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Path Dependence, Increasing Returns, and the Study of Politics*

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Abstract

It is increasingly common for social scientists to describe political processes as "path dependent." The concept, however, is often employed without careful elaboration. In fact, there are a variety of forms of path dependence. This essay stresses the importance of investigating one particular type of path dependent process: a dynamic of "increasing returns," which could also be described as a "self-reinforcing" or "positive feedback" process. Reviewing recent literature in economics and suggesting extensions to the world of politics, I demonstrate that increasing returns processes are likely to be prevalent, and that we are developing a good foundation for understanding their causes and consequences. The paper concludes by suggesting that the investigation of increasing returns can provide stronger analytical foundations for some of the key claims of recent scholarship in historical institutionalism: that specific patterns of timing and sequence matter; that large consequences may result from relatively small and contingent events; that particular courses of action, once introduced, can be virtually impossible to reverse; and that, consequently, political development is punctuated by critical moments or junctures that shape the basic contours of social life.

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"No decade in the history of politics, religion, technology, painting, poetry and what not ever contains its own explanation. In order to understand the religious events from 1520 to 1530, or the political events from 1790 to 1800, or the developments in painting from 1900 to 1910, you must survey a period of much wider span. Not to do so is the hallmark of dilettantism." Joseph Schumpeter (1946)

"There simply are no logical or even methodological distinctions between the social sciences and history -- appropriately conceived." Anthony Giddens (1979, p. 230)

It is increasingly common for social scientists to describe political processes as "path dependent." Although often presented without careful elaboration, the notion of path dependence is generally used to support a few key claims: that specific patterns of timing and sequence matter; that a wide range of social outcomes are often possible; that large consequences may result from relatively small and contingent events; that particular courses of action, once introduced, can be virtually impossible to reverse; and that consequently, political development is punctuated by critical moments or junctures which shape the basic contours of social life.[1] All of these features stand in sharp contrast to prominent modes of argument and explanation in political science, which attribute "large" outcomes to "large" causes, rather than to small or accidental events, and emphasize the prevalence of unique, predictable political outcomes, the irrelevance of timing and sequence, and the capacity of rational actors to design and implement optimal solutions (given their resources and constraints) to the problems that confront them. If path dependence arguments are indeed appropriate in substantial areas of political life, they will shake many subfields of political analysis. This essay argues that they are.

My analysis begins with a general discussion of the concept of path dependence and the distinctive characteristics of one type of path dependence: social processes which are subject to "increasing returns." I focus on increasing returns processes, which could also be described as "self-reinforcing" or "positive feedback" processes, both because they are of great social significance and because in contrast to other forms of path dependence social scientists are beginning to develop rigorous arguments about the causes and

[1]For useful discussions see Krasner 1989, Collier and Collier 1991, and Ikenberry 1994.

consequences of increasing returns. While it will be immediately apparent that the characteristics of increasing returns processes carry considerable implications for political science, a full discussion of those implications will be postponed until later in the paper. In Part II, I review the development of increasing returns arguments in the social science discipline where they have received the greatest attention: economics. This review suggests the wide sweep of potential applications, even in a field that might be expected to be hostile to the idea.[2] More important, these economic applications provide the most analytically-developed discussions of increasing returns. Economists have successfully highlighted both the aspects of a particular social environment that generate such processes and clarified their principal implications.

This discussion of economics prepares the way for an exploration of the distinctive characteristics of *politics* (Part III). Rather than simply applying extant arguments in economics to political phenomena, we need to consider the features of the political world that require modifications in the use of path dependence claims. From this discussion I conclude that increasing returns arguments are at least as relevant to an understanding of politics as they are in other areas of the social sciences. Indeed, factors such as the greater ambiguity of political processes and outcomes, the central role of formal, change-resistant institutions, and the prominence of collective activity in politics make this a domain of social life which is especially prone to increasing returns processes.

In the final section of the paper I discuss what these arguments can and cannot contribute to political analysis. They provide an important caution against a too easy conclusion of the inevitability, "naturalness", or functionality of observed outcomes. Given the ubiquity of claims about efficient or functional elements in politics, this alone would be an important corrective. Yet increasing returns arguments can do more. They can direct attention toward particular variables, and generate promising hypotheses about the sources of

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[2]Indeed, an additional reason for focusing on economics, the traditional homeland of equilibrium analysis, is rhetorical. Because the arguments presented here raise difficulties for those drawn to models emphasizing unique equilibria and efficiency in social processes (e.g., many rational choice theorists), demonstrating the growing acceptance of increasing returns arguments in economics may diminish their resistance to the analysis developed here.

important political phenomena. At least as significant, by stretching the temporal horizons of political analysts, they can reorient both the answers given and the questions asked in ways that contribute to a richer appreciation of the sources of variation in political life. Finally, they can help orient political scientists to a realistic -- which is to say modest -- set of aspirations regarding the possibilities for achieving parsimony and predictability in the study of politics.

I. Path Dependence and Increasing Returns

While many analysts now invoke the concept of "path dependence", clear definitions are rare. In practice, usage tends to fluctuate between a broader and narrower conception. In the broader version, path dependence refers to the causal relevance of preceding stages in a temporal sequence. While sometimes presented with considerable rigor, this usage often entails only the loose assertion that "history matters." In the narrower version, path dependence refers to the manner in which preceding stages may radically narrow the range of possible outcomes -- that is, to the difficulty of moving off of an established "path." Frequently, authors are not clear about which of these two meanings they intend.

To establish greater clarity, I will use the term "path dependence" to cover the first idea, following Sewell's claim that path dependence means "that what has happened at an earlier point in time will affect the possible outcomes of a sequence of events occurring at a later point in time" (Sewell 1996, pp. 262-3). Note that such a definition involves no suggestion that a particular path is difficult to exit. Rather, the claim is that we cannot understand the significance of a particular social variable without understanding "how it got there." To take an example offered by Andrew Abbott, the contemporary significance of a group's organization of 40% of its potential membership depends greatly on whether that membership used to be 100% or 10% (Abbott 1983, p. 131). Previous events in a sequence influence outcomes and trajectories, but not necessarily by inducing further movement in the same direction. Indeed, the "path" might matter precisely because it tends to provoke a reaction in some other direction.

The second meaning of "path dependence", in which preceding steps in a particular direction induce

further movement in the same direction, is best captured by the more specific concept of "increasing returns." In an increasing returns process, the probability of further steps along the same path increase with each move down that path. Put a different way, the *relative* benefits of the current activity compared with other possible options increase over time (or, alternatively, the costs of "exit" rise). Increasing returns processes can also be described as "self-reinforcing" or "positive feedback" processes.

Dynamics of increasing returns should be seen as a particular kind of path dependence. This essay is based on the presumption that the idea of path dependence will be more useful if it is disaggregated and the dynamics of distinctive types of path dependence are systematically explored. Different forms of path dependence are generated in different ways, with different consequences. I will focus here only on increasing returns processes, for two reasons.[3] First, I will argue that increasing returns processes, in which events feed on themselves and the range of possible outcomes narrows over time, characterize many important parts of the social world. Second, social scientists are developing analytical tools which make the investigation of the causes and consequences of increasing returns a particularly promising area of inquiry.

The basic logic of increasing returns processes can be captured in a simple mathematical illustration.[4] Imagine a very large urn containing two balls, one black, one red. You remove one ball, and then return it to the urn, accompanied by an additional ball of the same color. You repeat this process until the urn fills up. What can we say about the eventual distribution of colored balls in the urn? Or about a series of trials in which we fill the urn and then start over again one hundred times?

> -- for each individual trial we have no idea what the eventual ratio of red to black balls will be; it could be 99.9% red, or 0.1% red, or anything in between. If we were to run 100 trials, we would probably get 100 different outcomes.

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[3]For useful, broader discussions of temporal sequences see Abbott (1983) and Abbott (1990). For an excellent theoretical and empirical treatment of path dependence in the first sense offered here, see Collier and Collier 1991.

[4]The following discussion relies heavily on Arthur 1994, which collects Arthur's ground-breaking essays on increasing returns and path dependence. When citing a particular essay from this collection, I have placed the date of original publication in brackets.

-- on any individual trial, the ratio will eventually reach an equilibrium. Since later draws in a particular series contribute only minutely to the distribution of balls in the urn, the distribution settles down onto a stable path.

-- sequence is thus crucial. Early draws in each trial, which have a considerable random element, have a crucial effect on which of the possible equilibria will actually emerge.

Mathematicians call this a *Polya urn process*. Its characteristic qualities stem from the fact that an element of chance (or accident) is combined with a decision rule linking current probabilities to the outcomes of preceding (partly random) sequences.[5] It is a process where history matters.

Polya urn processes exhibit *increasing returns* or *positive feedback*. Each step along a particular path produces consequences which make that path more attractive for the next round. If such effects begin to accumulate, they generate a powerful virtuous (or vicious) cycle of self-reinforcing activity. Such processes have quite intriguing characteristics, which Brian Arthur (1994) has summarized as follows:

1. *Unpredictability*. Because early events have a big impact and are partly random, many outcomes may be possible. We cannot predict ahead of time which of many possible end-states will be reached.

2. *Inflexibility*. The further into the process we are, the harder it becomes to shift from one path to another. In applications to technology, a given subsidy to a particular technique will be more likely to shift the ultimate outcome if it occurs early rather than later. Sufficient movement down a particular path may eventually "lock-in" one solution.[6]

3. *Non-ergodicity*. This mouthful means that individual, accidental events do not cancel out. They cannot be treated (which is to say, ignored) as "noise." Instead they are fed back into future choices. Small events are remembered.

4. *Potential Path-Inefficiency*. The outcome that becomes locked-in may not in fact generate higher pay-offs than a foregone alternative over the long run. In this case, the process may be called path-inefficient.

To this one can add a general point, which is that these are processes where sequencing may be critical. Early

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[5]This case depicts a specific type of increasing returns process, where the probability of a particular "draw" precisely equals the ratio between the two alternatives in the existing population. Arthur (1994) has shown that many of the features of this case have a greater range of application, but not all of them.

[6]This *emerging stability* represents a critical distinction between increasing returns processes and chaotic processes which may generate *no* stable equilibrium and instead constantly change and evolve. For an interesting discussion of this quite different framework, with applications to politics, see Fearon 1996.

events, including "noise", matter much more than later ones. Different sequences are likely to produce different outcomes.

If these characteristics are common in politics, they carry major implications for both the kinds of questions we should ask about politics, and the kinds of answers we should expect to find. Most important, they suggest the need to think of social processes as fundamentally historical in nature. Politics occurs in time, and political outcomes are the result of temporal processes. In searching for explanation, we need to think about causes and effects that are often separated in time, rather than focusing exclusively on synchronic explanations (Harsanyi 1960; Stinchcombe 1968; Skocpol 1992; Pierson 1996). To explore these implications, I begin by reviewing recent applications of increasing returns arguments in economics.

II. Increasing Returns Arguments in Economics.[7]

Economics has traditionally focused on the search for unique equilibria. The goal was attractive, because it suggested a world of potential predictability and efficiency. Given a knowledge of existing factor endowments and preferences, equilibrium analysis would point to a single optimal outcome. Moreover, because economists assumed a context of decreasing marginal returns, this goal was potentially achievable. With decreasing returns, economic actions will engender negative feedback, leading to a predictable equilibrium. A sharp rise in oil prices prompts increased conservation, exploration, and exploitation of other sources of energy, leading to a fall in oil prices. Each step away from equilibrium is more difficult than the one before. As Arthur (1994 [1990], p.1) summarizes, negative "feedback tends to stabilize the economy because any major changes will be offset by the very reactions they generate. ... the equilibrium marks the

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[7]Some social scientists also have been drawn to arguments about path dependence, critical junctures, and punctuated equilibria in evolutionary biology, especially the work of Stephen J. Gould (see especially Krasner 1989; Spruyt 1994). Without denying the relevance of this literature, I find it a less useful point of departure than the economists' focus on increasing returns. Most aspects of politics lack anything like the mechanism of natural selection which drives Darwinian theory (international relations, and certain characteristics of electoral systems constitute important exceptions). Furthermore, socially-created constructs of norms and formal institutions have no real analog in evolutionary theory. Norms and formal institutions, however, are crucial features of politics and, as we shall see, are a critical element in social processes subject to increasing returns.

'best' outcome possible under the circumstances: the most efficient use and allocation of resources."

During the past decade, however, this decreasing returns tradition has faced a mounting challenge. Economists have exhibited a growing interest in the idea of increasing returns. On a wide range of subjects, including the spatial location of production, the development of international trade, the causes of economic growth and the emergence of new technologies, path dependence arguments have become increasingly prevalent.

Many of the ideas developed in this research are not entirely new. The concept of increasing returns received attention in the work of Adam Smith and (especially) Alfred Marshall. In the 20th century, an underground of "institutionalist" scholarship, including figures such as Kaldor, Myrdall, and Veblen, continued to explore these issues. Yet in the past few years, prominent mainstream economists have embraced these ideas. Their work has received considerable attention in leading journals. Douglass North, who places great emphasis on such arguments in his analysis of the development of modern capitalism, was recently awarded the Nobel Prize for economics.

Investigations of technology have provided the most fertile ground for exploring the conditions conducive to increasing returns. As Brian Arthur and Paul David have argued, under certain conditions a single technology may achieve a decisive advantage over competitors, even though it is not necessarily the most efficient one in the long-run (Arthur 1994; David 1985). Once an initial advantage is gained, however, feedback effects may lock in this technology, excluding other alternatives.

Figure 1, derived from Arthur's work, summarizes the process. Each technology improves (generates higher payoffs) as it becomes increasingly prevalent. In other words, these technologies are subject to increasing returns. Because technology B starts with lower payoffs, however, early users gravitate to technology A. This movement activates the increasing returns process, improving the performance of technology A, inducing more new users to adopt it, which widens the performance gap between technology A and B, encouraging yet more users to gravitate to technology A. Eventually technology A becomes locked in,

even though technology B would have generated higher pay-offs if it had been the first to reach a critical threshold of usage (in this instance, 30 users).

[FIGURE 1 ABOUT HERE]

The essential idea here is that of *increasing returns*. If a new technology is subject to increasing returns, being the fastest out of the gate (if only for reasons of historical accident) becomes critical. With increasing returns, actors have strong incentives to focus on a single alternative, and to continue moving down a specific path once initial steps are taken in that direction.

Crucially, Arthur has addressed not only the characteristics of such processes, but the conditions which are likely to give rise to them. Not all technologies are prone to increasing returns. Arthur offers a short list of circumstances which generate such dynamics. Understanding these conditions is essential for the broader concerns of this paper, because as we shall see in Section III, analytically similar circumstances occur frequently in the world of politics. Arthur's characteristics thus provide the foundation for developing hypotheses about when increasing returns processes are likely to operate in the social world.

Arthur argues that four features of a technology and its social context generate increasing returns:

(1) *Large set-up or fixed costs.* These create a high pay-off for further investments in a given technology. By moving to larger production runs, fixed costs can be spread over more output, leading to lower unit costs. When set-up or fixed costs are high, individuals and organizations have a strong incentive to identify and stick with a single option.

(2) *Learning effects.* Knowledge gained in the operation of complex systems also leads to higher returns from continuing use. With repetition, individuals learn how to use products more effectively, and their experiences are likely to spur further innovations in the product or in related activities.

(3) *Coordination effects.* These occur when the the benefits an individual receives from a particular activity increase as others adopt the same option. If technologies embody positive *network externalities,* a technology will become more attractive as more people use it. This enhanced appeal attracts more users, reinforcing the existing advantage. Coordination effects are especially significant when a technology has to be compatible with a linked infrastructure (e.g., software with hardware, automobiles with an infrastructure of repair facilities and gas stations).

(4) *Adaptive expectations.* If options that fail to win broad acceptance will have drawbacks later on, individuals may feel a need to "pick the right horse." Although the dynamic here is related to coordination effects, it derives from the self-fulfilling character of *expectations*. Projections about

future aggregate use patterns lead individuals to adapt their actions in ways that help to make those expectations come true.

It is a useful exercise at this stage to take a step back from the discussion of technology and recognize the broad applicability of the qualities just presented. Many social interactions share some or all of these features. New social initiatives -- such as the creation of organizations or institutions -- usually entail considerable start-up costs; individuals, and organizations, learn by doing; the benefits of our individual activities or those of an organization are often enhanced if they are coordinated or "fit" with the activities of other actors or organizations; it is frequently important to bet on the right horse, and therefore we adapt our actions in light of our expectations about the actions of others. Indeed, the following discussion of technology is important primarily because it clarifies a set of relationships characteristic of many social interactions.

A number of economists argue that the conditions which Arthur outlines have been relevant in the development of new technologies, especially those in complex, knowledge-intensive industries. The increasing returns variant of path dependence arguments has been applied to the development of the "QWERTY" typewriter keyboard, the triumph of the light-water nuclear reactor in the United States, the battles between Betamax and VHS video recorders and DOS-based and Macintosh computers, early automobile designs, and competing standards for electric current.[8]

While increasing returns arguments about technology are probably the best known, economists apply similar analyses to other contexts as well. In fact, the wide range of such applications is striking. Both Krugman (1991) and Arthur (1994 [1990]) point to the role of increasing returns in the spatial location of production. Given the importance of physical proximity in many aspects of economic life, *agglomeration effects* are widespread. Initial centers of economic activity may act like a magnet, influencing the locational

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[8]Many of these examples have been contested in turn by critics who deny the empirical claim that superior technologies lost out. Since these criticisms raise broader issues about the usefulness of increasing returns arguments, I will postpone discussion until the end of this section.

decisions and investments of other economic actors. Established firms attract suppliers, skilled labor, specialized financial and legal services, and appropriate physical infrastructure, which make the particular location attractive to other firms making similar products. So do social networks, which allow for easy exchange of information and expertise. Increasing returns arguments help explain the prevalence of pockets of specialized economic activity, from Silicon Valley to the high-end textile manufacturers of Northern Italy. As Krugman has concluded, "[i]f there is one single area of economics in which path dependence is unmistakable, it is in *economic geography* -- the location of production in space. The long shadow cast by history over location is apparent at all scales, from the smallest to the largest -- from the cluster of costume jewelry firms in Providence to the concentration of 60 million people in the Northeast Corridor (Krugman 1991, p. 80)."[9]

These claims closely parallel a set of arguments about international trade, where arguments about increasing returns have gained wide acceptance. Researchers began by focusing on economic trends which appeared anomalous from the perspective of traditional trade theory -- most notably, the explosion of *intra*-industry international trade after World War II (Krugman 1994). If comparative advantage results from "natural" features of different countries, one would expect most trade to occur between quite different countries -- e.g., North-South trade of manufactured goods for raw materials. Most international trade, however, is North-North. Developed economies trade primarily with other developed countries, including extensive exchanges within particular industries. This pattern suggests a puzzling result: broadly similar countries appear to have developed highly specialized "niche" comparative advantages.

Increasing returns provided an answer to this puzzle. Knowledge-intensive sectors will be prone to positive feedback. Countries which gain a lead in a particular field, for whatever reason, are likely to

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[9]Spatial concentration of production does not by itself demonstrate that one region was able to consolidate its position because of historical accident. Often geographic advantages (location near crucial natural resources, or transportation networks like the Great Lakes) may play a key role. In many cases, both "natural" advantages and historical accidents play a part.

consolidate that lead over time. The result is a high degree of specialization. Even countries with similar initial endowments develop divergent areas of economic strength. Comparative advantage is not simply given, it is often *created* through a sequence of events over time.

It is worth noting that this research on trade has been used to derive some controversial policy implications. If first-mover advantages are significant, free trade may not be an optimal policy for a country competing with countries willing to subsidize emerging sectors. Under certain (restricted) conditions, a policy of "picking winners" may make considerable economic sense (Krugman 1994; Tyson 1991). There remains considerable dispute about the significance of such opportunities for strategic intervention. Krugman, for instance, maintains that they will appear relatively infrequently -- not so much because path dependence is rare, but because of a government's inability to identify winners *ex ante*. Whatever the appropriate policy implications of increasing returns in comparative advantage may be, however, its existence is now widely recognized in mainstream economics.[10]

Economists have also applied increasing returns arguments to economic change more broadly. The most prominent development in recent discussions of economic growth has centered on "endogenous growth" theory (Romer 1986). Economists in the 1980s became puzzled by the existence of growth rates (notably in developed countries during the post-World War II period) that seemed far greater than what measured increases in inputs of capital and labor could explain. Romer and others argued that increasing returns associated with economic applications of knowledge could help account for the anomaly. Unlike capital and labor, many aspects of knowledge are non-rival -- their use in one firm does not prevent their use in another. Thus, a single gain in knowledge can be applied in many settings, and can lead to dramatic improvements in productivity. Economic growth generates the kind of positive feedback that defines increasing returns processes.

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[10]As Krugman (1996, pp. 110-11) notes, in the American Economic Association's classification system for journal articles one will now find "models of trade with increasing returns and imperfect competition" alongside the category for "conventional trade models."

A somewhat different analysis of growth based on increasing returns has emphasized the importance of complementarities (Milgrom, Quian and Roberts 1991). Various economic activities (e.g., in information technology) are often complementary to other related activities. Improvements in a core activity can thus spill over by improving related parts of the economy (lowering costs or increasing productivity). These improvements in turn may increase the attractiveness of the core activity. From their formal analysis of such a dynamic, Milgrom, Guian and Roberts derive what they call the "momentum theorem": "...once the system begins along a path of growth of the core variables, it will continue forever along that path or, more realistically, until unmodeled forces disturb the system" (Milgrom, Quian and Roberts, 1991, p. 85).

While economists are now applying increasing returns arguments to a wide range of important economic phenomena, it is Douglass North's application to issues of institutional emergence and change that is perhaps most important for students of politics (North 1990a). North argues that all the features which Arthur identified in investigations of increasing returns in technology can be applied to institutions. In contexts of complex social interdependence, new institutions often entail high fixed or start-up costs, and involve considerable learning effects, coordination effects, and adaptive expectations. Established institutions generate powerful inducements that reinforce their own stability and further development. "In short", North concludes, "the interdependent web of an institutional matrix produces massive increasing returns" (North 1990a, p. 95).

This argument provides the core to North's sweeping reinterpretation of economic history. The central puzzle motivating North's inquiry is the limited convergence of economic performance across countries. Neo-classical theory suggests that laggard countries should easily adopt the practices of high performers, and therefore fairly rapid convergence among economies should occur. But it does not. According to North, institutions, which he defines broadly to include "the rules of the game in a society or, more formally, ... the humanly devised constraints that shape human interaction" (p. 3), explain the anomaly of continued divergence in economic performance among countries over time. Once in place institutions are

hard to change, and they have a tremendous impact on the possibilities for generating sustained economic growth. Individuals and organizations adapt to existing institutions. If the institutional matrix creates incentives for piracy, North observes, people will invest in becoming good pirates. Thus, where institutions fail to provide incentives to be economically productive, there is unlikely to be much economic growth.

For political scientists, North's insight is crucial for two reasons. First, he highlights the parallels between characteristics of technology and certain characteristics of social interactions. In this context, it is worth noting that Arthur's arguments about technology are not really about the technology itself but about the characteristics of a technology *in interaction with* certain qualities of related social activity. This is a promising line of thought which I will develop further in the next section. My view is that North has focused on some of the most important parallels, but there are other significant ones.

Second, North rightly emphasizes that institutional development is subject to increasing returns. Indeed, it is through their role in patterns of institutional emergence, persistence, and change that increasing returns processes may be most significant in social life. Given the prominent role institutions have played in recent political science theorizing, the possible implications of this insight should be evident, but I will discuss them in more detail later in this essay.

The dialogue in economics surrounding increasing returns is the impassioned discourse of an emerging paradigm. Economists talk of "new" growth theory, "new" trade theory, and so on -- all based on arguments involving increasing returns. Yet despite the prevalence of such arguments and the intellectual excitement associated with them, there is good reason to believe that the range of application should be at least as wide in politics as it is in economics. To understand why, it is helpful to consider the major objections to increasing returns arguments that have recently surfaced in economics.

In a forceful critique, Liebowitz and Margolis (1995) have raised some tough questions about this new literature on increasing returns. They argue that there is little reason to believe that accidents matter much, or that economic systems are very likely to get locked onto courses of sub-optimal performance. Two

aspects of their critique are relevant here.[11] They emphasize that only "remediable" path dependence is really of theoretical significance. They also claim that market mechanisms insure that remediable path dependence is rare. I will take up each point in turn.[12]

Following Williamson (1993), Liebowitz and Margolis distinguish remediable and non-remediable path dependence. They note two kinds of path dependence ("first degree" and "second degree") that are non-remediable, by which they mean that there are no *feasible* improvements in the path, either now or in the past. First degree path dependence "is a simple assertion of an intertemporal relationship, with no implied claim of inefficiency" (p. 207). Everyone accepts that current events depend on prior ones, in the minimal sense that these prior events create the stock (e.g, of factors of production) which current actors must work with. It is not clear that the claim that "history matters" in this sense gets us anywhere.

Second-degree path dependence "stipulates that intertemporal effects propagate error." With hindsight, we wish that some other alternative had been chosen. Yet Liebowitz and Margolis question whether second degree path dependence has profound implications. If we acted as best we could with the information available at the time, the mistake was unavoidable, and we cannot reasonably describe the outcome as inefficient.

Liebowitz and Margolis argue that the only kind of path dependence with major ramifications is path dependence that is potentially remediable: "third-degree path dependence, ... /which/ supposes the feasibility, in principle, of improvements in the path ... is the only form of path dependence that conflicts with the neoclassical model of relentlessly rational behavior leading to efficient, and therefore predictable, outcomes" (ibid). This distinction between remediable and unremediable path dependence is crucial to their argument,

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[11]Liebowitz and Margolis also develop an empirical critique of an alleged case of path dependence: VHS vs. Betamax. Elsewhere they have criticized other favored examples, such as the QWERTY keyboard (Liebowitz and Margolis 1990).

[12]Note that the Margolis/Liebowtiz critique depends on *both* parts of their argument being true. The significance of path dependence for social scientists can be sustained if *either* the relevance of non-remediable path dependence or the prevalence of remediable path dependence can be sustained.

because Liebowitz and Margolis believe that instances of the more theoretically troubling, remediable kind occur very infrequently.

Is their dismissal of non-remediable path dependence convincing? As Williamson notes, for policy purposes remediability is likely to be an appropriate standard. Recognizing the existence of path dependence may not help policymakers much if they do not know how to identify it *ex ante*.[13] But if our purpose is instead to understand -- perhaps *ex post* -- why aspects of societies move in particular directions and the consequences of such movements, this objection loses much of its force. Indeed, since it will often be impossible *in principle* to demonstrate that an alternative course of action would have been superior (either because the meaning of superiority itself is subject to dispute, or because we cannot know what improvements in an alternative technology would have occurred if another path had been followed), the remediability test seems more like a debater's point. By insisting on an impossible burden of proof, suggestions that the actual path chosen may have been problematic are simply ruled out of court by fiat.

The second part of the Margolis/Liebowitz analysis is the claim that remediable path dependence is rare. Here, their argument is straightforward. If one of two options is superior in the long-run but not in the short-run, market arrangements will generally assure the adoption of the superior path. The ability of private actors to capture the returns from long-term investments prevents bad choices. Institutions of property rights, provisions for patents, etc. facilitate the internalization of possible externalities, and market arrangements such as a plentiful supply of venture capital mean that options with low short-run pay-offs will nonetheless receive the support that they deserve. Economic actors, in short, calculate in the shadow of the future, and are thus unlikely to indulge in myopic, short-term maximizing behavior at their own long-term expense.

This argument clearly has some force.[14] How much, however, depends on the strength of these

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[13]As noted before, it is precisely for this reason that Krugman questions those making broad claims about the implications of increasing returns arguments for trade policy.

[14]Indeed, Arthur explicitly recognized this possibility, although as far as I know he did not systematically pursue the implications. See Arthur 1994, p. 28, fn 11.

mechanisms for over-coming short-term thinking or free-riding. In my view, Liebowitz and Margolis are more than a little complacent about the capacity of such mechanisms to fully internalize the considerable externalities that are central to increasing returns arguments. I think it wise to leave this matter to economists, however.[15] For current purposes there is a more fundamental objection. Even if Liebowitz and Margolis are right regarding economics, their arguments still have very limited relevance for political scientists. However strong market mechanisms for "far-sightedness" may be, they are almost certainly far weaker in politics. I explain why in Section III.

III. Moving From Economics to Politics: The Applicability of Increasing Returns Arguments

The application of economic methods to the study of politics has been fruitful. In areas such as the study of party competition (Downs), the formation of interest groups and social movements (Olson) and voting and legislative behavior (Arrow), imports from economics have illuminated important features of the political landscape. The value of economists' academic exports is greatly enhanced, however, if the political science importers take careful account of the distinctive features of the "local" environment (Moe 1990). Arguments drawn from economics must be sensitive to the quite different nature of the political world.[16]

This is as true for arguments about path dependence and increasing returns as it has proven to be for other kinds of analysis. Politics differs from economics in many ways. The key is to identify those aspects of the political environment which are most relevant to an investigation of the sources and consequences of path

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[15]Except for one observation. The Liebowitz/Margolis critique focuses on choice of technologies or products. As noted earlier, this is but one of the many ways that increasing returns arguments are invading economics. How well could their argument be extended to other increasing returns processes? As I will make clear in the next section, it has little relevance to the development of institutions, which are also subject to increasing returns. In this regard it is revealing that the Liebowitz/Margolis essay does not even cite North's work. As North has argued, path dependent processes of institutionalization are crucial to the development of particular market economies. Here far-sighted financial markets are generally of limited help. Thus the argument developed in Section III about increasing returns processes in politics is relevant for economists as well. Features of the polity -- which may themselves be path dependent -- determine whether the mechanisms upon which the Liebowitz/Margolis argument relies will in fact be present.

[16]The following discussion is particularly indebted to Lindblom 1977, Moe 1984, Moe 1990, and North 1990b.

dependence. I divide this discussion into two parts. First, I consider three prominent aspects of politics which make it conducive to increasing returns processes: (1) the extremely high density of institutions; (2) the central role of collective action; and (3) the intrinsic complexity and opacity of politics. After briefly explicating each of these characteristics, I discuss their relevance to the current discussion. *Each of these features makes increasing returns processes prevalent in politics.*

Second, I explain why the ameliorative mechanisms which Liebowitz and Margolis identify in economic systems are often less effective in correcting path dependence in politics. In particular, I emphasize three characteristics of politics: the weakness or absence of efficiency-enhancing mechanisms of competition and learning; the shorter time horizons of political actors; and the greater "stickiness" of political institutions. *Each of these features makes increasing returns processes in politics particularly intense.* They increase the difficulty of moving off a path once actors have started down it.

Thus having shown in Part II that increasing returns processes are now seen as central to economics, I wish to argue here that these dynamics will be at least as prevalent and often more intense in politics. I begin by discussing the reasons for expecting increasing returns processes to occur frequently in politics, before turning to the reasons to expect these processes to place particularly powerful constraints on the course of political development.

The Institutional Density of Politics. The central features of political systems are *compulsory* rather than voluntary. Legally binding rules are not just a foundation for political activity (like property rights in the economy). They are instead the very essence of politics (Lindblom 1977; Moe 1990). Politics involves struggles over the authority to establish, enforce, and change rules governing social action in a particular territory. Both formal institutions (such as constitutional arrangements) *and public policies* place extensive, legally-binding constraints on behavior.

Although unorthodox, the inclusion of public policies as well as formal institutions in this formulation is important (Pierson 1993). While policies are generally more easily altered than the

constitutive rules of formal institutions, they are nevertheless extremely prominent constraining features of the political environment. Policies, grounded in law and backed by the coercive power of the state, signal to actors what has to be done, what cannot be done, and establish many of the rewards and penalties associated with particular activities. Most of these policies are also remarkably durable (Rose 1990). Especially in modern societies, extensive policy arrangements fundamentally shape the incentives and resources of political actors.

Much of politics, in other words, is based on authority rather than exchange. Established constraints apply to all -- those who do not approve as well as those who do -- and they are backed up, ultimately, by force. The "exit" option, while central to the workings of the market, is often unavailable (or prohibitively costly) to actors who feel poorly served by existing political arrangements. In politics, institutional constraints are ubiquitous.

Such institutions are generally subject to increasing returns. North's analysis highlights how institutions induce self-reinforcing processes that make reversals of course increasingly unattractive over time. In contexts of complex social interdependence, new institutions and policies often generate high fixed costs, learning effects, coordination effects, and adaptive expectations. Institutions and policies may encourage individuals and organizations to develop specialized skills, make certain investments, purchase particular goods, or contribute time, money, and a sense of identification to certain organizations.[17] These activities increase the attractiveness of existing institutional arrangements relative to hypothetical alternatives. In institutionally-dense environments, initial actions push individual behavior onto paths that are hard to reverse. As social actors make commitments based on existing institutions and policies, the cost

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[17]It has become common to refer to such consequences as "sunk costs." While intuitive, this terminology is unfortunate. When economists refer to sunk costs they mean costs that cannot be recovered and should be regarded as irrelevant to current choices among options. By contrast, the whole point of path dependence is that these previous choices *are* relevant to current action. In cases of increasing returns, social adaptations represent investments which provide continuing benefits. Actors may be locked-in to a current option because massive new investments would be required before some theoretically superior alternative generated the same or a higher stream of benefits.

of exit from existing arrangements generally rises dramatically (Pierson 1996).

Now this is true of economic institutions as well as political ones. *Institutional density*, however, is simply greater in politics than in economics. Sets of mandatory constraints are more central to what politics is about.

The Collective Nature of Politics. Suppose you are working for a firm with an annoying boss and bad pay. You have a clear option: acting on your own, you can seek work elsewhere, either at one of a large number of other firms or by setting up business on your own. Your ability to move depends on the state of the labor market, but the existence of competitive options sets clear limits on how annoying your boss can afford to be, and how bad the pay can get.[18]

Or suppose you invent a great new product. Assuming that you can get financial backing (which you should be able to do -- it is a great idea, and the market generates a ready supply of venture capitalists), your prospects are good. Nothing stops you from going into business, or selling the idea to someone who will. Either way, the new, superior product gets to see the light of day, and you reap considerable benefits from your innovation.

The setting of consumers is similarly atomistic. In the textbook economics case, my decisions as a consumer are taken to be essentially independent of my expectations regarding the choices of other consumers.[19] There is no need for explicit attempts to coordinate behavior; the market simply aggregates the isolated decisions of individuals.

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[18]I am not trying to glorify the labor market here, but merely pointing out a crucial difference between politics and economics in the nature of "exit" options.

[19]Although this represents a critical difference between economics and politics, one would need to make a number of important qualifications. The decisions of other consumers clearly do affect the price, supply, and quality of the goods available to me. Furthermore, much economic activity, both on the production and consumption side, involves significant externalities, which make the implications of consumption interdependent. As noted in Section II, these conditions of independent consumption often do not apply to high-tech products, which frequently involve network externalities. For a good discussion of some of these complications see Hirsch 1977.

These highly stylized examples illustrate the flexibility, fluidity, and atomization of economic markets. Political "markets" are different. They are far from being flexible and fluid. In politics, my actions are highly dependent upon the actions of others. What I get depends not just on what I do, but (mostly) on what others do. Following Olson's ground-breaking work, students of politics have long recognized the "logic of collective action." Most of the "goods" produced in politics are public goods; it is difficult to limit their consumption to those who helped provide them. As a result, individuals will have a strong tendency to free-ride. Coordinating the activity of many people -- creating conditions favorable to collective action -- is a principal issue in political life.

There is another reason why political action frequently requires coordination. Many of the goals which political actors pursue have a "lumpy" or "winner-take-all" quality to them (politicians, coup plotters, and lobbyists either win or lose; legislation either passes or is rejected). Unlike economic markets, where there is usually room for many firms, finishing second often does not count for much in politics. Indeed -- the Menshiviks in 1917 come to mind -- it can be extremely problematic. Here too, the effectiveness of my actions depends heavily on the actions of others. This is less true of some aspects of politics -- such as answering an opinion poll question or voting -- than others. Even in voting, however, the lumpiness of election outcomes (in the absence of a pure system of proportional representation) means that if a person does not want to "waste" her vote, her actions may well turn on what she expects others to do.

Under these circumstances, actors must constantly adjust their behavior in the light of expectations of how others are likely to act. Whether I put energy into developing a new party, or provide resources to an interest group, may depend to a considerable degree on my confidence that a large number of other people will do the same. To take a more dramatic example, a protestor's willingness to join a demonstration against an oppressive regime under the watchful eyes of the security police depends heavily on her confidence that she will be joined by many others (Kuran 1991; Lohmann 1994). In short, issues of collective action abound in politics.

Collective action represents the second core feature of politics that is subject to massive increasing returns. Like institutional development, the dynamics of collective action are highly path dependent, since they involve many of the qualities conducive to positive feedback: high set-up or fixed costs, coordination effects, and a prominent role for adaptive expectations.[20] Thus, the kinds of incremental, micro-level adaptations that drive competitive adjustments towards efficient outcomes in the marketplace (e.g., consumers "voting with their dollars" by shifting from one product to another, or workers switching firms in search of higher wages) are likely to play a less prominent role in politics.

Because individual adjustments in the absence of coordinated action are often ineffective in politics, change will be muted unless a "critical mass" can be generated. Creating such a critical massive generally requires some kind of coordination. Adaptive expectations are likely to be crucial. If this critical mass occurs, however, collective behavior is likely to exhibit increasing returns and major disruptions may take place (Baumgartner and Jones 1993). Collective action is therefore prone to unpredictability. Small events feed back into the possibilities for further activity. It is a process where history matters.

The Complexity and Opacity of Politics. Economics is built in large part around the useful and plausible assumption that economic actors seek to optimize and are relatively good at it. Firms operate to maximize profits. The metric for good performance is relatively simple and transparent. Various features of the economic environment can be analyzed in terms of how they contribute to or detract from firm performance. Observable, unambiguous, and often quantifiable indicators exist for many of these features. Workers can easily obtain fairly good information on the wages and working conditions on offer from different firms. Consumers, too, are reasonably adept at navigating most aspects of the economic world. Links between choices and outcomes are generally clear: I take a new job and my income rises; I buy a car and my checking

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[20]Although "threshold" models of collective action are now prevalent (see Granovetter 1979; Chong 1991), I am not aware of anyone systematically applying the core elements of increasing returns arguments to collective action problems. Arguments in Mancur Olson's *The Rise and Decline of Nations* (Olson 1981), however, contain considerable similarities and could be recast in these terms.

account balance shrinks. Prices send strong signals which facilitate comparisons. The quality of goods is generally evident in relatively short order, and repeated purchases allow consumers to sample alternatives. Of course, one could add many complications to this simple picture of the economic realm. My claim is not that economics is completely transparent. Rather, I wish to highlight that the role of prices, the prevalence of repeated interactions, and the presence of relatively short causal chains between choices and results make it relatively easy for economic actors to correct mistakes over time. In other words, these features improve the prospects for learning.

Politics is a far, far murkier environment. It lacks anything like the measuring rod of price, despite some reductionist efforts to make the search for votes the equivalent of the search for dollars. Political actors frequently pursue a range of goals. While politicians often will be focused on reelection, others (e.g., bureaucrats, interest groups) have different ambitions. Thus, it is difficult to say what an "effective" political system would look like -- what it would optimize -- even in theory.

It is even harder to actually identify observable aspects of political performance. And, if we believe that a system is not performing well, it is still more difficult to determine which elements in these highly complex systems are responsible and what adjustments would lead to better results. The complexity of the goals of politics, and the loose and diffuse links between actions and outcomes, render politics inherently ambiguous. As North has argued, "political markets are far more prone [than economic markets] to inefficiency. The reason is straightforward. It is extraordinarily difficult to measure what is being exchanged in political markets and in consequence to enforce agreements" (North 1990b, p. 362).

It is important to note that North is not simply arguing that political decision-making is prone to greater inefficiency. It is not just, or even primarily, that politics deals with the same issues as economics but does so less efficiently because of the way that political decisions are made. Rather, politics gets stuck with the more difficult problems. Where transaction costs are low, market mechanisms are likely to be effective, but they tend to break down when transaction costs are very high. Thus, it is complex and ambiguous issues

and problems that gravitate toward the public sphere.

Even if mistakes or failures in politics are apparent, improvement through "trial-and-error" processes is difficult. Most participants in politics (voters, members of interest group) engage in activities only sporadically. Their tools of action are often crude, such as the blunt instrument of the vote, and their actions have consequences only when aggregated. There are often long lags and complex causal chains connecting these political actions to political outcomes. The result is that mistaken understandings often do not get corrected.

Instead, understandings of the political world should themselves be seen as prone to path dependence. As North (drawing on work in both cognitive psychology and organizational theory) has argued, actors operating in a social context of high complexity and opacity are heavily biased in the way they filter information into existing "mental maps" (North 1990; Denzau and North 1994). Confirming information tends to be incorporated, while disconfirming information is filtered out. Social interpretations of complex environments like politics are subject to positive feedback. The development of basic social understandings involve high start-up costs and learning effects; they are frequently shared with other social actors in ways which create network effects and adaptive expectations. Mental maps induce increasing returns.

North's work here converges with long-standing views of those studying political culture as well as the recent contributions of cognitive science. Once established, basic outlooks on politics, ranging from ideologies to understandings of particular aspects of governments or orientations towards political groups or parties, are generally tenacious. They are path dependent.[21]

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[21]Indeed, as Madison Avenue knows well, such path dependent cognitive effects are evident even in the less ambiguous world of consumption. This is why advertisers covet the attention of youngsters who have yet to make definitive (and resilient) choices. A telling recent example is the new marketing effort of the National Football League, which is alarmed by indications that youngsters are increasingly drawn to basketball and soccer. These marketers speak the language of increasing returns. A former MTV executive now working on special events says "it's all about getting a football ... into a kid's hands as soon as you can. Six years old, if possible. You want to get a football in their hands before someone puts a basketball in their hands, or a hockey stick or a tennis racquet or a golf club" (Seabrook 1997, p. 47).

There are, then, compelling reasons to believe that politics will be unusually prone to the increasing returns variant of path dependence. Increasing returns are characteristic of three of the most prominent features of political environments: processes of institutional development, processes of collective action, and processes of social interpretation. This conclusion should be underlined. By itself, it suggests why increasing returns is a critical concept for those who seek to understand the sources of political stability and change. If a recognition of the significance of self-reinforcing processes is shaking up economics, political scientists have at least as great a need to consider its implications.

Yet there is also reason to believe that these effects in politics are often particularly intense. In the remainder of this section I consider why it is frequently more difficult to move off an existing path in politics than it would be in economics. Economists have rarely worried about the possibilities of inefficient outcomes, because they believe the market provides two powerful mechanisms for restoring efficiency: competition and learning. Competitive pressures in a market society mean that new organizations with more efficient structures will develop, eventually replacing suboptimal organizations (Alchian 1950). Learning processes within firms can also lead to correction. According to Williamson (1993), one can rely on

> the "far-sighted propensity" or "rational spirit" that economics ascribes to economic actors... Once the unanticipated consequences are understood, these effects will thereafter be anticipated and the ramifications can be folded back into the organizational design. Unwanted costs will then be mitigated and unanticipated benefits will be enhanced. Better economic performance will ordinarily result. (pp. 116-17)

It is worth emphasizing that neither of these mechanisms represents a guaranteed corrective in the increasing returns contexts explored by Arthur, North and others, because inferior options possessing initial advantages will often reinforce themselves over time. More fundamentally, both these corrective mechanisms are even less effective when one shifts from firms in private markets to the world of political institutions (Moe 1984, 1990). This is clearest for mechanisms of competition. Political institutions rarely confront a dense environment of competing institutions that will instantly capitalize on inefficient performance, swooping in to carry off an institution's "customers" and drive it into bankruptcy. While models of

competition may be helpful for understanding some important aspects of politics (such as international relations and party systems), there can be little doubt that political environments are typically more "permissive" than economic ones (Krasner 1989).

As just discussed, the complexity and ambiguity of politics creates serious problems for learning arguments. It may be appropriate in some circumstances to argue that politics involves learning processes, in which responses to public problems proceed in a trial-and-error fashion (Lindblom 1959; Heclo 1974; Hall 1993). There is little reason, however, to think that this acts as a selection mechanism with anything like the efficiency-enhancing properties of market competition in economics or Darwinian natural selection in biology. Because political reality is so complex and the tasks of evaluating public performance and determining which options would be superior are so formidable, such self-correction is often limited. The development of what North calls our "subjective models" of the political world is itself path dependent -- we tend to feed back in information that confirms pre-existing views, rather than correcting them.

Even where learning does occur, it faces additional hurdles: in Williamson's words, learning must still be "folded back into the organizational design." Here, all the barriers to change in systems subject to increasing returns become relevant: long movement down a particular path will have increased its desirability relative to possible alternatives. Furthermore, in politics the pursuit of such change faces two additional obstacles: the short time-horizons of political actors and the strong status quo bias ("stickiness") associated with the decision rules governing most political institutions. These factors will often make lock-in effects particularly intense in politics.

Time Horizons. A statement attributed to David Stockman, budget director during the Reagan administration, is unusual among political decision makers only for its candor. Asked by an adviser in 1981 to consider pension reforms to combat Social Security's severe long-term financing problems, Stockman dismissed the idea out of hand, exclaiming that he had no interest in wasting "a lot of political capital on some other guy's problem in [the year] 2010" (quoted in Greider 1982, p. 43).

Many of the implications of political decisions -- especially complex policy interventions or major institutional reforms -- only play out in the long run. Yet political actors, especially politicians, are often most interested in the short-term consequences of their actions; long-term effects tend to be heavily discounted. The principal reason is the logic of electoral politics. Keynes once noted that in the long run, we are all dead; for politicians in democratic polities, electoral death can come much faster. Because the decisions of voters, which determine political success, are taken in the short-run, elected officials employ a high discount rate. They generally will pay attention to long-term consequences only if these become politically salient, or when they have little reason to fear short-term electoral retribution.

Political scientists have paid limited attention to the issue of time horizons. An interesting literature is developing on "credible commitments" -- the attempt of political actors to create arrangements that facilitate cooperation by lengthening time horizons. Yet we know relatively little about the time horizons of different political actors, or about the institutional arrangements that are conducive to lowering their discount rates (i.e., increasing the political relevance of the future).[22] Recent research suggests that particular institutional designs (such as independent central banks), empowering particular kinds of political actors (e.g., bankers) may succeed in lengthening time horizons in politics.

In general, however, such mechanisms are less effective in politics than in economics. As noted in Part II, the marketplace possesses some strong mechanisms for lengthening time horizons -- especially the basic continuity of firms over time and the presence of capital markets. Such mechanisms in politics are generally far weaker. It is difficult to monitor political behavior over time because indicators of performance are typically so limited. It is no accident that much of the generally optimistic rational choice discussion of "credible commitments" in politics has focussed on relatively transparent *financial* issues (e.g., budget deficits, monetary policy). In these instances, performance indicators are clear and behavior relatively easy to

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[22]For an introduction to the literature on credible commitment see North and Weingast (1989) and Shepsle (1991).

monitor. While these issues are clearly important, it must be stressed that for reasons already noted they are fundamentally atypical of the kinds of matters dealt with in politics. Not only is monitoring often exceptionally difficult in politics, but it is also hard to hold actors accountable, because of the relatively rapid turnover of critical positions. Politics, in short, lacks the characteristic property rights that facilitate the linkage of actors' decisions over time in the economic sphere. In many cases, the long term is essentially beyond the political horizon. A statesman, Bismarck said, is a politician who thinks about his grandchildren.

The different natures of time horizons in politics and in economics matter a lot. This can be seen by revisiting the critique of path dependence presented in Section II. Liebowitz and Margolis properly point to the mechanisms of financial markets as a protection against "Type III" path dependence. If it is known that long-term benefits, applying a market discount rate and allowing for uncertainty, will be greater using option B, then investors should gravitate toward that option even if in the short-term it will perform more poorly than option A. Thus, they argue that market mechanisms should allow the more efficient outcome (B) in Figure 1.

In politics, however, the outcome may well be different. Assume that the crucial decision-maker is a politician up for re-election in two years. In this context, effects after the election cycle do not count for much.[23] A politician focusing on the short term pay-off would choose Option A. This has profound consequences. If political decision-makers face many decisions like those outlined in Figure 1, and if their time-horizons tend to be short, we can expect movements onto less-than-optimal paths to be common. Crucially, we can also expect that once on such a path political actors will generally have powerful incentives to stay on it. The costs of change are borne in the short-run, while the benefits will generally only accrue in the long run -- that is, to someone else.

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[23]These long-term effects *will* count if an actor with longer time-horizons (such as an interest group) is able to make them relevant to politicians -- e.g., through campaign contributions or votes. The question is whether such mechanisms are anywhere near as effective as the capital markets operative in the economic sphere. In my view, there are strong reasons to be skeptical of this, but it is clearly an issue deserving considerable attention.

Institutional "Stickiness" in Politics. Political arrangements are unusually hard to change. An individual with a new idea for a product need only secure the finance to put it on the market. If enough consumers (choosing independently) find it sufficiently appealing, the product will be a success. Change can be engineered through competition against existing products. Similarly, those with property rights over a firm are generally in a strong position to remake their organizations as they choose. Lines of authority are clear, and the relevant decision makers are likely to share the same broad goal of maximizing profits.

By contrast, key features of political life, both public policies and (especially) formal institutions are change-resistant. Policies and institutions are often *designed* to be difficult to overturn. There are two broad reasons why. First, those who design institutions and policies may wish to bind their successors. Moe terms this the problem of "political uncertainty." Unlike economic actors, political actors must anticipate that their political rivals may soon control the reins of government. To protect themselves, these actors therefore create rules that make pre-existing arrangements hard to reverse. As Moe (1990, p. 125) puts it, designers

> do not want 'their' agencies to fall under the control of opponents. And given the way public authority is allocated and exercised in a democracy, they often can only shut out their opponents by shutting themselves out too. In many cases, then, they purposely create structures that even they cannot control.

Political actors do not only wish to bind their successors, however. In many cases, they are also compelled to bind themselves. The key insight of the "credible commitments" literature is that actors can often do better if they remove certain alternatives from their future menu of options. The economy of a country will grow faster, for instance, if a monarch can credibly commit himself to refrain from expropriating an excessive amount of the hard-earned wealth of his subjects (North and Weingast 1989). This can be done if he accedes to Parliamentary control over the power to tax. Like Ulysses preparing for the Sirens, political actors often bind themselves, restricting their own freedom in order to achieve some greater goal. To constrain themselves and others, designers create institutions that are sticky. Stickiness is built into the design of political institutions to reduce uncertainty and enhance stability, facilitating forms of cooperation

and exchange which would otherwise be impossible. Often, the barriers to reform are extremely high: e.g., unanimity requirements in the European Union, multiple supermajorities to alter the American constitution.

The relevant point for the current discussion is that this institutional stickiness characteristic of political systems reinforces the already considerable obstacles to movement off of an established path. Combined with the lack of competitive mechanisms, the weakness of learning processes, and the short time horizons characteristic of politics, it suggests that increasing returns tendencies in political development are often particularly intense.

It should be acknowledged that there is an important characteristic in political systems which runs counter to this line of argument. Because politics is an effective system for mobilizing coercive power, governments may at times be in a position to orchestrate a "jump" from one path to another. Governments, by sanctioning non-participants, can coordinate adjustments in a way that markets might never be able to achieve. For instance, the British government was able to enact a shift to the metric system that would have been difficult or impossible to engineer through the more atomistic mechanisms of the market.[24] And governments are clearly capable on occasion of mobilizing resources for more dramatic changes in course. Such possibilities, however, should not be exaggerated. The metric example represents a relatively modest instance of reversing path dependence. Costs of adjustment were low; the problem was essentially one of coordination -- inducing everyone to make the switch at the same time. For this task, the authoritative rule-setting capacities of government are of great assistance. For reasons already discussed, it is much less evident that governments will generally be willing or able to engineer shifts to a different path when adjustment costs are high. Cases of fundamental or revolutionary reform in well-institutionalized political systems attract our attention precisely because they are so rare.

Politics differs from economics in many ways. Applying tools of economic analysis to politics is treacherous, unless these differences are systematically taken into account. In this instance, attention to the

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[24]Thanks to Alan Jacobs for his suggestion of this example and discussions of the broader issue.

character of politics suggests a striking result. The political world is unusually prone to increasing returns. Both the prevalence and intensity of increasing returns processes in politics support the broad claim that path dependence arguments offer an important tool for understanding political dynamics.

IV. Path Dependence, Increasing Returns, and the Study of Politics

Let me briefly summarize the discussion so far. Where increasing returns processes are at work, the following are also likely to be true:

> (1) *Multiple Equilibria*. Under a set of initial conditions conducive to increasing returns, a range of outcomes -- perhaps a wide range -- are generally possible.
>
> (2) *Contingency*. Relatively small events, if occurring at the right moment, can have large and enduring consequences. Accidents can matter.
>
> (3) *Timing and sequencing* become crucial. In increasing returns processes, *when an event occurs may be just as important as what occurs*. Because early parts of a sequence matter much more than later parts, an event that happens "too late" may have no impact, though it might have been of great consequence if the timing had been different.
>
> (4) *Inertia*. Once an increasing returns process has been established, social actors will face strong pressures to adapt, and these adaptations will generally lead to a single equilibrium. This equilibrium will in turn be strongly resistant to change. Once down the path, inertia will be prevalent.

There are also good reasons to think that increasing returns processes are widespread in politics, since they will be characteristic in institutional development, collective action, and the emergence of our understandings of the political world.

What are the implications for political scientists? What can an understanding of increasing returns contribute to our study of politics, and, equally important, what are the limitations of such arguments? These are the issues which I take up, in a preliminary way, in this final section.

If increasing returns processes are widespread in politics, this has fundamental implications both for the kinds of questions we ask about politics and for the kinds of answers that we generate. With respect to questions, the most important implication is the need to focus on branching points or critical junctures.

Arguably, the main reason these junctures are "critical" is precisely because they generate increasing returns processes which narrow the scope of choice later on.

Thus a focus on increasing returns processes will often suggest a turn to history. At one level, of course, all social scientists agree that "history matters." The existing conditions which influence current social outcomes came into being in some way. Those earlier processes are thus relevant to a full understanding of contemporary social events. Yet the standard argument is that for most purposes we may safely put such issues aside. Looking back leads to the familiar problem of infinite regress. An exploration of each preceding event leading to the conclusion that some other preceding occurrence was also part of the chain of events, and so on. Social scientists, by this line of thought, need to break through the seamlessness of history somewhere, and the present is as good a place as any to do so. George Homans (1967) compared the situation of social scientists to that faced by mine-sweepers who needed to know the magnetic charge of a ship. Such a charge resulted from an infinite range of small factors accumulated over the ship's lifetime. For practical purposes, however, a simple expedient could be used: the current charge of the ship could be measured. If the task is to understand the ship's vulnerability, one can simply cut through the Gordian knot of historical regress.

For many purposes, this is an appropriate approach. Social scientists often have good reason to focus on synchronic causality -- to try to understand how variations in current variables affect present social outcomes. Where increasing returns processes are significant, however, such a strategy will often be problematic.[25]

Increasing returns arguments rest on a conception of "historical causes" (Stinchcombe 1968, pp. 103-18; Harsanyi 1960; Ikenberry 1994), where some original ordering moment caused current patterns, and

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[25]A second powerful objection to Homans' solution is Abbott's trajectory argument discussed on p. 3. We cannot understand the significance of a group's 40% membership level without knowing whether it used to be 90% or 10%. In such situations, we cannot really know where the ship "is" without knowing where it has been.

the activity is continuously reproduced even though the original event no longer occurs. While under conditions of path dependence it is true that current circumstances in some sense "cause" current outcomes, a focus on these simultaneous occurrences is highly misleading. It provides a "snapshot" explanation for what should be seen as a moving picture. In increasing returns processes, the necessary and sufficient conditions for current outcomes may have occurred in the past. Reproduction of the current path is now commonplace, perhaps basically invisible or at least analytically uninteresting. The crucial object of study, the critical juncture, lies in a preceding set of events which set development along a particular path.

If an awareness of increasing returns processes can change the sort of questions we ask, it can also alter the answers that we provide. Put differently, an understanding of increasing returns can be a fruitful source of hypotheses about the sources of social outcomes. One virtue of increasing returns arguments is that they provide a plausible counter to functionalist explanations in political science, which often go unchallenged. Although not always explicitly stated, functionalist arguments are prevalent among political scientists. They are common, for instance, among those who emphasize the rational choices of individual actors that underlie political activity, and the reasonably efficient nature of collective responses to social needs.

Functionalist arguments take the following form: outcome X (an institution, policy, or organization, for instance) exists because it serves the function Y. In a world of purposive actors, it may indeed be the case that the effects of an institution have something to do with an explanation for its emergence and persistence. Arguments about increasing returns, however, suggest the large dangers in any assumption that an existing institution arose or continues to exist because it serves some particularly useful purpose. Thinking in functionalist terms about an existing institution, policy, or social organization may be a good way to derive causal hypotheses, but functional accounts are far from being the only plausible ones. Many alternatives to the outcome in question might have been possible, and a dynamic of increasing returns may have locked in a particular option even though it originated by accident, or the factors that gave it an original advantage have

long since passed away. *Rather than assuming relative efficiency as an explanation, we have to go back and look.* Thus an awareness of the possibility of path dependence necessarily draws social scientists to an investigation of history, if only to evaluate the validity of functionalist assertions.

Increasing returns arguments also direct attention to hypotheses about the role of timing and sequence in politics. Under conditions of path dependence, the same event (e.g., an exogenous shock such as depression or war) often has a radically different impact depending on when in a sequence of events it occurs. Peter Hall (1989) has shown how the timing of the exogenous shock of the Great Depression in relation to domestic sequences of political events (e.g., whether a left or right party happened to be in office) played a critical role in determining divergent patterns of political response. Steven Skowronek (1993) has persuasively argued that we cannot understand the opportunities, constraints and demands that a president faces without placing him within a sequence of presidencies that support or oppose the dominant coalition of a particular period.

Perhaps most exciting is the prospect that an investigation of the sources of increasing returns processes can provide a basis for developing important hypotheses about the sources of political stability and change. To repeat, Arthur's work on increasing returns is ground-breaking not simply because he described the characteristics of these processes, but because he has begun to identify the conditions which are conducive to path dependence. The major ambition of this essay, building on North's work, has been to begin the process of adapting these arguments to the study of politics. Doing so has required careful attention to the distinctive features of the political world -- its intrinsic ambiguity, the prevalence of highly sticky institutions, the prominence of collective action problems, and the pervasiveness of short time-horizons. Not all aspects of political life are subject to increasing returns. Furthermore, this paper has highlighted more specific features of political environments (e.g., those that affect the time horizons of key political actors) which are likely to influence the initiation and reinforcement of increasing returns processes. In short, this is fertile territory for developing new propositions about the conditions that facilitate or impede various types of

political change.

Consider one example. A prominent theme in recent research in comparative political economy is the idea of "varieties of capitalism." Even in the face of a major increase in international economic interdependence, which seems to generate pressures towards convergence, the advanced industrial societies continue to exhibit fundamental differences in their core institutional structures (Soskice 1990; Hall 1996; Berger and Dore 1996). From the current analysis, one can easily see why the elaborate production systems of modern economies would be subject to increasing returns. Start-up costs, not just for new firms, but more fundamentally for the key organizations and institutions which link private actors, are enormous. Organizational forms, and the formal and informal arrangements (both public and private) which help to structure their interactions, are, as North would put it, densely linked "institutional matrices." Coordination effects are widespread; particular courses of action make sense because of anticipated actions of others in the system. Tremendous amounts of learning by doing have occurred over time in these complex systems. In short, national economic systems are highly path dependent, and are likely to exhibit substantial resilience, even in the context of major exogenous shocks such as recent changes in the global economy.

One could also develop more fine-grained hypotheses about the aspects of such arrangements that are most likely to undergo major change. On the one hand, differences in the benefits of adjustment to some alternative path are critical. These may reflect, for instance, differences between local and world prices for a given product (Frieden and Rogowski 1996). On the other, resistance to adjustment will be influenced by the ingredients that generate increasing returns: the costs of start-up, the scope of network externalities and adaptive expectations, and the degree of learning required to make a new system work well. Arguably, many privatization initiatives involve relatively low adjustment costs. Firms may be privatized one at a time, and a change in ownership structures may involve relatively modest change a broader network of economic activity. By contrast, disruption may be much more widespread if adjustment affects many linked economic sectors simultaneously -- as is the case, for instance, with industrial relations systems or systems of health care

provision. Thus, hypotheses about increasing returns may help to explain uneven processes of policy and institutional change.

In addition to generating promising hypotheses about the sources of change and stability, path dependence arguments offer a broader advantage. They can help political scientists to think more clearly and explicitly about the role of time, and history, in social analysis. Indeed, the central properties of increasing returns provide considerable support for many of the key claims of "historical institutionalist" analyses in political science. The phrase "historical institutionalism" is a fortunate one, capturing two critical themes which have been explored in this essay. This work is historical because it recognizes that political development must be understood as a process that unfolds over time. It is institutionalist because it stresses that many of the contemporary implications of these temporal processes are embedded in institutions -- whether these be formal rules, policy structures, or norms (Pierson 1996).

The significance of temporal processes in historical institutionalist analysis is often left implicit or downplayed.[26] Much of this work has been essentially inductive in orientation, and in general practitioners have not been inclined to reflect on their methods. Nevertheless, empirical work in this tradition has highlighted the need to study temporal processes in order to explain critical political outcomes. Historical institutionalist scholarship has often emphasized critical moments in politics, distinctive developmental sequences, and the rigidities that make it difficult for social actors to escape from established paths.

Of course, these recent works of historical institutionalism are in turn built on a healthy tradition of attention to history in the social sciences. Particularly for those pressing to answer critical questions which grow out of the experiences of real polities, the turn to history has been common. Issues of timing, sequence, and critical junctures figure prominently in this body of work. Moore's study of transitions to democracy

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[26]For important exceptions see Skocpol 1992; Skowronek 1993; Orren and Skowronek 1994. In my view, Steinmo and Thelen's otherwise excellent review of historical institutionalism pays insufficient attention to temporal processes (Steinmo and Thelen 1992). For a contrasting review, which stresses precisely these themes, see Ikenberry 1994.

(Moore 1966) and Lipset and Rokkan's analysis of the formation of party systems (Lipset and Rokkan 1967) are two classic examples; many others could be mentioned. Indeed, it is fair to ask whether incorporating the concept of increasing returns (or the broader concept of path dependence) into the study of politics is akin to the man who discovered that he had been speaking prose all his life. Are path dependence and increasing returns merely trendy names for old ideas?

Discussions of path dependence and increasing returns would be worth having if they did no more than focus the attention of fad-prone political scientists on the insights and continuing relevance of this earlier body of work. Yet there is every reason to believe that the concept can do more. Understanding the dynamics of increasing returns processes can greatly sharpen our understanding of *why* particular junctures (and which aspects of those junctures) are critical and why timing often matters so much. While it would take a detailed literature review to document this claim, most of the work just mentioned has been vague on this point. The specific characteristics of positive feedback provide a key -- perhaps the key -- to making sense of the complex mix of stability and bursts of rapid change which characterize so many political processes. As just discussed, an investigation of increasing returns processes can generate sharper hypotheses about the sources of divergent paths and social inertia. In an oft-abused but still useful phrase, attention to the character of increasing returns can help provide the *micro-foundations* which lay bare how the actions of individuals aggregate to produce fundamental, macro-level outcomes.

There are, of course, important difficulties with increasing returns arguments as well. Two require at least brief attention. The first, more narrowly methodological, concerns the difficulty of testing hypotheses involving complex, path dependent arguments (Geddes 1997). The "many variables, few cases" problem which has recently received renewed attention in political science (Keohane, King and Verba 1995) is worsened in path dependent arguments, which require analysts to evaluate sequences of variables over time. This need not pose particularly acute problems for studying outcomes where it is possible to generate many cases (e.g., the formation of interest groups), but it is a problem for increasing returns arguments that operate

at a more aggregated level. Of course, this need to generate more cases helps to explain why comparative politics has always been the natural home for analyses emphasizing path dependence. Counterfactual analysis is also emerging as an important tool for such studies (Fearon 1993; Tetlock and Belkin 1996). As Geddes argues, there are ways to deal with the "small n" problem, but they demand careful research designs, and are unlikely to be adequate for anything but fairly simple increasing returns arguments.

A second problem concerns the understandable suspicion that increasing returns arguments yield an overly static view of the social world. Arthur's polya urn processes, to take the starkest illustration, all settle on a particular equilibrium and then essentially stop. Increasing returns processes seem to generate only brief moments of "punctuation" in a largely frozen social landscape. To many, the significance of increasing returns is belied by the evident dynamism of social life.

There are three important replies to this sensible challenge. First, while dynamism in social life is indeed apparent, the very large islands of inertia are an equally striking -- and in many respects puzzling -- aspect of political development.[27] Second, I must emphasize again that there is no claim here that *all* social processes are subject to increasing returns. Just as many -- probably most -- technologies are not subject to increasing returns, so many political environments will fail to exhibit positive feedback. The entire point of this essay is that we are beginning to understand which social contexts are conducive to such effects, and which are not.

This leaves political scientists with a tremendous challenge. If political environments are made up of a variety of linked contexts, some of which are prone to increasing returns and others are not, we need to investigate what happens when these different tendencies "collide." This difficult agenda -- which will worsen the methodological problems which Geddes identifies -- would seem to be at the heart of the recent work of Karen Orren and Steven Skowronek (Orren and Skowronek 1994). Rigid structures may be overwhelmed by external pressures. Indeed, much research on path dependence and critical junctures has

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[27]Echoed, for instance, in the well-known query in rational choice theory: "why so much stability?"

stressed precisely the crucial role of exogenous shocks in sweeping away long-established but increasingly inflexible political arrangements. Increasing returns arguments should not be understood as an alternative to more "dynamic" investigations of political processes, but as a critical analytical building-block for understanding the complex interplay of social stability and social disruption.

Thus, increasing returns arguments open up an exciting research agenda in political science. In addition, an understanding of increasing returns processes can make one final contribution to political scientists: a healthy dose of humility. Since the rise of behaviorism, many political scientists have had lofty aspirations about developing a science of politics, rooted in parsimony and generalization, and capable of great predictive power. Despite modest achievements over a period of four decades, these aspirations remain. Setbacks are shrugged off with calls for more time or more sustained application of the proper methods. Yet the inability of political scientists to generate powerful generalizations that facilitate prediction remains a puzzle. If the prevalence of increasing returns processes is indeed a distinctive feature of politics, however, then we have been looking in the wrong place for an explanation. The problem lies not in our methods, but in the character of the political world itself.

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