

Public Policy Models in Deep Time

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ABSTRACT

Influential policy models developed over the past half-century tend to incorporate “time” implicitly, rather than as an explicit factor that affects policy processes. As a result, many these models do not obviously accommodate political and policy questions extending across a generation or more. Policy models should distinguish policy time, the natural timeline of a policy problem, from political time, the timeline of public and institutional attention paid to a particular issue. This article addresses the ability of current policy models to account for this important distinction and introduces a framework for consideration of political time. Expressly accounting for short-term and long-term political time could reveal opportunities for altering the design and implementation of policies with deep-time consequences.

KEY WORDS: policy models, intergenerational policy, time horizons, political time, policy time

INTRODUCTION

Scholars have addressed various effects of time in politics and policy, particularly in legislative behavior, comparative political institutions, and presidential politics (Adler & Wilkerson, 2012; Bonfiglioli & Gancia 2013; Box-Steffensmeier and Jones, 1997; Goetz & Meyer-Sahling, 2009; Jacobs, 2011; Shugart, 1995). But most policy theories and models have not been designed for relevance to policy processes that extend beyond the next budgetary or political cycle. Our focus in this article is whether influential models of the policy process explicitly or implicitly accommodate or exclude behaviors and processes that affect long-term policy issues.

Suggesting that each theory offers “a single lens of the policy process,” Schlager and Weible ask “could a collection of theories offer a collective lens that bound consciously or unconsciously the question asked, the concepts studied, the measurements used, and the hypotheses tested?” (2013, p. 389). We do not propose to synthesize or reconcile the time elements in policy process theories and models; it is not clear whether, or how, this should be attempted (Cairney, 2013) and it is beyond the scope of this article, as is a review of studies that consider long-term policies. Our objective is not to criticize these models. They have, individually and collectively, helped us greatly with our understanding of complex political and policy processes. Rather, we seek to unfold some of their provisions and use them to learn more about some of the particular challenges in making policy decisions that span many years.

Long-term policy making requires the consideration of issues in the present that have consequences for inhabitants of future years, either because current issues and decisions will extend into upcoming decades or because new policy challenges can be reasonably anticipated. Two difficulties are quickly identified. First, future interests usually lack the ability to take political action because they may not have been born yet or identified themselves with those interests, they have little incentive to organize and articulate their preferences until their problems are realized, and they have no active constituency to push a problem onto political agendas, particularly when the need for resources and institutional attention have not reached the threshold for political action.

Second, confidence about the future usually decreases as the time horizon increases, even when future conditions are plausible or even predictable, such as when historical trends have continued over many decades with little deviation (e.g., the overall poverty rate in the U.S. is basically unchanged since 1968). Future needs can be dismissed as speculative or unrealistic, and technological optimism or faith in substitutability can be invoked as an alternative to political choices. The dilemma of action in the face of uncertainty is reflected in the “precautionary principle,” which is embraced in many nations but remains controversial in the US.

Whether these characteristics render long-term policy-making difficult or nearly impossible, decision makers do act on issues that extend beyond the next few years; after all, people today benefit from actions taken sometimes decades before. But although researchers have studied the challenges of long-term policy making (Jacobs, 2011; Sprinz, 2012) usually these are not linked to standard policy process models. After introducing a framework for thinking about time spans and their political and policy consequences, we examine many of the major policy models and frameworks to determine whether they can include political and policy durations of more than a few years. Because most policy models assume limited time spans, they

often fail to capture the explicit effect considerations of time can have on recommended policy outcomes. We conclude with a discussion of some distinctions between short-term and long-term political time spans.

POLICY AND POLITICAL TIME

Time Spans

As we will see, time spans and long-term temporal effects are not explicit variables in most policy models but sometimes we can infer how they might explain policy making over many years. But first we need clear descriptors of time spans. We divide the concept of time into three categories (Table 1).

-----Table 1 about here-----

First, “near time” captures the budgetary and electoral cycles that are major drivers of most active political and policy initiatives, typically less than four years. For many purposes near time is a reasonable time horizon: many problems occur and require action within weeks and months, and political, media, and budget behaviors occur within the ebb and flow of one-, two-, and four-year budget and electoral phases. In this, the political arena is not unique: near time coincides with many time horizons in individuals' lives—most purchases, tax returns, vacation planning, and health issues. The time horizons of businesses rarely extend beyond this duration. Near time is the realm of political campaigning and product marketing, of experiential gratification and most personal concerns.

“Medium time” extends from about four to twenty years and is sometimes used in strategic policy planning, particularly regarding infrastructure or urban and regional planning, and more rarely in general political discussions. What happens in policy after the next presidential election is expected to be mostly a continuation of current events. Issues in medium time often are assumed to be extrapolations of familiar problems—not “current” events but imaginable, albeit with increasing forecasting errors. But in this time range confidence declines that current policies will still be appropriate, that societal preferences will be stable, that resource needs and supplies will remain constant, or that external events such as wars and disasters won't happen. Individuals' lives include medium time phases such as birth to school, elementary school, high school, college, college to marriage, marriage to family, and retirement, but businesses rarely have the stability in products and markets to plan in medium time unless they have well-established product lines and marginal innovation and competition.

“Deep time” encompasses the next twenty to a hundred or more years, and into the much more distant future for issues such as nuclear waste storage. It often is only a shadow hanging over present-focused policies, and deep time appears in individuals' lives only rarely (e.g., insurance, retirement planning, and mortgages) and even more rarely beyond a single lifespan. To some, it is simply “the next generation.”¹ The future to which people feel emotionally attached extends between two and four generations; people often regard long-term geologic events through a compressed time scale of under 10,000 years, although studies of time perception related to nuclear waste refer to “deep time” as geological durations of millions of years (Drottz-Sjöberg, 2010). To college students “short-term” is three months or less, while “long-term” means ten years or more (Bluedorn, 2002). (In this article we use “deep time” to

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encompass both medium and deep time but note that for many policy issues the distinction should be preserved.) "A week in politics is a lifetime," but our understanding of a lifetime in politics is weak.

Many current policy issues begin in near time but are compounded into deep time. For example, pre-kindergarten programs today will have accumulating impacts across decades in K-12 education and jobs, and today's geopolitical issues usually have roots in decisions made decades ago. Yet deep time often evokes science fiction utopias or dystopias – unimaginable computing power, environmental horrors, space travel, or other (often exaggerated) possibilities—enabling a denial that we have the tools, knowledge, or duty to influence such an unimaginable world. Social Security and Medicare, some national security scenarios, and some environmental issues are notable exceptions to this “fear of the future.”

Different conceptions of time can affect (and be affected by) worldviews and durational horizons used to weigh the present and future costs and benefits of a policy (Douglas & Wildavsky, 1982; Rayner, 1999). A near time horizon for policy outcomes could lead to a different set of political and policy alternatives than a deep time horizon and could spawn different political coalitions and processes. Disagreements or differing assumptions about time horizons can be at the root of seemingly intractable political disputes, but they also could facilitate agreements as near-term and long-term effects mobilize different sets of stakeholders. Of course, policy time horizons can both affect and be defined by budgets, legislative cycles, electoral politics, planning capabilities, and policy priorities.²

Policy Time and Political Time

Policy time is the time during which a policy issue is operative, based on empirical realities of a real world problem or opportunity that can be addressed by a policy initiative. Policy time can be near, medium, or deep time, depending upon how long a policy problem exists in the world prior to resolution (if it can be resolved at all). The longevity of a policy issue can be related to natural phenomena (e.g., geologic events), gradual human effects (atmospheric carbon buildup, antibiotic resistance), human behavior (increasing obesity), or the use or consumption of resources in the short term for the purpose or having the effect of “intertemporal transfer” such as scientific research or national debt (Jacobs, 2011; deLeon, 1978; Patashnik & Zelizer, 2013). Policy time can be clearly defined, as for an emergency solid waste removal program after a flood, or nuclear waste policy that must extend for thousands of years because of the laws of physics irrespective of the actions or inactions of Congress. Similarly, changing demographics will alter the social policy landscape regardless of political activity as the American elderly population continues to increase over the next few decades. But sometimes the length of policy time often is not well-defined. It can vary for a single issue when a defined “policy problem” that responds to a “problem situation” is restructured (Dunn, 2012), such as when a short-term policy action in response to a flood also instigates natural hazard preparedness strategies or land use planning.

Political time is the period during which political institutions attend to a policy issue, from when it is identified as a matter requiring attention until the issue is no longer active in the political process. The beginning and end points of political time may be unclear as issues germinate quietly, sprout quickly in response to political or exogenous forces, fall dormant until information or coalitions are gathered, and remain quietly in play throughout a long period of implementation interrupted by occasional bursts of oversight. Further, the scope of political time

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can differ for legislators, federal agencies, state and local officials, the media, and the public, depending on institutional factors such as agendas, organizational resources, stakeholder patience, budgetary issues, internal decision making procedures, strategic advantage, or actors within other institutions. For example, the White House may choose not to pursue certain initiatives due to limited resources, congressional agendas, or legal ambiguities. Also, an agency's political time is likely to be determined by legislation that might not align with the timing of organizational needs; the 1993 Government Performance and Results Act (GPRA) required federal agencies to prepare strategic plans with time horizons of at least five years (to be updated every three years), but OMB's Program Assessment Rating Tool necessarily focused on annual budget submissions, so "GPRA plans were organized at too high a level to be meaningful for program-level budget decision making" (GAO, 2004, p. 6).

Our understanding of policy time and political time differs somewhat from Jacobs' distinction between "the intertemporal structure of a policy" and "the time horizons of those who enact it." The latter is "the length of time over which [an actor] considers the potential consequences of her choices" (Jacobs, 2011, p. 22), while political time to us is the entire period during which political institutions are engaged with a specific issue. Jacobs treats political time as a time horizon choice by an individual policymaker, but with our interest in policy process models we see it as an institutional phenomenon, alluding to the activity span of the political process. Likewise, we separate policy and political time, while Sprinz intertwined them by defining a long-term problem as existing "only if the mechanism creating it leads to substantial adverse effects for at least a human generation of 25 years or remedies take an equally substantial amount of time" (2014, p. 3).

Table 1 illustrates policy time and political time on near, medium, and deep time scales. As many of the policy examples suggest, different conceptions of political time can have large impacts on policy outcomes as political perspectives change.

Political Time versus Policy Time

Policy time is distinct but not always independent from political time. They may be in sync, such as when politics favor near time policy solutions in response to a natural disaster. Political time can be strongly unaligned with policy time, however, particularly when policy time can be extended far into the future, allowing actors in near-term political time to postpone decisions. "Policy inconsistency" can result when current optimal choices conflict with optimal choices in the future, particularly when policies lack credibility because of a lack of a commitment mechanism in political near-time for unaltered deep-time policy actions (Kydlund & Prescott, 1977). Political pressure "expands as a continuous function" while policy undertakings "enlarge as a step function," and so "it is unlikely for them ever to be appropriately matched" (Schulman, 1975, p. 1356). The policy process "usually involves time spans of a decade or more, as that is the minimum duration of most policy cycles, from emergence of a problem through sufficient experience with implementation to render a reasonably fair evaluation of a program's impact" (Sabatier, 2007, p. 3).

Political time also can be extended when short-term decisions are postponed for political reasons. For instance, the "zone of electoral safety" for government actors (Jacobs, 2011, p. 44; see also Frederickson, 1994) may postpone policy decisions to forestall the cumulative effects of rising medical costs or climate change. Sunset provisions recognize that policy time for an issue might be lengthy but that political issues or uncertainties require re-evaluation and policy

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renewal. Thomas Jefferson recommended unsuccessfully that all laws and constitutions expire every nineteen years, but “temporary legislation,” ranging from a few weeks to ten years or more, now comprises about forty percent of all enacted laws. They can engender more political agreement largely because they recognize complexity and require learning and adjustment, such as the ten-year 1994 Assault Weapons Ban (Adler & Wilkerson, 2012) and the 1997 Kyoto Protocol that set national greenhouse gas emission targets only through 2012 with the expectation of a series of five-year follow-on agreements.

Future political options also matter. Policy makers facing near-time political processes might try to limit the options available to their successors (North & Weingast, 1989) but rarely do (Adler & Wilkerson, 2012), while deep time policy issues such as climate change are likely to be addressed in short increments of political time because of a reluctance or inability to bind future decision makers to imperfect policies. Current politics also matter; for example, the US has debated nuclear waste disposal policy for more than a half-century but political forces (for example, President Obama’s courting of the Nevada vote in 2008 by postponing a decision on the Yucca Mountain site) delayed action.

Policy time and political time also can conflict when program termination is considered. In some cases the underlying cause of a policy action is resolved or a policy problem is solved but policies also can be truncated by mostly political factors; for example, after six lunar landings and with three more planned the Apollo program was terminated as policymakers and the public declared the program to be a success (i.e., no longer interesting). In fact, “termination” is often a policy adjustment or correction leading to further political action, or vice versa (deLeon, 1978).

Institutions can develop complex mechanisms to coordinate political time and policy time. For example, the president provides a six-year Future Years Defense Plan to Congress every two years as a part of his budget submission, examining short-term threats (generally one to two years, such as conventional terrorism), medium-term problems (two to five years, but sometimes up to ten years, such as proliferation of nuclear weapons), and more distant problems (such as a globalized Chinese navy). The White House produces an *annual* national security strategy report, a *biennial* National Military Strategy review, and a Quadrennial Defense Review Report that looks *twenty* years into the future. However, security strategies tend to “describe security challenges and opportunities in the present tense, rather than specifically addressing how those security conditions might be expected to evolve over time” (Dale, 2008, p. 21).

In both policy and political decisions, time plays an essential role. While elected officials might vote to provide benefits beyond near time, it is unrealistic to expect them to ignore current incentives to benefit a distant and uncertain future that can be ignored at little peril. Policy makers can offer incentives, information, and constraints to change individual behavior for a collective current benefit, but the politics of adopting medium or deep time policies present additional challenges. Do the major policy process models and frameworks encompass these problems?

TIME IN EXISTING POLICY MODELS

Public policy textbooks usually include a survey of policy models and frameworks, with diagrams that include arrows indicating the flow of time, events, and causality. Both policy time and political time may be implicit in these models, but time itself is rarely a specific subject of concern—especially the peculiar implications of deep time policy and politics.³ Other than the

fact that some things happen before other things, and that sometimes we can assert that B happened at time t_1 because A happened at t_0 , time tends to be simply part of the background of policy models, much like the white paper or screen of this page is the setting for dark letters or pixels. But despite the relevance of time in the field of politics, until recently “neither political science in general nor studies of democracy in particular have taken explicit and systematic notice of it” (Schedler & Santiso, 1998, p. 5). Jacobs observed that most studies of policymaking either ignore the timing of policy consequences, or acknowledge the political relevance of the long term but treat it as a constant and thus ignore “*under what conditions* influential political actors are willing to engage in *tradeoffs* over time” (Jacobs, 2011, p. 17; emphasis in original).

Policy theories mostly focus on observable or imputable phenomena such as active constituencies and stakeholders, identifiable effects, salience for policy agendas, and records of institutional action. As a result, many policy studies consider the impact of only near time events on electoral competition, regime stability, policy innovation and diffusion, and economic liberalization, but these are dynamic processes that occur over years or decades. Scholars have written about time in the context of temporal lags, budgetary and financial planning, the effectiveness of lobbying, business-government relations, and particularly sustainability and environmental policy. However, understanding a policy aimed across forty years requires a different approach than a one-year policy repeated forty times. In this section we examine the extent to which prominent policy theories and frameworks incorporate medium and deep time policy perspectives.

Systems Model

One of the earliest and most influential policy process models was David Easton’s systems model, consisting of inputs, outputs, and feedback loops that carry the results of outputs to become inputs for new iterations of the policy cycle. The model focused attention beyond static institutions of policy-making and toward a dynamic process, which is likely to involve more than a single institution. The special challenges of long-term policies were not Easton’s concern, but his framework has implications for deep time politics and policy making:

If we should concern ourselves with the input-output exchange at a particular point in time, ignoring its long-term implications for the life of the system, we would have overlooked the distinctive problem of systems analysis as Easton conceives it. The fundamental goal of the political system is to insure its own survival or persistence. The input-output exchange must therefore be considered in light of the effort of the political system to persist over time (Miller, 1971, p. 200).⁴

Easton recognized that political “stability is only a special example of change, not a generically different one,” and much of his work was intended to explain how disturbances from within and outside a political system are converted into demands and supports that perturb the “goal-setting, self-transforming, and creatively adaptive system” (Easton, 1965a, p. 132).

Threats to the persistence of the system include excessive near time demands or a shortage of supportive inputs, or a decline in the perceived legitimacy of the political system (“diffuse support”). The system should be encouraged toward stability by feedback that provides information to decision makers about the satisfaction of the society’s members, but this is likely to flow through “gatekeepers” who select, modify, and articulate political demands and supports. Much depends on those feedback loops and those who affect them (Easton, 1965b). But for deep time issues, long-term beneficiaries can generate no feedback, and the gatekeepers who might

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espouse their interests have strong competition from near time voices and pressures. The best hope for policy issues in deep time in Easton's framework is the enlightened perception of political leaders that the nation's long-term stability and legitimacy require at least some inclusion of the interests of future persons in near political time.

Stages Model

The *stages or policy processes model* characterizes policy making in terms of problem identification and agenda setting, the formulation of policy alternatives, the selection and adoption of a preferred policy alternative, implementation, and policy evaluation (Jones, 1970). This model does not purport to describe precisely how policies are made, emphasizing that these stages overlap and cycle backward. Sabatier and Jenkins-Smith (1993) and others prefer to call it the "stages heuristic" rather than a theoretical model. But here again, the function of time is fundamental because these stages—as heuristic categories if not actual policy events—can be thought of as temporally distinct if not unidirectional.

The policy process model implies that the stages happen during a finite time period: years, perhaps, but not stretched over a lifetime or more. The stages are stages *of something* precisely because they are related and connected. The recursiveness of the framework—the idea of overlap, where re-formulation can happen during implementation, for example—means that the stages are connected even if they aren't linear. And "the process" is basically a narrative of a sequence or set of events that begins with problem identification and logically ends with evaluation. Our concern is whether the temporality inherent in the stages model is implicitly near-term.

Nothing in the stages model alludes specifically to time horizons. Some policies move across the stages within a single year or electoral cycle. Problem identification, adoption, and implementation all may happen in near time; on the other hand, the struggle over racial equality has required centuries, with multiple entries and exits from the national policy agenda, many failed attempts at policy formulation and adoption, and a wide array of implementation efforts and evaluations over deep time.

Some parts of the stages model are less compatible with long-term policy issues than others, happening at a pace determined by the resources of legislators and bureaucrats. Adoption generally is rather short-term because it depends on limited institutional attention, while implementation is more long-term, often going through its own stages (immediate response, short-term development of procedures, and long-term business-as-usual, for example). "Implementation is evolution. Since it takes place in a world we never made, we are usually right in the middle of the process" (Majone & Wildavsky, 1984).

Getting long-term issues, or consideration of deep time impacts of current issues, onto institutional agendas is difficult. Group promotion is crucial to agenda formation but is challenging for medium or deep time policies as key constituencies for long-term policy might not exist yet. Groups have an interest in maintaining the "legitimate jurisdiction of existing governmental authority" (Cobb & Elder, 1983, p. 85), and considering the interests of yet-unborn citizens with speculative interests are unlikely to provide political benefits. Nevertheless, policy entrepreneurs and events sometimes allow a concern to be reframed as a "glide path" issue by showing that incremental and relatively inexpensive investments can have accumulating long-term benefits.

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Furthermore, policy analysis and evaluation can be somewhat insulated from current political forces and can focus attention on medium- and deep time problems and solutions in ways that are difficult for electoral institutions. They can extend over many years and straddle political cycles and even cultural changes. Civil servants, nonpolitical appointees, academics, and think tanks are the most likely sources of long-term policy analysis.

Lowi Typologies

Analyzing interest group politics, Lowi argued that “policy determines politics.” Hence people should behave differently when considering deep term policy rather than near time policy. Lowi’s analysis (later expanded into a typology by Ripley and Franklin) offers some insights for temporal policy (Lowi, 1964; Ripley & Franklin, 1991). Distributive policies, with clear beneficiaries but ambiguous payers, are popular with elected officials because they engender relatively little political conflict while allowing credit-claiming. Long-term policies have ambiguous beneficiaries, and claiming credit for their improved welfare would have little electoral payoff. Redistributive policies create more controversy, with discernable costs to some and clear benefits to others. Policy “investments,” unlike typical distributive policies, could “provide those who bear costs today with *a stream of even greater benefits over the long run,*” creating positive-sum outcomes, but this depends on the credibility of promises about long-term benefits, making the politics of distributive politics more uncertain for non-near time issues (Jacobs, 2011, p. 11, emphasis in the original.) On the other hand, regulatory approaches often are intended to protect large classes of people (individuals in the future) from the harmful effects of current individuals and may be better suited for deep time policies.

Lowi’s perspective was intended to be predictive: the type of policy would allow statements about the mobilization of interests and the amount of consensus or conflict that ensues. However, critics pointed out that Lowi’s typology did not offer mutually exclusive categories and doubts were raised about the falsifiability of the framework because of the subjectiveness of the categorizations (Greenberg et al., 1977; Spitzer, 1989). Wilson (1972) added to the policy typology by introducing entrepreneurial politics, which recognizes competition between groups with highly unbalanced organizational abilities. Oshitani (2006) used this approach to explain difficulties in defending the environmental interests of future generations because their benefits are diffused and speculative while current costs are concentrated on energy-intensive industries that are much more easily mobilized.

Lowi also discussed the emergence of “interest group liberalism,” in which government responds to constantly growing interest-group claims, finding that the proliferation of pluralist principles allows governments to expand but not to plan. “Planning requires the authoritative use of authority. Planning requires law, choice, priorities, moralities. Liberalism replaces planning with bargaining” (Lowi, 1979, p. 67). In this view, deep-time beneficiaries have no way to compete in the pluralistic bargaining arena dominated by current interest groups that can leverage near time concerns in political time while deep time concerns in policy time fall to the wayside.

Incremental Policy Making

Lindblom (1959) contested the assumption that goals are set first, then policies are shaped to maximize their attainment. Instead, policy makers tend to choose policies and goals at

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the same time; comparisons among alternatives are limited and simplified rather than comprehensive. With its emphasis on considering the goals and values of “present interest” and disregarding those not “immediately relevant,” the incremental framework intends to explain the reduction of the number of policy alternatives, largely based on familiarity from past experience, and to identify choices that might allow predictions of consequences as small policy steps are extended into the future.

While this approach may seem at odds with deep time policies, Lindblom notes that values, objectives, and public preferences regarding *current* policy choices usually are not known either—in many cases because they simply don’t exist, and policy makers who substitute their personal values are likely to find that “the only practicable way to disclose one’s relevant marginal values even to oneself is to describe the policy one chooses to achieve them” – that is, “it is not irrational for an administrator to defend a policy as good without being able to specify what it is good for” (Lindblom, 1959, p. 84). For long-term policies the ambiguity of precise outcomes is quite likely, so “agreement on policy” as a test of policy correctness offers a practical approach. And if decision-making procedures and societal values are relatively stable, a present-oriented policy might incrementally adjust to accommodate changes effectively over long periods of time.

Another insight into deep time policy making derives from Lindblom’s arguments about how comprehensiveness might be achieved. If agencies have incentives to focus on incremental short-term changes, how will the bigger picture emerge? One answer is pluralism: “Almost every interest has a watchdog,” so mutual adjustments emerge even when there is no direct communication, in ways that can be superior to explicit bargaining (because a limited number of interests can sit at the negotiation table while others will be excluded). The key for long-term policy is for future interests to have such a “watchdog” (Lindblom, 1959, p. 85).

Lindblom also directly addressed the problem of long-term policy making: “It is clear that important values must be omitted in considering policy, and sometimes the only way long-run objectives can be given adequate attention is through the neglect of short-run considerations. But the values omitted can be either long-run or short-run” (Lindblom, 1959, p. 86). In other words, the processes of incremental policy making offer multiple opportunities for the interests of non-current interests to be either heard or ignored—just as is the case for current interests.

Some policy issues do not fit well into the Lindblom framework, especially those that require comprehensive and indivisible decisions. These policies are likely to have “critical mass” points involving significant political and resource commitments yet public support might be fickle, and small steps in policy time might lead political leaders to declare victory in political time and move on. Some policies are all-or-nothing: it makes no sense to go halfway to the Moon or to build a highway halfway to a city, and urban redevelopment often involves significant early efforts to convince others to invest in reliably long-lived policy initiatives. Schulman points out that most policy models describe “deviance-minimizing, self-stabilizing, and equilibrating operations” while nonincremental policy “entails a high-level, unstable process of deviance amplification” (Schulman, 1975, p. 1370). But although the Apollo program had the nondivisible objective of a lunar landing, its success rested on a huge number of small, non-directed incremental science and engineering research projects extending back for a half-century or more.

Multiple Streams Model

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The multiple streams model examines patterns of problems, politics, and policies that are likely to result in an issue reaching the action agenda when they coincide and reinforce each other at a particular time: a “window of opportunity” (Kingdon, 1984). The phenomenon of time is relevant insofar as it relates these streams to each other, but the multiple streams model does not focus specifically on what happens to policies *over* time. The examples used by Kingdon and the applications of his model by others typically involve episodes lasting at most a few years. When focusing events draw attention to deep time problems, such as accidents that point to aging infrastructure, *timing* may be important but *time* itself is not considered as a variable of interest.

Kingdon focused on near-time political inputs via elections and polls more than non-institutional inputs such as broad movements or ideas that might occur over longer periods. The streams model has been challenged because the streams are less independent than suggested; a stronger linkage between the political and policy streams was an impetus for the advocacy coalition framework of Sabatier and Jenkins-Smith. And several authors have questioned Kingdon’s underdeveloped concept of policy entrepreneurs (Zahariadis, 2003), who are crucial for promoting intergenerational issues.

Deep time appears indirectly in Kingdon’s observation that civil servants may not have much influence over policy agendas, but one finds “staff people located in such places as planning and evaluation or legislation offices, who concentrate on legislative proposals, studies of future problems, and thinking about the directions public policy might take” (1984, p. 31). This is due largely to their longevity; if civil servants are unable to convince political appointees they can wait them out, especially when agencies have explicitly long-term missions such as the US Forest Service (Lowry, 1988). But few civil servants can wait for a generation or more. Similarly, Kingdon described the role of policy entrepreneurs who are willing “to invest their resources – time, energy, reputation, and sometimes money – in the hope of a future return” (1984, p. 122). That return might be in the form of personal interests or promoting their values by shaping public policy, possibly in medium or deep time issues.

The streams model unveiled some time-relevant counterintuitive features of policy making. Kingdon quotes a policy maker discussing the Washington Metro system’s huge budget: “For a politician, the costs are the benefits” (1984, p. 137). For long-range public projects, such an adept political calculus is likely to be a great asset. Cost-benefit analysis and discounting are not easily applied to medium and deep time policy making, and in this context we should take note that in politics, waste is not necessarily a bad thing and costs are not always to be avoided.

Advocacy Coalition Framework

The *advocacy coalition framework* (ACF) describes how groups argue for different policy outcomes, noting that over time (perhaps a decade or more) value conflicts might be mediated or resolved, often in response to shocks to existing arrangements (Sabatier & Jenkins-Smith, 1993). The ACF recognizes that changes in scientific and technical knowledge can occur over years or decades and have a powerful effect on policy making. It identifies a set of parameters that are “relatively stable” over time (as much as a century or more): basic attributes of the problem area, the basic distribution of natural resources, fundamental socio-cultural values and social structure, and basic constitutional structure—reminding us of the importance of different time spans for different parts of the policy process. But it is not always clear which values are indeed fundamental; dramatic changes in attitudes about supposedly deeply-seated values regarding gay marriage and the legalization of marijuana occurred with surprising speed.

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The ACF explicitly recommends a time perspective of a decade or more to understand policy change. As we have discussed, policy change over decades is likely to involve large numbers of undefined and evolving institutions and political interests. According to the ACF, policies occur in an environment rich with ideas, events, constraints, social and technological change, and political strategies. From this perspective, time is considered largely in terms of the stability of political coalitions, with some events and parameters being relatively stable while others are dynamic.

“Identifying the appropriate scope of a [policy] subsystem is one of the most important aspects of an ACF research project. The fundamental rule should be: ‘Focus on the substantive and geographic scope of the institutions that structure interaction’” (Sabatier & Weible, 2007, p. 193). Perhaps the idea of temporal scope is implicit in the idea of “substantive” scope, but the ACF would be richer if it directly addressed the possible conflicts between political time and policy time. After all, the ACF was designed in part to take into account longer-term time perspectives than other theories and frameworks. Albright (2011) has used the ACF to address flood policy changes in Hungary, extending her analysis of the role of belief systems back to the mid-eighteenth century. Leifeld (2013) used the ACF to explain policy change in the German pension system with a time horizon reaching to 2035, explaining shifts in advocacy coalitions regarding long-range policies based on the de-polarization of discourse and coalitions facilitated by governmental “brokers” that bridge issues and tensions over many years.

The ACF offers valuable tools and concepts for understanding deep time policy. For example, it distinguishes between very stable “deep core” beliefs that change very slowly, if at all, and “policy core” or “secondary beliefs” that are more responsive to subsystem dynamics and empirical information. Policies embody belief systems, so the malleability of those systems should tell us how quickly we should expect policies to change.

Social Construction

Adapted by Schneider and Ingram (2005) from Mannheim’s work in the 1930’s, the politics of social construction posits that “public policymakers typically socially construct target populations in positive and negative terms and distribute benefits and burdens so as to reflect and perpetuate these constructions” (Ingram, Schneider, & DeLeon, 2007, p. 93; Mannheim, 1936). Social constructions become the rarely-questioned “normal” ways of perceiving policy problems, the affected groups, and the values upon which policies are based. This model asks why some groups persistently win and others lose, noting that group images can be manipulated in the political process where they are embodied in rules, interpretations, and narratives that are carried into the future and can affect political participation, orientations toward government, and the designation of some groups as “deserving” while others are not (Shanahan et al., 2011). Schneider and Ingram (2005) offered a matrix of political power and social construction: the *advantaged* (e.g., homeowners, scientists, the military) have high power and positive social constructions, *dependents* (the poor, children) have positive constructions but low power, *contenders* (big business, labor, environmentalists) have high power and negative social constructions, and *deviants* (criminals, welfare mothers) have low power and negative constructions.

These placements are not precise. For example, Schneider and Ingram describe the poor and the homeless as having a positive social construction, while welfare mothers are somewhat negative. The placements are also mobile: gays and lesbians were in the “deviants” category but

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in recent years these groups have developed a positive social construction for a growing proportion of the population.

Future generations mostly would be in the low power but positive social construction quadrant along with other “dependents.” Those in this segment can claim political resources because they are viewed as deserving (our “grandchildren”) and in need of nurturing. Yet although dependents may be viewed as “good” people, their policy benefits are likely to be largely rhetorical, fragile, and means-tested. Any benefits directed toward the “dependent” future are likely to be subjected to “counter-mobilization, resistance in implementation, legal challenges, and other defenses” (Schneider & Ingram, 2005) that posterity cannot fight against except through contemporary agents. Larsen has examined the factors that affect public support for welfare policies, with “deservingness” shaped largely by five criteria (control, need, identity, attitude, and reciprocity). These can relate strongly to deep time policy insofar as similar issues arise about where to draw the line about “need,” whether future people are seen as “others,” and whether their anticipated gratitude can substitute for reciprocity (Larsen, 2005; Rothstein, 1998).

The social construction model notes that “policymakers, especially elected politicians, respond to, perpetuate, and help create social constructions of target groups in anticipation of public approval or approbation.” “Moral entrepreneurs” may try to shift groups into the deviant and therefore undeserving category (Schneider, Ingram, & DeLeon, 2007, pp. 106-108). This approach could be used to show how future generations can be imaged as appropriate beneficiaries of significant, sustained political support.

Institutional Analysis and Development Framework

The institutional analysis and development (IAD) framework (Ostrom, 1986; Ostrom, 1990; Poteete, Janssen, & Ostrom, 2010; McGinnis, 2011) has evolved into a complex set of concepts, variables, and relationships that are intended to help understand how institutions behave and decide. Institutions are defined as the rules, norms, and strategies that humans use to organize repeated interactions and can be formal or informal. Social choices and decisions are made in an “action arena” in which behavior is governed by institutions and rules, by the characteristics of the relevant community, and by attributes of the external environment (e.g., events, resources). The key variables in an action situation are the participants and their positions, outcomes (payoffs, costs, benefits) of their decisions, linkages between actions and outcomes, the flow of information, and the power of the participants.

The IAD’s focus on rules highlights the importance of stability, trust, and the monitoring and enforcement of rules and decisions, all of which are particularly relevant for non-near time policies. Consider the relevance of rules for rights (e.g., current property rights or the rights of future generations); the formal and tacit rules that connect values, decisions, and outcomes over time; enforcement mechanisms (the stability of laws over time and the use of laws to constrain future decisions); and the existence of sanctions to punish those who violate agreements that must be policed over many years and in changing political and policy circumstances. Ostrom (1986) described six rules that shape how institutions decide, including boundary rules (which actors participate in a choice), rules governing the sharing of information, scope rules that determine the range of outcomes to be considered, and payoff rules that specify the distribution of benefits and costs. These rules could be employed to address challenges in deep time policy decision-making—e.g., rules governing whether those with future interests will be represented,

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whether only near time benefits, costs, and outcomes will be included, and how values, interests, and choices will be conveyed over time.

The IAD literature includes concepts of polycentricity, recognizing that decisions could be multi-level, multi-type, multi-sectoral, or multi-functional. To this we would add *multi-temporal*, insofar as decisions can span different time periods and thereby affect the jurisdictions, organizations, and institutional rules and behaviors; this has been the focus of the “ecology of games” approach, building on the IAD and other frameworks with a complex adaptive systems perspective that recognizes the importance of time, but also focuses on spatially limited issues and jurisdictions (Lubell, 2013). Feedback and adaptive learning can stretch across years or decades, and IAD recognizes that decisions and the systems that make them can be nested and related over time. Time spans can be shaped by exogenous forces or natural events, by the tides of politics, or by strategic maneuvering.

The IAD framework has been applied particularly to the governance of common pool resources (CPR) that extend over time, perhaps many decades, and raise questions about values and goals, uncertainty, rights, obligations, and enforceability (Imperial & Yandle, 2005). A fundamental question raised by the IAD/CPR literature is whether an “external Leviathan” is necessary to prevent near time individuals and institutions from ignoring the commons issues inherent in deep time policy issues, or whether a current well-established regulatory apparatus can serve this function. Although the IAD has become quite complex, it is robust in reflecting the importance of time, particularly non-near time, in governance processes.

Time-Conscious Concepts and Models

Several approaches have been directly concerned with the effect of time (especially non-near time) on politics and policy. First, the idea of *path dependence* has been popularly reduced to “history matters” but it offers some nuanced ideas about events, values, and policies over long periods, in part by noting how the order and timing of events shape political outcomes (Pierson, 2004; Page, 2006; Pollitt, 2008). Path dependence emphasizes positive feedback and increasing returns. Decisions are affected by often exogenous factors that change costs and benefits, thereby limiting future choices. Those decisions become self-reinforcing, which can result in either increasingly unpredictable changes *or* increasingly stable institutions—depending on the starting conditions, the nature of the influencing events, and the direction in which positive feedback leads. The concept has been used to understand why some institutions remain stable over long periods while others change (Kay, 2005). Critics of path dependence argue that the feedback process is poorly understood so the approach is necessarily underspecified. But Pierson noted that assumptions of either static institutions or entrepreneur-driven fluidity should take into account how time horizons, threshold effects, and causal changes can affect long-term policies, and he observed that “slow-moving” causes and outcomes – often stretching over decades—are excluded from most policy frameworks.

Other policy models are based on the idea of change over time. The *punctuated equilibrium* model emphasizes the stability of policy networks until an external “reframing” event shifts the institutional location or conceptualization of a policy issue, but such policy changes are rather rare (Baumgartner & Jones, 1993). It treats stability and change explicitly, focusing on the issue definition and agenda setting stages of the policy process, and builds on assumptions of bounded rationality and the “stickiness” of institutional decision outcomes. Long-term policy making can emerge from normal short-term or stable processes only when new

issues emerge that allow or force the political agenda to expand beyond the special interests that occupy the “policy monopolies” of routine politics. Because the American governmental system consists of overlapping subsystems, there is a strong bias against significant change. This can be overcome by strong cumulative positive feedback, by the emergence of new policy-shaping images, or by policy entrepreneurs who can change political priorities and discourse (True, Jones, & Baumgartner, 2007).

Policy learning and *policy diffusion* models often focus on spatial factors more than temporal effects and on how policy entrepreneurs can get issues onto public agendas, rather than how policy or political time spans affect diffusion or learning for different types of issues (May, 1992; Rogers, 1995; but see Klingman, 1980; Shipan & Volden, 2008). They remind us, however, that time spans matter, particularly when learning and diffusion occur. Urban planning theorists in particular have used *complexity theory* to emphasize the unstable dynamism and overlapping efforts by various actors over different time periods as cities grow, dissipate, and self-organize (Dussauge-Laguna, 2012; Innes & Booher, 1999).

Recent work on the politics of attention, inattention, and information also have implications for understanding policy processes over long time periods. Searching for information leads to the discovery of new issues, problems, and solutions, and this can lead to new programs. Ignoring relevant information about problems can lead to accumulating problems that eventually will be addressed in bursts of attention and decision making. This approach has been applied to understanding budgets over long periods, with some evidence for a path dependent budgetary model but with possible “exponential incrementalism” and deviations or oscillations in long-term slopes of budget growth. Baumgartner and Jones suggested that “(b)y ignoring the question of long-term developments of public policies and by focusing on election-effects, political scientists may well have overplayed the leadership hypothesis and underplayed the problem-solving nature of what leaders do” (2012, p. 271).

TIME AS AN EXPLICIT POLICY FACTOR

Policy decision-making implicitly relies on a variety of different time spans. A policy problem’s natural timeline could stretch into near, medium, or deep time. A problem’s political timeline is usually much shorter, capturing the attention of the public and decision-making institutions usually only in near time. These time spans are implicit in nearly all policy decisions and shape the design and implementation of policies, especially those with deep time horizons.

The policy models discussed in Part II do not expressly distinguish between these different time spans. Most of the models appear to assume a political near time starting point. Some models can accommodate deep time policy considerations, such as the IAD consideration of rules that lend stability to institutions and promote adaptive decision-making over time. Other models make useful distinctions between different policy types, such as the Lowi typologies, but fail to consider the effects of longer time spans on the politics of (re)distribution (but see Jacobs, 2011). Analysis of the policy process would benefit from expressly acknowledging the distinct time spans underlying policy decision-making.

The Effect of Policy Time Spans on Policy Decision-Making

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Different policy domains implicate different time spans, affecting decision processes throughout the entire policy process. While few policy problems fit categorically into one time span as compared to another, Table 2 shows simplified examples of policy domains that rely primarily on a consistent time span (space limitations require us to combined medium and deep time policies). Annual budget decisions, for instance, are made on a near political time span (cell I), as legislators and parties barter over the total budget and categorical allocations, following the President's yearly submission of his proposed budget. While the idea of a balanced budget has deep time policy implications, the most salient policy outcomes are in near political time (cell II), as the congressional budget generally funds only the next year's expenditures in near political time under political pressure. Techniques such as scenario analysis (Bradfield, Wright et al., 2005) and robust decision making (Lempert & Collins, 2007) can be used to examine how near-term decisions could promote long-term objectives across a range of possible futures, but these tools are not designed to overlap with policy process models.

-----Table 2 about here-----

Issues with deep political timelines but near policy timelines (cell III) are not rare because many pressing policy issues are recognized to need more learning or can be addressed only through sequences of near time compromises, resulting in temporary legislation and a political obligation to continue revisiting an issue (Adler & Wilkerson, 2012). Furthermore, near time politics sometimes focuses on "manufactured controversies," or issues that have short policy time implications but gain lasting public and political attention, such as the controversy over President Obama's birth certificate.

Finally, some issues garner both deep political and deep policy time lines (cell IV). Climate change, disposal of nuclear waste, and other policies focus on policy outcomes in future decades or centuries. The public, media, and institutions might pay attention to these issues as well, possibly putting the political and policy timelines in sync. "Time consistency" policies are consistent with the IAD model insofar as they emphasize credible but adjustable rules rather than outcomes for sustainable long-term policies (Kydlund & Prescott, 1977) or intergenerational contracts (Evans & Quigley, 2013). However, unlike policy domains in the near political and near policy time category, public attention and the mobilization of interests on deep time issues is often much lower than for shorter term issues, thus yielding less policy action. Policy models have not adequately addressed these challenges.

Policy Process Characteristics Dependent on Time Spans

The different time spans of policy domains have a distinct impact on decision-making processes and outcomes. This effect is a consequence of the nature of deep time issues. As time extends, data become unavailable, causal models gain uncertainty, variables proliferate and system effects become more intertwined, and the political dynamics of self-interest and bargaining introduces unfamiliar actors, strategies, and contexts. Yet these are mostly problems of degree: they apply to near time as well. In all policy models, limited resources must be allocated strategically, plans must be made but adjusted, and the decision time ("political time") must either be in sync with the longevity of the objective ("policy time") or political and institutional processes will need to re-engage as policy realities shape political considerations. To

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encompass medium and deep time policy processes, policy models need to be able to address the impact of time on several fundamental characteristics.

First, the attention paid to a policy issue differs based on the *time context* of the policy, in terms of public values, culture, and perception. In the short-term, values underlying policy preferences may be diverse but are relatively stable and can be used to inform a policy outcome. Preference effects can be quite complex throughout life spans and across cultures, and future values are more speculative. Normative questions arise, such as what is owed to future generations (for example, whether people not yet born have rights today). People also make assumptions about resource substitutability and economic or technological growth, believing that the future can take care of itself without explicit current action. And the media usually portray the future as a utopia or dystopia and rarely as a plausible extension of today's world, coloring any considerations of deep time as science fiction or fantasy. While many of these problems exist for near time considerations as well, the ambiguity of deep time policies exacerbates the difficulty of context considerations. This distinction is reflected in the incremental and ACF models which acknowledge that values and public preferences change over time.

Second, the attention paid to a policy issue is highly dependent on the interests and values of the relevant *policy actors*. For near time issues, these include voters who can mobilize behind an issue, media that shed light on a problem, and interest groups who can rally resources to influence a policy outcome. For deep time, media and voter interest fades and only a small subset of NGOs and businesses will try to influence policy outcomes. Policy models generally assume that politics is shaped by active actors who can represent their interests in concrete and immediate terms. Kingdon's model requires focusing events and stable actors such as civil servants to overcome the incentives for actors to represent only vocal interests in near-time political streams. In the ACF, a coalition forms to preserve or promote a present interest, but it may be sustained because of shared stable values with long-term effects. In the incremental model, long-term policies emerge through a form of pluralism, where interested actors lobby for the outcomes they desire. Deep time considerations within institutions must be promoted by a "watch dog," as opposed to the robust array of actors interested in near time issues.

Third, the behavior of *institutions* that address policy issues may differ based on near or deep time political considerations. In near time, the relevant political institutions are mostly stable and reactive to issues that garner public attention, as the IAD notes. In deep time, however, the jurisdiction, mission, or existence of decision-making institutions may change. The stages model assumes that for near time policies, the issues are generally discrete and well-bounded, flowing through a more natural (although overlapping and backward-looping) timeline of stages within one or several decision-making institutions. However, as the punctuated equilibrium model notes, long-term attention to an issue cannot always be maintained in these institutions, resulting in policies that collapse unless an issue is on an institution's long-term agenda regardless of institutional change. On the other hand, the systems model sees disturbances as normal, while stability (that is, the survival of the system) depends on gatekeepers and feedback loops that allow future interests to be incorporated in near-term responses; otherwise, the system would be completely reactive.

Fourth, the *resources* that actors and institutions apply to a near time issue will be more robust than those allocated for deep time issues. In near time, resources are considered to be competitive and zero-sum, with allocations biased for short-term policy results. For deep time, the lack of near time advocates and uncertainty about future costs and benefits will tend to decrease resources devoted to the issue. The social construction model accounts for this

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distinction as deep time interests fall within the “dependents” category for having low power but positive social construction, with the resources devoted to these interests being largely rhetorical, fragile, and means-tested, as opposed to the substantial resources devoted to the “advantaged.”

Fifth, the *procedures* for addressing policy issues will differ based on near or deep time spans. In near time, the IAD’s “rules” include putting procedures for putting decision-makers in place (elections and appointments), institutional requirements such as voting or hierarchical rules, and negotiations among relevant actors. In deep time, procedures include oversight and legislative renewals, evolutionary changes in electoral and party processes, and strategic planning initiatives or other steps taken to promote longer term outputs. Easton’s systems model acknowledges the difficulty of long-term decision-making through its procedural requirement of feedback loops that tend to stabilize the political institutions engaged in decision-making but may have limited impact on deep time policy interests because feedback may only come from near time political actors. This effect is captured in the path dependency model, which focuses on the stability produced by decisions over time reinforcing each other. If these decisions are made with only near time procedures rather than strategic or longer term perspectives, the course of the future will be set historically rather than with an explicit deep time focus.

CONCLUSION

Current policy models account for near political time and near policy time considerations very well. Indeed, a near time span is assumed by many of these models, so these policy process models tend to be most useful for understanding near time policies. Deep time policy issues, however, are often underdeveloped in these models, and the challenges to politics over many years usually receive little attention. Time is typically considered in policy models as a constant, as part of the landscape on which events occur, and it usually receives little consideration as an independently important part of understanding politics and policy. If these models explicitly accounted for time as a factor in their policy outcomes, some could be adjusted to accommodate medium and deep time.

Another challenge is the rational choice approach that is implicit in most policy models, which suggests the need to create or impute a collective utility function that includes both current and future interests. Decision makers focus on short-term solutions to limit the problem space, uncertainty, and the range of variables, and consequently the time span during which decisions will be made. But “(i)f a rational-actor assumption is serviceable for many analyses of short-run distributive struggle, ... a theory of long-term policy choice must identify the processes through which actors manage [far greater] causal and informational complexity under cognitive constraints” (Jacobs, 2111, p. 12). Likewise, some economists concerned about deep time discount rates have argued that “very long-run policymaking needs to be conceptualized differently than policymaking over shorter periods,” particularly to “make a case for giving more weight to the distant future, taking more actions on its behalf, than would be implied by choosing ‘reasonable’ parameters for the fundamental discounting equation” (Summers & Zeckhauser, 2008, pp. 116, 123). Rational choice also has been used to describe collaboration over time, with people and institutions learning that it is rational to engage in cooperative behaviors in repeated choice situations (Rawls, 2005, p. 49; Gauthier, 1984). In this view, those who seek a basis for deep time policy in contractarian theory or a narrowly-formulated version of self-benefit must be disappointed. This approach also requires that we determine what types of values are consistent

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over time and that we recognize that preferences can change as a result of public policies. Applying rationality to long-term policy hinges on the stability of values, the time horizons of decision makers, and the speed and magnitude of exogenous changes.

Opening the existing variety of policy models (or new ones) to consideration of political and policy time suggests an array of under-examined questions for policy scholars. We offer several examples. When multiple institutions that are active on a policy issue do not share the same time horizon, are they more likely to coordinate or compete? Because political time can be longer for agencies than for electoral institutions, there may be an incentive to rely more on regulatory processes for long-term policies. Also, the “temporal capability” of policy institutions – their ability to “integrate and differentiate multiple temporal constructs” (Huy, 2001) – is likely to explain some of their differences in analytical and political power. And the time characteristics we have discussed will affect when it is productive or harmful for political and policy time to be in sync, and when adaptive or mitigation strategies are most effective (Ruhl, 2008; Ingham et al. 2005)

Whether policy models emphasize near time processes because of familiarity with recent and current issues or because of the implicitly understood conceptual and methodological challenges of explaining stability and change over longer periods, we need explanations that relate to the array of policies that stretch into medium and deep time. We have noted that many differences between near and deep time political factors are matters of degree rather than substance: in both time spans there are significant problems with data, causal models, uncertainty, representation of interests, and the definition and operationalization of rights. As the time horizon of policy issues grows to years or decades, however, new dynamics will emerge and new perspectives may be needed. The rich literature spawned by the insightful policy models discussed here provides evidence that they offer a strong starting point for asking new questions about political and policy processes.

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Table 1: Categories of Time Horizons

	Duration	Individual Perspective	Political Perspective	Policy Perspective	Policy Examples
Near time	0 - 4 years	Focus on consumption decisions	Focus on news cycles, congressional party politics, interest group politics	Routine/annually-recurrent issues; emphasis on budget issues and responsiveness rather than strategic directions	Budgeting/appropriations, elections, technological development, emergency response, capital project expenditures
Medium time	4 - 20 years	Focus on savings decisions	Focus on presidential term; party planning for future presidential elections and party platforms	Issues over which agency personnel perceive having career-spanning jurisdiction, for which current planning is potentially relevant	CBO forecasts, defense planning, some construction/acquisition projects, applied scientific research, new drug development, recurrent project costs (e.g., maintenance)
Deep time	20 years +	Focus on major life cycle changes (e.g., retirement planning)	Little political representation of future interests; no current office-holders and few civil servants remain in office; “movement” issues become mainstream	Beyond agency budget or planning horizons; profound uncertainties; large compounding effects	Entitlement programs for the aged, debt interest, forestry and wilderness, water management, some infrastructure, some weapons systems, some incarceration practices, basic research, climate change, nuclear waste storage

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Table 2: Categories of Time Spans and Examples of Policy Issues

I. Near Political / Near Policy Time Fiscal year budgets, unemployment insurance and income assistance	III. Deep Political / Near Policy Time Manufactured controversies, temporary legislation
II. Near Political / Deep Policy Time Balanced budget measures, healthcare reform, financial reform, social security funding, technological innovation subsidies, resource conservation	IV. Deep Political / Deep Policy Time Climate change, biodiversity, basic scientific research, nuclear waste disposal, the space program, large-scale migration, genetic modification

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NOTES

¹ The duration of "a generation," usually defined as the time from the birth of a parent until the birth of a child, can range from twenty (!Kung mothers) to thirty five years (for fathers in Quebec and Iceland).

² Goertz and Meyer-Sahling discussed distinctions between the polity, politics, and policy temporal rhythms of political systems: "The tree dimensions are concerned, respectively, with term lengths and configurations of political and senior administrative officeholders, their time budgets and time horizons; rights to influence the timing, sequencing, speed and duration of political decision-making processes; and the temporal properties of public policy, such as transposition deadlines or the duration of temporary derogations" (2009, 184-185).

³ Attempts to resuscitate policy-relevant forecasting such as 1970's-era technology assessment have led to a growing literature on, for example, "anticipatory governance" (Guston 2014) and "constructive/real-time technology assessment" (Guston and Sarewitz 2002).

⁴ Easton specifically observed that systems "prefer" persistence, risking accusations of anthropomorphizing.