

The substantial amount of published work in comparative policy studies (see the references at the end of this chapter) includes comparisons of policy outputs at the national, subnational, and local levels. This chapter will consider all of those types of studies, while focusing primarily upon large-*N* comparative studies that have involved the American states. If the subfield of comparative policy