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# CULTURAL EVOLUTION AND CONSTITUTIONAL PUBLIC CHOICE: INSTITUTIONAL DIVERSITY AND ECONOMIC PERFORMANCE ON AMERICAN INDIAN RESERVATIONS

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**Stephen Cornell and Joseph P. Kalt**

**Working Paper No. 192**

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## IRIS Summary

Extensive economic research and history continue to point to the crucial importance of a society's institutions of collective action, especially the institutions of government, in explaining economic development and social well-being. Such institutions lay down the "rules of the game" that determine the incentives and constraints that individuals and groups face when they save, invest, produce, trade, cooperate, coerce, and otherwise interact in the process of specialization and exchange from which development arises. Notwithstanding the importance of institutions and the rules of the game they establish, they are collective goods. As such, their provision and maintenance are subject to non-cooperative free riding by individuals, and standard economic analysis encounters significant difficulty in explaining the non-coercive emergence, persistence and evolution of the institutions of government. Consequently, under many different labels, there is presently a convergence of social science interest on understanding the foundations of effective collective institutions of government.

This paper argues that the foundations of effective collective institutions rest on the processes of normative and positive acculturation of individuals, and we refer to socially shared normative and positive conceptions (or "norms") of proper and feasible behavior in the realm of human action as "culture." In this framework, culture -- especially a society's set of political norms -- constitutes an informal social contract. Based on extensive field and quantitative research into the economic performance and constitutional structures of contemporary, self-governing American Indian societies in the United States, we set forth and tests (to the extent possible) an evolutionary theory of the social contract.

The extra-constitutional social contract is the set of political norms that are transmitted over a network of rational, but socially-constructed (acculturated), individuals. In this theory, rationally self-interested individuals have capacities for the relevant preferences (i.e., the "social sentiments") of a social being that engages in specialization and exchange. Culture provides the specific content to such latent preferences (i.e.., constructs tastes). As social beings, individuals are sending and receiving nodes within a network of individuals. The cultural norms that survive and reproduce do so through a process of environmental selection, as opposed to a process of individual choice that aggregates to an invisible hand. The consequence is a theory of cultural evolution. The theory predicts sustained heterogeneity of institutional forms (e.g., types of government) across societies, path dependence in the evolution of cultural norms and institutional forms, and heterogeneity of successful institutional forms.

The evidence drawn from contemporary American Indian reservations reveals considerable variation in economic and social conditions. Unemployment rates, for example, vary from the single digits to levels approaching 90%; and economic systems range from highly developed industrial

economies to reservations that are almost entirely dependent on transfer payments and public programs of the U.S. Government. We find that economic success and independence is correlated with reservation governments that have "checks and balances" mechanisms for enforcing a rule of law and for channeling rent-seeking into productive activities. Consistent with our predictions re: path dependence of norms, we find that successful reservations are marked by a congruence between the structure and functions of their peoples' historic 19th Century pre-reservation governments and the contemporary governments under which they operate. Such congruence, where it occurs, is largely serendipitous, as reservations' contemporary constitutions were generally imposed on reservations by the Federal Government in the 1930s. Moreover, consistent with predictions re: the heterogeneity of successful governmental forms, we find that, while successful reservation governments are all marked by the rule of law and institutional constraints on wasteful rent-seeking, they vary dramatically in the ways by which they arrive at these traits. Successful reservation governments range from textbook parliamentary democracies to tractional theocracies.

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# CULTURAL EVOLUTION AND CONSTITUTIONAL PUBLIC CHOICE: INSTITUTIONAL DIVERSITY AND ECONOMIC PERFORMANCE ON AMERICAN INDIAN RESERVATIONS

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## I. INTRODUCTION: EVOLUTIONARY REASONING AND CONSTITUTIONAL POLITICAL ECONOMY

In a major contribution to social science reasoning, Armen Alchian set forth in "Uncertainty, Evolution, and Economic Theory" an alternative to neoclassical economic mechanisms of change and equilibration in individual and organizational behavior (Alchian, 1950). Alchian's mechanism -- what he called "environmental adoption" -- replaced orthodox utility maximization and profit maximization with agents that draw on suites of adaptive, imitative, trial-and-error, lucky, and goal-directed strategies. With conscious use of Darwinian language, Alchian defines success in terms of survival, and surviving strategies are selected on the basis of their relative performance (fitness) in an environment in which resource constraints mean that not every strategy can survive. Rationality, in the usual sense of informed transitive choice over more or less complete preference orderings under conditions of scarcity, remains

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standing only as a special case of models that produce downward sloping demand schedules and (relatively) efficient outcomes.

Those of us fortunate to have become students of Armen Alchian recognize his characteristic intellectual trait in his pioneering of evolutionary approaches to economic problems.[2] There is a methodological preacher in Armen Alchian. The message is at the heart of the UCLA School that stands as his legacy: Economics is a *social* science. The goal of economics is not to test economic models, as the range of "economic" may be defined by the sociology of the profession at any particular time. The goal is to understand society -- why it is like it is, why it changes as it does. With appropriate deference to Occam's Razor and the "as-if" Popperian positivism of the Chicago School, there remains in Alchian's message a methodologic questioning: Be careful with any single set of axioms and theorems; there might be some, or whole ranges of, interesting social phenomena that your model won't be able to capture. And, infused in this verifiable proposition, there is the philosopher's benevolent advice to probe the methodologic edges of social science inquiry.

The introduction of evolutionary modes of reasoning into analysis of economic problems is, indeed, methodologically stretching in at least several notable ways. First, it turns attention away from motive and intention in human behavior. In particular, invisible hand mechanisms for explaining the position and movement of such social phenomena as the state of the economy and the operation of political institutions become truly impersonal, i.e., not

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[2] Among the two of us, Kalt is a 1980 UCLA Ph.D. in economics, with an unpayable debt to Armen Alchian for his teaching, advising, and mentoring. As a University of Chicago-trained sociologist, Cornell is not so fortunate, but has been privileged to spend several hundred man-days in the field, mostly on long drives through rural America, over the last seven years, listening to and challenging the methodologic speculations of one of Alchian's students.

necessarily choice-theoretic in even their microfoundations. Second, evolutionary modes of reasoning draw attention away from stasis, homogeneity and equilibrium, focusing scholarly attention on change, heterogeneity, and disequilibrium. Finally, when the evolutionary reasoning of the biologic sciences is applied to social phenomena as not mere metaphor, but as a competing substantive paradigm, it pulls analysis away from models of human behavior as individual optimization subject to constraints. Even if such models remain valid and useful in their own realm (in which questions such as "why those tastes?" are off-limits), the evolutionary perspective seems pregnant with the promise of more complete explanations of social phenomena in which diversity (and perhaps, mutability) of individuals, groups and institutions seems to be

pervasively at the heart of outcomes,[3] and actual behavior is undertaken in the messy environment of uncertainty, luck and learning that Alchian investigated in his seminal piece.[4]

Alchian introduced the case for evolutionary modes of reasoning in the context of familiar market institutions such as firms. At the present time, however, the call for such modes of analysis is nowhere more pressing than in the investigation of non-market behavior and institutions. Public choice economics and the related subfields of other social sciences have pushed themselves up against the very difficult problem of understanding the origins, change and sustainability of the collective institutions that devise, implement and enforce a society's crucial

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[3] Consider, for example, the explanatory fate of neoclassical economics in the face of the following (somewhat) stylized facts: Holding constant the effects of price, income, expected criminal penalties and other monetizable determinants of demand, per capita consumption of cocaine in New York City is much, much higher than in Salt Lake City, Utah. Heuristically, the demand curve for cocaine in Salt Lake City lies much closer to the price axis than the demand curve of the representative individual in New York. Neoclassical theory is relatively powerful in predicting that both cities' demand schedules are negatively sloped, but quite poor at explaining the positions of the respective schedules. For many questions (such as how much consumption will be reduced if supply interdiction by law enforcement authorities succeeds in raising price), the neoclassical perspective may indeed be potent. Yet, for other questions that are arguably much more interesting questions (such as why the cocaine business is so much bigger in New York City than in Salt Lake City), neoclassical analysis is of little help. It seems obvious that religious beliefs in the two populations have more than a little to do with the phenomenon, and the neoclassical approach might find ways to describe the effects of religion in choice theoretic terms -- with reference to the relative size of the penalties for illicit drug use that participation in a particular religion (e.g., Mormon) might entail. Going down this path, however, is largely a linguistic exercise in saving the discipline. It begs the question of why the constraints of religion that are holding back the choices of residents of Salt Lake City took hold and persist. The Stigler-Becker (1977) offer to explain present heterogeneity of tastes (i.e., the positions of demand schedules) by reference to past differences in experience with the good at hand in a population of originally homogeneous individuals offers no particular assistance. It means that particular phenomena of interest, such as why cocaine use is so much higher in New York City than in Salt Lake City, are extremely path dependent and, thereby, largely immune from economic analysis. In fact, such path dependence suggests the need to turn to modes of explanation that worry themselves with matters such as why particular traits successively disperse themselves throughout a population, while other traits remain confined or are eliminated. The very language here suggests the usefulness of evolutionary models.

[4] The "messiness" referred to here gives rise to what Alchian suggests in his analysis. Namely, processes of "environmental adoption" (read *evolution*) provide room for survival of multiple phenotypes (e.g., types of firms in a given industry) within a given system at any point in time and over time, and no individual type can be said meaningfully to be optimally adapted (particularly when dynamic environmental change makes success in subsequent periods dependent on present period traits).

"rules of the game." This study presents the outlines of an interdisciplinary model of at least part of the problem: the embeddedness of individuals as social animals in implicit, extra-choice social contracts.[5] We draw on the results of research we have been conducting over the last seven years on a particularly fruitful sample of several hundred (recently) self-governing mini-nations which are struggling with the problems of launching and sustaining productive economic systems -- contemporary American Indian reservations in the United States. We argue that: (1) the evidence strongly supports the key hypothesis that a form of implicit social contract founded on durable cultural norms of political propriety undergirds the formal institutions of successful societies, and (2) this finding is consistent with a model of cultural conventions shared over a network of socially constructed rational individuals.

## II. THE WEALTH OF NATIONS AND THE SEARCH FOR THE SOCIAL CONTRACT

Evolutionary modes of reasoning hold particular attraction at the present time for social scientists interested in economic development. Hard theoretical and empirical research, as well as recent world events, continue to drive home the point that the formal and informal institutions by which people govern themselves hold the necessary, if not sufficient, keys to the wealth of nations. From the kind of theoretically-informed search for generalizable paradigms represented by North (1981, 1990), Ostrom (1990, 1992), Putnam (1992), Olson (1982), and Bates (1992), to concrete case studies and everyday reports from the World Bank (e.g., 1991, 1994), to the "natural" experiments such as East/West Germany and North/South Korea, a

[5] As made clearer below, we are using "extra-choice" here to capture the idea that the process of embeddedness is not logically representable in the terms of standard neoclassical economic choice theory, but is, instead, a process of learning and acculturation.

central lesson of the post-WWII period seems to be that it is institutions and the policies that flow from them that determine at least whether a society is able to move close to the production possibility frontier defined by its resources, or whether it will be consigned to poverty far off the frontier.

The almost cliche advice of economists to the effect that economic development "requires getting price signals right and creating a climate that allows businesses to respond to those signals in ways that increase the returns to investment" (World Bank, 1994 at 61) has been vindicated as a general matter. But "getting prices right" (i.e., establishing and sustaining markets) and creating an environment that channels rent-seeking into productive endeavors requires a whole panoply of formal and informal social institutions that set down the "rules of the game." Formal institutions range from courts and constitutions to laws and regulations. Informal institutions range from norms regarding whether it is proper to vote to standards of on-the-job behavior. Getting prices and incentives "right" requires getting institutions "right."

North (1990; and, of course, many others) must have the basic story of the primacy of institutions down right: (1) *Specialization* is productive, apparently reflecting diseconomies of scope in (at least) human capacities. (2) Successful specialization requires a certain amount of *coordination* (so that an appropriate mix of desired goods and services is produced within a group) and *exchange* (so that members of a group are not stuck solely with the particular item they produce). (3) Coordination and exchange require *enforceable and stable rules* of allocation and dispute resolution. (4) Rules of allocation and dispute resolution require *third-party enforcement* by parties restricted in their ability to wield enforcement powers for self-aggrandizing rent-seeking.

The ability to create a list like the foregoing oversimplifies the challenge of economic development. In point of fact, there cannot be much of the world that has not been exposed to some version of the "get prices and institutions right" advice. Yet, in society A the advice takes hold, and in society B it does not. More generally, notwithstanding the change in political and market affairs occasioned by the collapse of the Soviet Union, it is hard to argue that there are invisible hand-like forces compelling convergence of political and economic systems on an optimum -- at least not at a rate sufficient to make convergence a more interesting topic than the diversity of systems that seems to predominate.

The challenging problem for human beings that is embedded in the New Institutionalist description of the foundations of economic development (and social success, more generally) is that the rules of the game, and the institutions through which those rules are devised, implemented and enforced, are classic shared public goods. As such, their creation and maintenance present self-interested individuals with Prisoners' Dilemmas, rife with defection and free riding opportunities. Ordinary, self-interested rationality by utility maximizing humans gives the invisible hand fits under such conditions, and the provision of mutually beneficial rules of the game and associated institutions, much less their optimal provision, is problematic in the extreme. How have many groups of humans succeeded in getting out, and staying out, of the Hobbesian world?

In one form or another, this question is now at the heart of burgeoning research efforts among social scientists (of all subdisciplines), biologists, psychologists, and neuro-physiologists. There is a logic to the convergence of disciplines on the matter. Beginning with economics, the search for some original voluntary binding of economically rational individuals

to a formal or informal constitution by which they agree to coordinate, legislate, adjudicate, and enforce mutually beneficial rules of the game has proven illusory. The problem is not the collective consumption attribute of rules and institutions as public goods; invisible hands can supply public goods when would-be free riders can be compelled to reveal and pay for their demands by exclusion devices (Demsetz, 1970). The analytic problem for economic models of governing social rules and institutions arises from their nonexcludability. As Hirshleifer (1976), North (1990), Buchanan (1972) and others have stressed, there is no meta-enforcer of contracts and constitutions by which we can bind ourselves to abide by laws and constitutions, or by which those individuals who control the instruments of governance at any particular time can be held to the role of the disinterested third-party enforcer. Contractarian theories of public choice are incomplete: we cannot write a contract or constitution to abide by our constitution without falling into an infinite regress of such contracts. Within a Contractarian framework, formal institutions of social control should be archetypically subject to defections and free riding. If such institutions should somehow arise, ruling cliques should overthrow (or at least whittle away at) them, otherwise well-meaning citizens should wait for their neighbors to bear the costs of policing such usurpers, and innumerable scofflaws should cheat on their taxes and run traffic lights.

The game theoretic approach to the problem of the genesis and maintenance of the rules and institutions of social control has taken as a major piece of its research agenda the discovery of the genesis and sustainability of cooperative behavior in Prisoners' Dilemma settings in which defection from cooperation with one's fellow members of society might readily seem individually rational (Axelrod, 1984; Maynard Smith, 1982). As Binmore's (1994)

comprehensive survey and analysis make clear, the results of the game theory search for cooperation out of conflict might best be described as a set of "partial possibility" results: In the long run in the infinitely repeated Prisoners' Dilemma with a fixed number of players who make no mistakes, equilibria can exist in which players cooperate. An infinite number of paths of intermediate play, however, can end up in this long run state; at any point in time, observed equilibrium strategies can be expected to be mixed strategies of cooperation and defection. The workings of economic rationality do not promise to eliminate "nasty" strategies, and both "nice" strategies of readily established cooperative behavior and "nasty" strategies may be upset by invasion by players entering from outside (Binmore, 1994 at 192-203). In fact, no strategy is stable in the face of invasion by outsiders in the infinitely repeated Prisoners' Dilemma (at 198).

Anything approaching *guarantees* of stable cooperative behavior requires, at a minimum, shared common knowledge -- knowledge not that everyone is rational, but commonly understood conventions about how behavior is to be coordinated (Binmore, 1994 at 5-6 and 139-40; also Aumann, 1976). Explanation of how people coordinate and cooperate that makes reference to commonly shared conventions, however, takes game theory approaches outside the realm of own-utility maximizing automatons and begins to embed them in socially-constructed shared histories and contexts. That is, such explanation starts down the path toward something like a social contract as the source of sustained cooperative behavior in models of human interaction and as the undergirding of formal institutions of social control in real societies.

In fact, that is exactly where we are headed. As Hirshleifer (1980 at 655) summarizes: "There is no doubt that, from the most primitive to the most advanced stages of society, a higher degree of cooperative interaction...takes place than can be explained simply

as a pragmatic option for totally egoistic man." As each of the social science disciplines, using its own terminology and arriving at key conclusions at its own speed, turns its research skills to the questions of why some societies are successful and others are not, the existence of extra-constitutional informal shared conventions and perceptions is more or less being deduced as a necessity: If invisible hand mechanisms emanating from the choice-theoretic micro-foundations of economics cannot adequately explain the genesis and life histories of societies' crucial institutions of collective action, what else is left? With formal institutions written on perishable paper, people must come to the game every day with informal constraints on their free riding and defection and informal prods toward cooperative outcomes -- constraints and prods that are not the product of neoclassical economic behavior. When a Buchanan (1972) confronts the "paper" foundations of Contractarianism and a Tullock (1993) asks "Why so much stability?", the economist starts looking for an understanding of shared "ideologies" (North, 1981, 1988, 1990), the rational choice brand of political scientist advises turning to our "sociologically-minded brethren" (Bates, 1988), more traditionally originating political scientists start investigating "social capital" (Putnam, 1992), sociologists and anthropologists reinvigorate models of "cultural norms" (Coleman, 1990; Elster, 1989), and historians find explanations for social and economic decay in mismatches between societies' sociopolitical cultures and their formal institutions (Davidson, 1992). Indeed, a new imperialist appears on the scholarly scene -- sociobiology, threatening to send all of the social scientists off to work on other problems (Wilson, 1975, 1978).

As the New Institutionalism, with its property rights, public choice and Contractarian antecedents, gives way to what we might as well call the New Social Contract

Theory, it is not the case that the Stiglerian chant of "no testable implications" can be used to protect the walls of economics. Neoclassical, choice-theoretic economic models are not the only testable models of individual and social human behavior. In fact, that is what Alchian's foray into evolutionary modes of reasoning demonstrates.[6] Evolutionary modes of reasoning are likely to stand at the center of the New Social Contract Theory, putting evolutionary selection mechanisms in the place that individual-level utility maximization and social-level invisible hand theorems might otherwise occupy. This is clearly the case when biologic explanations enter the Theory. But it is also likely to be the case when the Theory makes reference to such concepts as common knowledge, shared ideologies, cultural norms, and social capital. As the "ideational" (as opposed to the genetic; Durham, 1991) pre-choice genesis of human behavior, their nature seems to call for models of mutation, invasion, dispersion through populations, and success-as-reproduction.

We now turn to outlining a version of a New Social Contract Theory. For purposes of drawing out testable implications, we focus in particular on the position within this Theory of what can be called the socially-constructed rational individual. To provide empirical context, and some tests of hypotheses, we embed our discussion in the results of our research on the performance of self-government on contemporary American Indian reservations in the United States.

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[6] Alchian's insights are echoed by Becker's (1962) demonstration that the central tools of economic reasoning (including the laws of demand) can be derived through a process equivalent to Alchian's "environmental adoption" without reference to the (within field) untestable axioms of neoclassical utility theory.

## III. SUCCESS, FAILURE, AND INSTITUTIONAL DIVERSITY AMONG AMERICAN INDIAN NATIONS

### III.A Institutional Setting

As a result of a series of U.S. Supreme Court decisions over the last two decades and the Indian Self-Determination and Education Assistance Act of 1975, American Indian tribes on U.S. reservations have a very high degree of political sovereignty.[7] Tribes generally have rights of self-government exceeding a state's, with the ability to establish their own courts, police, legislatures, bureaucracies, business and environmental codes, tax systems, civil and criminal procedures, and most of the other functions of sovereign polities.[8] Most tribes operate under constitutions that were drafted by the United States Government in the 1930s, pursuant to the Indian Reorganization Act (IRA) of 1934. IRA constitutions were modelled after business or social club boards of directors. They typically provide for: (1) a representative tribal council of (commonly) 7-20 members with legislative powers; (2) a tribal chairperson or president selected in parliamentary fashion by the council or in U.S. executive fashion by direct popular

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[7] A word of caution and perspective: The use of terms such as evolution, cultural norms, customs, etc. in a study that focuses on "tribes" might conjure up the image of a long tradition of anthropological research which concerns itself with pre-industrial peoples. Our research is not in that tradition. "American Indian" and "Tribe" are the self-designations of American Indian polities in the U.S. (in Canada, both terms are politically incorrect). Images of primitivism, however, have no relevance to the current state of reservation life. In terms of daily *activity* American Indian reservations are modern societies, with factories, schools, bureaucracies, businesses, social clubs, and so on. As with other societies (e.g., many holidays and customs in the U.S. trace back to primitive European practices), activity is conducted within the context of highly path-dependent custom and convention with deep historical roots. What perhaps does distinguish such contextual settings in Indian Country is that the particular military, social, and political histories of most tribes bring issues of temporal continuity in tribal cultures to center stage in discussion and debate.

[8] While the boundaries between tribal sovereignty and federal and state authority are contentious and somewhat unstable, the key elements are that tribes are subject to U.S. civil rights laws (including the Bill of Rights), tribes and tribally-owned enterprises (but not private Indian enterprises or individuals) are free of non-tribal taxation, state governments have very little regulatory authority on reservations, and congressionally mandated federal regulatory authority is often subject to lax enforcement or exemption. See Cornell and Kalt (1994).

election; (3) little or no provision for judicial institutions or functions; (4) little enumeration of powers of the various parts of the tribal government; and (5) a requirement that the U.S. Secretary of the Interior approve of any changes in the tribal constitution. Even tribes without IRA constitutions often had their constitutions drafted by others (e.g., at the time of a treaty), and non-IRA constitutions often follow the foregoing enumerated structure.

We believe that the particular history of the origins of the formal institutions by which contemporary American Indian reservations today are governed provides hard-to-find "torque" to research questions of the kind raised here. Because tribal constitutions were effectively imposed on tribes in most cases (and changes in those constitutions were and are often made subject to control by an outside power through Secretarial approval), and tribes demonstrably differ a great deal in their present and historic sociopolitical cultures, the Indian context affords the possibility of observing mismatches between "social contracts" and formal institutions. The public goods theory of such institutions reviewed in Section II above directly yields the hypothesis -- testable because of the torque of the Indian setting -- that a mismatch between the underlying social contract and the formal institutions of a self-governing society should lead those formal institutions to perform relatively poorly. Moreover, because we have tribes with the same formal institutions (derived from the IRA), but with different sociopolitical cultural settings (contracts), the Indian context provides some prospect of isolating the social contracts as undergirding determinants of social success. Lastly, because American Indian societies are relatively homogeneous within-tribe and heterogeneous across-tribe, and because within-tribe homogeneity is much clearer than in larger nations such as the U.S. (where it may

be harder to conclude that a particular cultural attribute is widely shared), it may be possible to generate observable paths of cultural evolution within Indian societies.

## III.B Economic and Social Conditions on Reservations

As a general matter, American Indian reservations are quite poor communities. Reservation Indians are the poorest minority in the U.S., with average unemployment across all reservations typically around 50% (even without adjusting for the not-surprising large discouraged worker effects on officially-defined Bureau of Labor Statistics unemployment). Average social conditions are correspondingly unsatisfactory, with rates of social pathologies (e.g., suicide, crime) far above the rates for the U.S. as a whole.

Such "average" images of struggling and underdeveloped economies mask diversity in reservation performance (Table 1). Some reservations appear to be almost pure transfer and grant economies with little on-reservation economic productive activity and most employment in social service sectors. The Pine Ridge reservation in South Dakota, for example, is the poorest community in the United States, according to the U.S. Census. At Northern Cheyenne in Montana, the Tribe reports that approximately 95% of all reservation income is derived from federal and state programs, with the remaining small amount of income coming from on-reservation agricultural production. At the neighboring Crow reservation, on paper, the Tribe is one of the wealthiest societies in the world as a result of extremely rich endowments of coal and agricultural lands, with measured per capita wealth exceeding $3,000,000 as of 1988; yet, the effective rate of income generation off of this wealth amounts to an annual rate

of return of approximately 0.01% (Cornell and Kalt, 1991). As at a number of reservations, Crow unemployment adjusted for discouraged workers is in the range of 80%-90%.

**Table 1 approx. here**

In contrast, some reservations have been booming economically and rapidly progressing in terms of social conditions. This holds even outside of the much-publicized cases of successful gaming tribes (which have been able to capitalize on their sovereignty and capture niches in the gambling market). The Flathead reservation in Montana, for example, is the site of an extremely healthy private sector economy based on agriculture and tourism, with real incomes growing and unemployment appearing to be at the economist's "natural rate" (Cornell and Kalt, 1996). With a different strategy -- i.e., tribal ownership of enterprises -- the Mississippi Choctaw have made the Tribe the fourth or fifth largest employer in the State of Mississippi, and the traffic flow at morning rush hour is *onto* the reservation as non-Indians commute to work at the Tribe's automobile subassembly plant, its industrial park, its greeting card factory, its shopping centers, and its tribally-run schools and other social service organizations. The White Mountain Apaches in Arizona have followed a similar organizational strategy to build a natural resource-based economy that is the economic base for Indians and non-Indians in its region. With a tribal membership of 12,500, the White Mountain Apaches operate tribal enterprises with revenues of $80-$100 million per year, including a major logging

and sawmill industry, a ski resort, the premier for-fee sport hunting business in the United States, and an aerospace manufacturing subcontractor.[9]

### III.C Explaining Cross-Tribe Differences in Performance

With tribes operating in a common policy environment vis-a-vis federal and state authorities, and with all tribes being turned loose to pursue self-government in approximately the same way at approximately the same time, what explains the fairly sharp differences in their economic performance since the start of the self-determination period? The answers to this question of the origin of the wealth of Indian nations are, of course, multi-layered and incomplete. We believe the evidence is strong, however, at a number of layers of inquiry.

First, it is clear that formal institutions matter in precisely the "get the institutions right" sense. In previous research, we have reported cross-sectional analyses of the 67 largest tribes (populations over 700) for which data on economic performance and plausible explanatory variables is available (esp. Cornell and Kalt, 1991). These analyses indicate with quite strong degrees of statistical confidence that, holding constant variables suggested by neoclassical growth theory (including human capital endowments, natural resource endowments, marketplace opportunities, and the like), constitutional forms add significantly to the explanation of cross-tribe differences in economic performance. The relevant results are shown in Table 2, which

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[9] The willingness of the Apaches to "marketize" their forest-based resources prompted us to write a section of a recent study entitled "Was Ronald Coase an Apache?" Based on analysis of the economic and ecological impact of Apache management (e.g., tribal members would have to pay the going market price of $15,000-$20,000 to hunt the Tribe's trophy elk), the answer, heuristically, is "yes" (Cornell and Kalt, 1994).

reports the *ceteris paribus* contribution to the level of tribal employment of alternative formal governmental institutions.

**Table 2 approx. here**

Over the sample, the combination of a directly-elected chief executive and an independent judiciary adds the most to tribal economic performance -- raising employment almost 20 (19.9) percentage points relative to a tribe governed by an "athenian" democracy with no independent judiciary. The latter is the poorest performing form of formal government in Indian Country. "Athenian" democracies (known as general councils in Indian Country) make every voting age member of the tribe a member of the tribal council. In so doing, they turn the political arena into a tragedy of the commons for rent-seeking political factions and individuals (Cornell and Kalt, 1991, 1992). Directly-elected chief executives and independent judiciaries, on the other hand, provide countervailing power bases that serve as checks and balances on rent-seeking through political action.

At a second layer of inquiry, we believe the evidence is compelling that there is, indeed, a social contract that undergirds successful formal institutions of self-government and, thereby, social and economic success at the level of Indian nations. The foregoing description of the contributions of various forms of formal governmental structures does not explain all of the variation in the performance of cross-reservation economies. As shown in Table 1, tribes differ sharply in the economic performance (the first and second columns of figures), and such differences persist when performance is measured (conceptually) as distance from the production

possibility frontier defined over resource endowments and governmental form (column three of Table 1). In particular, holding constant production possibility frontiers (as given by resource endowments, etc.) *and* holding constant governmental form, there remain sharp differences in tribal economic performance. In Table 1, for example, the White Mountain Apache and the Pine Ridge (Oglala Lakota) Sioux have very similar strong-chief-executive/no-independent-judiciary IRA governments from the 1930s. Yet, the Apaches are performing more than 20 percentage points (in terms of employment) higher than would be predicted by neoclassical growth theory mediated by the New Institutionalism, and the Sioux are performing 20 percentage points more poorly than predicted (column 3, Table 1).

In previous research, we have hypothesized that such differences arise as a result of mismatches between indigenous tribal sociopolitical norms regarding the location, scope, source, and structure of political authority, on the one hand, and the (imposed) formal institutions of tribal government, on the other (Cornell and Kalt, 1991, 1995). It is relatively easy to document the immediate (commonly in the second half of the 1800s) pre-reservation governmental systems of a number of tribes. As self-governing societies that had passed the test of environmental adoption to that point in time, such systems were embedded in the indigenous, diverse cultures of tribes. In some cases, the basic structure of a tribe's contemporary government accords well with the historic structure of that tribe's government; in other cases, the mismatch is stark. Thus, for example, the quite successful Cochiti Pueblo has never given up its traditional theocracy, has no written constitution, and operates a highly productive tourism and retirement home economy; Cochiti shows a "match" in Table 1 (Cornell and Kalt, 1996). On the other hand, the current Crow government of undifferentiated athenian democracy bears

little or no resemblance to the hierarchical and two-branch governmental structure of pre-reservation Crow society; Crow is a "no match".

Applying pseudo-regression Boolean procedures (Ragin, 1987) to the sample of twelve tribes for which data on current and prior governmental systems are obtainable and which are shown in Table 1 permits testing as to whether a "match" between the current governmental system and the indigenous sociopolitical culture adds significantly to our ability to explain and predict the relative economic performance of tribes. As we report in Cornell and Kalt (1991), the results are very interesting. Our tests indicate that economic success (defined either as the ability to sustain growth in the present period of self-determination, or as the ability to simply sustain more than a grants and transfers economy) is undergirded by a set of jointly necessary and sufficient conditions: Economic success requires (1) the willingness to specialize and engage in trade with the broader off-reservation economy; (2) a non-trivial stock of at least one resource (e.g., human capital, natural resources); (3) a formal governmental structure that provides some mechanism of confining the government to the third-party enforcer role;[10] and (4) a match between indigenous cultural norms governing political affairs and the present formal governmental institutions.[11]

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[10] Note that there is huge diversity in this regard. The Flathead reservation has opted for a highly developed U.S.-style judicial system, including participation in a third-party intertribal appeals court. At Cochiti, with its traditional theocracy, when asked what prevents the extremely powerful theocrat from moving from third-party to interested party, senior tribal leaders report (paraphrasing): "He wouldn't do that, but if we did catch him with his fingers in the pie, a group of the senior males would get together and declare him senile, thereby removing him from power." In fact, this group of senior males is made up of appointed War Captains, which the traditional theocracy at Cochiti continues to vest with impeachment powers. See Cornell and Kalt (1996).

[11] Note that these conditions do not imply a naive view that tribes could all perform well if they could just go back to their traditional ways. For example, a tribe with a traditional government of the athenian form would not be expected to succeed in the environment of the 1990s. A tribe that may have

In Cornell and Kalt (1995), we show that a detailed dissection of Apache and Sioux societies reveals that the pre-reservation Apache produced notably hierarchical governing structures with authority (including legislative and judicial) centered in single, charismatic chieftains. Among the Oglala (Sioux), on the other hand, single autocratic chieftains were seldom created, and executive functions were performed by multiple individuals selected, parliamentary-style, by a sitting legislature. In a sense, it appears that the White Mountain Apaches got "lucky". The IRA constitution, with its directly-elected chief executive and absence of an independent judiciary, which was essentially imposed on both White Mountain and Pine Ridge, "matched" the Apaches' indigenous norms of political legitimacy relatively closely. As shown in Table 1, the Apaches have begun to prosper in the era of self-determination, while the Pine Ridge reservation remains desperately poor. In fact, the mismatch of formal governmental institutions and cultural norms of political legitimacy appears to be a recipe for defection and the breakdown of cooperation in the extreme: Pine Ridge tribal government is extremely unstable, with only one tribal president being re-elected to the office's two-year term since elections began in 1937; and the single re-elected individual emerged as the faction leader favored by U.S. federal officials during the armed Wounded Knee civil war in 1973.

### III.D Summary

In short, the evidence derived from contemporary American Indian reservations is supportive of the conclusions that: (1) economic and social success require "getting

survived without significant "international" trade in a pre-reservation period could not expect to succeed with that strategy now. Furthermore, it is reasonable to conclude that, in the course of things and absent federal imposition, tribes' pre-reservation governmental forms would have continued to evolve, albeit in diverse and path-dependent ways.

institutions right" in the way that Section II implies; (2) formal institutions of social control and organization are shared public goods for which no meta-enforcer exists to shut down defections and free riding; and (3) successful formal institutions of governance are founded upon on informal, shared system of coordinating norms and conventions that we can call a social contract. Having set forth evidence that seems to support the logical deductions (as discussed in Section II) that lead to the existence of a social contract as the glue of society in an otherwise Hobbesian world, the question of how this contract "works" -- its genesis and evolution -- remains. To this point, we have said nothing of particular force that would explain how the social contract comes about and how it operates.

## IV. CULTURAL NORMS AND NETWORKS OF SOCIALLY-CONSTRUCTED RATIONAL INDIVIDUALS

The American Indian cases exhibit a number of attributes that appear to be more generally applicable to the evolution of societies. Beyond the mere existence of a social contract that supports and sustains the viability of effective institutions of social control and organization, the evidence from Indian Country indicates a great deal of diversity in institutional form and economic development strategies. From the theocracy of Cochiti to the autocracy of White Mountain Apache to the parliamentary democracy with a strong judiciary at Flathead, a variety of structures and strategies are succeeding. If there is a process of equilibrating homogenization going on, it is not yet evident. Diversity seems to pervade culture and institutions. Moreover, the historical cultural roots of conventions and norms of political legitimacy that underlie both

cases of success (as at White Mountain) and failure (as at Pine Ridge) appear to be quite durable.[12]

These generalizations suggest the questions that a theory of the social contract ought to be able to address. How does the process of generating and sustaining the coordinating conventions and norms of a society -- the social contract (Binmore, 1994) -- work? What makes agreement, for example, on the propriety and authority of a strong chief executive less susceptible to defection among the White Mountain Apache than among the Pine Ridge Sioux? What makes it possible for a group of senior males at Cochiti, peacefully and with authority, to remove a rent-seeking theocrat, who, in turn, can have the authority to appoint all tribal officials and direct overall resource allocation so long as he stays away from rent-seeking (Cornell and Kalt, 1996)? Why are at least some shared conventions and norms so durable? What is the source of evident diversity in social contracts and the formal institutions of social control that they apparently support? Under what conditions do conventions and norms change?

To get at questions of the foregoing type, we propose a model in which:

1. *Rationality*: Individual human beings are self-interestedly rational (at least in the presence of sufficient information), seeking to make themselves as well off as possible given their tastes and resource constraints.

The selfishness hypothesis is, perhaps, the most readily established link between biology and choosing behavior; its fitness value is undeniable. Indeed, a great deal of research has gone into the question of whether there is any room at all for altruism or some form of

[12] Our general finding that cultural norms from the pre-reservation period of the second half of the 1800s are durable and affect performance of tribal institutions in the second half of the 1900s is consistent with the durability found by Putnam (1992) for Italian villages under central-government mandated changes in institutional form, and the durability described (from another viewpoint) by Davidson (1992) for the case of recently decolonized African countries.

other-regardingness in human behavior (Wilson, 1978; Becker, 1976). It seems fair to summarize this research as indicating that instrumental altruism or other-regardingness can be one equilibrium outcome of evolutionary processes, where "instrumental" refers to the concept that own well-being may be set aside when assisting the well-being of others capable of replicating and propagating one's own traits (e.g., in genetic kin) is sufficiently enhanced (Becker, 1976; Pollock, 1991a, 1991b).

That human beings are calculating, reasoning entities is self-evident (to be Cartesian about the matter). This conclusion is not altered by the fact that this trait is grounded in physiological mechanisms that may or may not make human rationality strictly logical (Barkow, Cosmides, and Tooby, 1992). In fact, rationality may be limited by both genetic hard-wiring (restricting the amount of information that can be processed, if nothing else) and pervasive uncertainty. As Heiner (1990), Denzau and North (1993), and others demonstrate, the problem of choice in such circumstances makes shorthand rules and conventions, imperfectly matched to reality at any point, productive in the effort to promote self-interest. Of particular relevance here, these authors also demonstrate that such "imperfect choice" (in Heiner's terms) generates diversity in decision rules, and this is a source of durable diversity within evolutionary systems that deprives such systems of optimality properties.

2. *Hard-wired social sentiments*: Individuals are hard-wired by genetic evolution with capacities for specific tastes. As a social animal, among these capacities are the capacities for *social* sentiments. These may include, with accompanying neuro-physiological effects in the brain, emotional affects such as guilt, belonging/loneliness, self-righteousness, and sympathy. Because human beings are social animals, social sentiments are triggerable by messages sent and received in interaction with other human beings.

While there is controversy among evolutionary biologists over the extent to which humans are hard-wired by evolution to behave in cooperative (and especially altruistic) ways, there is little controversy that we are hard-wired to be sociable. In fact, researchers studying the brain and intelligence report strong evidence that even the logical structure of the brain is constructed to acquire information and solve problems of social coordination. Barkow, Cosmides, and Tooby (1992) and Cosmides and Tooby (1989), for example, find a mental mechanism apparently functioning to monitor and detect defectors in potentially cooperative settings. Even if it takes linguistic construction to label the sensation of mental activity accompanying mental functioning of this type as a social sentiment or emotion (Binmore, 1994), the existence of interpersonal triggering mechanisms labeled isolation and loneliness, sympathy, guilt and so on seems compelling from this and other research.

Whether or not these emotional capacities have evolved for the purpose of solving interpersonal coordination problems (per Frank, 1988) may be debated, but the biological basis for such social sentiments in humans seems conclusive (see also Durham, 1991; Hirshleifer, 1980). Cosmides, Tooby and others at the forefront of evolutionary psychology, in fact, see the familiar economic concepts that specialization is productive and that specialization requires coordination as the keys to the process of environmental selection over human fitness -- what has made the human animal so evolutionarily successful is the notable ability to solve the problems of coordination and cooperation (Allman, 1994). Their experiments demonstrate that taking a given set of problems with identical logical structures, human reasoning capability increases dramatically when the problems are posed as the task of detecting defectors within a group seeking a shared cooperative solution. Cosmides concludes: "Many of the most

important problems our ancient ancestors had to face were social. They needed to know how to cooperate, how to respond to threats, how to participate in coalitions, how to respond to sexual infidelity, and so on. The result is that the human mind contains a number of specific mechanisms that were specially designed by evolution for processing information about the social world. One of these mechanisms is a 'cheater detector'" (Allman, 1994 at 39-40).

3. *Social construction of specific tastes:* The capacities for social sentiments are given specific ideational content by processes of acculturation. These processes attach specific tastes to the hard-wired capacities for social sentiments.

While it seems incontrovertible that there is a biological basis (if not an evolutionary explanation) for social sentiments such as affection, loneliness, guilt and the like (see above, as well as Fisher, 1992), the range of specific ideational constructs that attach themselves to what can be called "primary values" (Durham, 1991 at 200-201) is astonishing. In one society, successful behavior leading to belonging and social inclusion may require eating one's fellows, while in another the same act is cause for the most extreme ostracism. From gambling to abortion, from individual accumulation of wealth to inviolate obligations toward the less fortunate, the specific tastes that fill up the human capacities for social sentiments seem virtually unbounded (except by the biologically unsustainable). The reason for the wide range of feasible tastes may have been identified by Becker (1962): There is no crisp invisible hand mechanism for weeding out more or less optimal tastes; indeed, the economic concept of tastes contains no criteria for choosing over specific tastes.

The huge range of specific tastes that humans attach to the social sentiments belies a genetic explanation for those tastes. A more cogent explanation lies in the workings of the cultural environment in which individuals grow up and function. Social interaction is the key

to acculturation, the process by which social sentiments take specific ideational form. The conceptual information that, once shared, constitutes culture is communicated between individuals in what we call cultural messages. These messages may take a variety of forms, may or may not be explicit, may be targeted or broadcast, and may or may not be intentionally sent. The mechanisms of cultural transmission or acquisition vary widely, from imitation to direct instruction, conditioned upon the individual's stage of cognitive development (Denzau and North, 1993). The result at the individual level is the socially-constructed person.

The socially constructed rational individual is in no way inconsistent with economic conceptions of the individual, since the economic approach takes the individual to be represented by the bundle of tastes that are brought to choice contexts. Economic models do not care directly about the process by which the chooser acquired her or his tastes. Of course, economics *qua* economics is uncomfortable with worrying itself about the origins of tastes. The combination of the first three propositions set forth here, however, yields tastes over dimensions of social interaction that are analytically no different, for purposes of economic reasoning, from the other tastes that economists assume exist when, e.g., investigating demand behavior. We can analogize to a taste for, say, chocolate candy. Arguably, the energy payoff to sugars has manifested itself as a genetic basis for the human attraction to what we label linguistically as "sweet." Much like the social construction of the specific tastes that trigger the social sentiments, a process of acculturation fills up the capacity for pleasurable responses to "sweet" with specific attributes -- chocolate candy in one culture, and a multiplicity of alternatives in other cultures (Douglas and Isherwood, 1979)

Whatever the mechanism involved, cultural transmission is not the same as precise replication. Messages may be ambiguous, and reception is affected by the pre-existing conceptions and capacities of receivers. Furthermore, transmission is not simply a matter of adoption. Messages move in two directions; senders are also receivers and vice versa. Conceptual information is not only transmitted through communication, but is transformed through debate and analysis as individuals exchange messages and, in effect, reason with themselves and each other (Douglas, 1992). The implied "mutation" in cultural messages is a source of variation in cultural conventions that societies throw up for potential adoption or rejection by the environments they face.

4. *Culture as positive and normative conventions:* Culture consists of shared conceptual, or "ideational", information that in fact or potentially guides behavior by providing (1) positive descriptions of the individual's context, identity, constraints and opportunities for action, and (2) normative rules for action.

The process of acculturation or social learning described above provides individuals with both positive and normative constructs. Across the positive dimension, individuals acquire mental models of how the world is, and of how to negotiate effectively within it (Swidler, 1986). Research indicates, for example, that the perception of colors and the ability of individuals to work with them is dependent on the linguistic cultural repertoire acquired by individuals, notwithstanding common genetic capacities to perceive color (Durham, 1991). Closer to the topics at hand, Douglas and Wildavsky (1982; and seconded by many others) argue convincingly that perceptions of risk that form part of individuals' representations of their opportunity sets are socially constructed. As they relate to issues of institutional design for political affairs among people, cultural conventions are inputs to the cognitive definition of

the boundaries of the feasible set of social institutions; the concept of a hierarchical theocracy may seem wholly functional to one society, and inconceivable to another.

As normative information, cultural conventions include conceptions of the desirable (ends or wants statements) and norms (should statements). Normative cultural conventions provide definitions of the proper, the fair, the just, and the normal. In so doing, they serve as the substance of the tastes that fill up the capacities for social sentiments. They provide the cultural messages by which responses of guilt, self-righteousness, morality, and the like are communicated within society. In so doing, normative cultural conventions (potentially) provide mechanisms by which defectors may be punished (i.e., through the triggering of appropriate sentiments in potentially free riding individuals).

5. *Individuals as nodes in a network:* Individuals socially constructed in this way constitute sending and receiving nodes in networks of associated individuals. Interactions with others trigger the emotional hard-wiring that causes a message with cultural content to be sent or received by the nodal individual.

While the goal here is to understand the genesis and evolution of a shared social phenomenon -- the social contract -- methodologic individualism remains at the heart of the analysis. Individuals reason, respond, make choices, cooperate, and defect. The social contracts that might emerge from their doing these things as social animals living in interaction with other individuals arise as the result of the individuals' behavior. Conceiving of individuals as nodes in a network respects methodologic individualism while recognizing that humans really are connected to each other in society. This connection arises, at least in part, because we have the ability to affect each other. We send affective messages to each other. In part, we do this with offers of material payoff through exchange or coercion. But we also "say" things to each

other -- linguistically, symbolically, attitudinally, representationally (Fisher, 1992). We threaten, cajole, sanction, praise, debate, admonish, encourage, etc. -- and thereby trigger the social sentiments. We do this within a social context in which each pairwise sender and receiver are participants in a network operating according to shared conventions of meaning and process.

Interestingly, Ostrom (1994) reports that, in her experiments on the emergence of cooperation in tragedy-of-the-commons games, cooperation is very hard to achieve at all in the absence of communication among players. When the opportunity for linguistic communication (as messages within the computer network of the experimental game) is opened up, however, efficiency-enhancing cooperation is sharply increased, and this is achieved by the exchange of moral sanctions against defectors that take the form of simple attacks: "You scumbag."[13]

6. *Cultural conventions as public goods:* The set of cultural conventions that come to be shared and sent as messages over a social network, along with the conventions for communication that allow a network to operate, constitute shared public goods and, together, make up the social contract.

Coordinating cultural conventions that propagate and replicate within a society are collective goods in the classic Samuelsonian sense. Whether they produce "goods" by productively solving problems of cooperation, or "bads" by destroying prospective cooperative solutions, the results are shared by the members of the network. If our network can sustain a norm, for example, which constrains rent-seeking by political leaders, we may be able to sustain formal institutions that provide *third*-party enforcement services; we will share in the raising

[13] As reported by Elinor Ostrom, "Frontiers of Research into the Design of Institutions," Seminar in Political Economy, John F. Kennedy School of Government, Harvard University, April 1994.

(other things equal) of our material well-being. At least in the pre- or extra-constitutional setting, cultural conventions are nonexcludable; and to the extent that every member of society grows up in an acculturating environment, no matter what formal and informal institutions exist, cultural conventions of the type set forth in Proposition 4 above are inherently nonexcludable. As the next proposition argues, the behavioral mechanism underlying the production of cultural conventions as public goods is the equivalent of a system of private Olsonian side-payments.

7. *Node participation as a private good:* The sending and receiving of cultural messages is economically experienced as a private good by the nodal individual, as the sending or receiving of a message triggers pleasurable or unpleasurable hard-wired feedback to the extent affected tastes are satisfied or contradicted.

Social interaction through networks is the route to the triggering of the social sentiments. Whatever the physiological manifestations of such triggering, they are experienced as private goods and bads (in the Samuelsonian collective/private sense) by affected individuals. As such, the triggering of the social sentiments as cultural messages on the network operates on socially constructed specific tastes as Olsonian side-payments. These can hold individuals in the public goods production process of message replication and transmission that network participation entails. In extremely dysfunctional societies, the net of increments and decrements to privately experienced well-being may be negative (in the expected present value sense), and individuals may then exit a network by migrating out. When this is a widespread response, networks break down as coordinating mechanisms and cease to survive. Successful (or "fit")

networks, on the other hand, have the property that they sustain shared cultural conventions (social contracts) that hold individuals as nodes.[14]

The triggering of privately-experienced responses to actual or potential acts of defection or cooperation in social interaction may occur as result of actual communication over the network, as when a receiver receives normative messages ("You scumbag") or positive messages ("You're wrong"), or a sender, A, receives such normative or positive messages from another sender, C, upon A's delivery of messages to a receiver, B.[15] Triggering may also arise as the consequence of the apparently hard-wired human capacity for "internalization" so much studied by developmental and child psychologists (see also Elster, 1989). As a learning and reasoning entity, humans can anticipate what kinds of messages their actions in a particular context might trigger, and such anticipation or "imagination" is sufficient to trigger emotional responses in the individual. In addition, it may be that the entity is hard-wired with logical capacities for detecting contradictions between prospective actions and identity-creating conceptions of the positive and normative dimensions of "self" -- with contradictions triggering internally felt responses of their own (Cancian, 1975).

A stylized illustration may help here. The relatively successful Apaches discussed above are somewhat surprising in their attitudes toward higher education. Relative to a number of other, less successful tribes, there appears to be little or negative cultural support for higher education. The Apaches show rates of educational attainment that are well-below national Indian

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[14] It is interesting to speculate on the evolutionary origins of the apparent universality of denying sociality as a method of punishment for extreme "defectors" (deviants and criminals). From Sioux banishments (Hassrick, 1964) to contemporary systems of solitary confinement and imprisonment, exile is punishment to a social animal.

[15] On senders' benefits, see Coleman (1990).

averages, while tribes such as the Crow show the opposite. Consider this representation of a network communication story for the Apache case: Despite the fact that niece Jane is the best student at the local high school, with all sorts of offers for minority scholarships to college, Uncle John sends her the message that she will not be a good Apache and may be shunned in the future if she is so uppity as to go to college. This interaction takes the following notional form: Actor A (Jane) potentially violates cultural norm N1 (good Apaches shouldn't go off to college). This is consumed as a private good by Actor B (John), taking the form of internalized self-righteousness upon B's sending A the message of ostracism and guilt in consonance with Apache conventions. Actor A consumes this message as a subtraction to her private well-being as the message triggers the social sentiments attached to guilt and ostracization; this raises the cost of going to college and tends to maintain Apache coordination around the issue of out-migration for purposes of education. Apache Actors C, D,... send their own supportive messages to Actor B for being a good Apache for reasons that mirror B's. The result is a network of reinforcing communication, held together by the privately rational behavior of each socially constructed individual.

8. *Sources of cultural variation:* Variations of cultural messages within the social contract arise from the acquisition by individuals of potential cultural conventions by imitation, trial and error, rational calculation, cultural drift, and perhaps changes in hard-wiring.

Within any process of cultural evolution, variation in cultural messages provides the raw material over which processes of environmental adoption or selection operate (Durham, 1991 at 21-22). Culture, however, consists of ideational, rather than genetic, material -- material that Dawkins (1976) has termed "memes" to distinguish it from "genes." This ideational material is acquired and communicated by individuals, and the corresponding sources

of cultural variation include: imitation as a method of learning in a social animal, trial and error by individuals confronting uncertainty and imperfect information, rational calculation and observation in the Kantian and Popperian senses, cultural drift in which rarely used conventions fail to replicate, and (perhaps) slow processes of on-going genetic variation affecting learning and mental capacity (Boyd and Richerson, 1985; Durham, 1991). As individuals learn in these ways, they impart variations in the messages that they send over the networks they participate in, creating the possibility of new messages that may propagate and replace old messages. If new messages take hold, the social contract changes.

9. *Mechanisms of environmental adoption*: Variations in the cultural messages that make up social contracts are successful, in the fitness sense, to the extent that they propagate through a network and are sustained in a process of environmental adoption. Success in these terms depends, in general, on compatibility with such factors as other norms, biological and physical constraints, rationality and pre-existing knowledge, market and political environments.

As variation in cultural material is thrown up by the foregoing mechanisms, they are subjected to a process of environmental adoption or selection. The relative fitness value of alternative cultural conventions applicable to a given area of human behavior (such as the design of third-party enforcement mechanisms and court systems) will in general be determined by their assistance in promoting the reproductive effectiveness of the individuals that carry them and send them as messages on the network. In a social animal where specialization and exchange are productive, environmental adoption can select for *shared* cultural conventions that promote the success of groups of individuals (Pollock, 1991a, 1991b). As described above, this can occur when a particular cultural convention that promotes the well-being of others sufficiently enhances an individual's own prospects of replication and propagation (Becker, 1976; Pollock, 1991b).

This last finding is of particular relevance to the evolution of cultural conventions as we have described them here. Cultural conventions provide guides to both public (civic) and private behaviors. That is, cultural conventions arise not only as behavioral guides in coordination contexts such as the design and implementation of political institutions; they also arise as guides in private activities from the mundane (cooking food) to the complicated (predicting outcomes of career choices). In fact, many cultural conventions have mixed public/private attributes. A norm regarding the proper number of children to have seems to possess much more privateness than a norm regarding the independence of the judiciary. This leads to the potentially testable prediction that a norm of the former type is much more instrumental and subject to invisible hand and relative price effects. On the other hand, norms which are primarily collective in their payoffs might be predicted to be less subject to invisible hand forces that weed out inefficiency, particularly when highly collective norms are produced by tying them (per propositions 1, 2, and 6 above) to the selective incentives of the perfectly rational private consumption of triggered social sentiments. Thus (from the Jane/John illustration above), Apache elders may be paying some private cost as their sanctions against higher education hold down future contributions from students who might return after college and contribute to tribal development. Compared to the immediate private payoffs from their production of sanctioning messages (upon receipt of pleasing internalized and external messages from others participating in the current norms of "proper Apacheness"), the future and necessarily shared improvements in wealth that more college education in the Tribe's capital stock might produce provide a relatively weak fitness test of current norms.

The description of the process of environmental adoption is fairly abstract to this point. What we have in mind is that the fitness of a particular cultural convention is dependent upon how it performs in the face of: biological and physical constraints (e.g., a norm urging a group to consider wholesale infanticide to be proper will not be replicable beyond one generation); imposition, invasion or removal of nodes in the network (e.g., the killing off of indigenous leaders sanctioned as "super nodes" within the culture may change the balance of cultural variation within a path-dependent system and put the society on a different path as substitute messages take hold); consistency/inconsistency with rationality and pre-existing knowledge among learning individuals (e.g., a positive cultural convention promoting the divine rights for rulers may be "unfit" as the new potential political convention is checked against other positive conventions in a culture that is already far down the path of secularism in its religious affairs); and market and political environments (e.g., a cultural norm that urges resistance to trade and interaction with outsiders in an increasingly internationalized economy and political system is likely to be relatively unfit, even if such a norm had been adopted in a prior setting before the market and political environment changed).

This process of environmental adoption suggests a high degree of path dependence and serendipitous predisposition in social contract options. For instance, picking up the example above of divine rights of rulers, the survivability of such a convention at Cochiti (where theocracy has realized a surprisingly unbroken history) in no way suggests that a theocracy would work at Flathead (where an amalgam of historically unaffiliated tribes were forced onto a common reservation -- see Cornell and Kalt, 1996). Similarly, serendipitously preadaptive paths to fitness are suggested by the White Mountain Apache case, where sustainable

conventions supporting autocratic central chieftains in the pre-reservation environment turned out to be relatively well adapted when the environment changed and the U.S. government "invaded" and imposed its IRA constitutions. In other words, the pairwise comparison of the histories of White Mountain Apache and Pine Ridge Sioux described in Section III above provides a test of at least this mechanism of the theory of cultural evolution and environmental adoption set forth here.

## V. CONCLUSION

The model of cultural evolution developed here seems to be ripe with additional testable implications. At this stage, however, we would say only that the model is consistent with key characteristics of the evidence on institutional forms and economic development in Indian Country. Specifically, the model describes cultural conventions as shared public goods transmitted in a network of socially constructed rational individuals interested in the private payoffs from social participation as nodes in that network. This is consistent with the evident durability of highly public conventions regarding the design, implementation, and maintenance of the institutions of governance. The path dependence of evolutionary models of the type developed here is likewise consistent with the durability of the diversity of social contracts and attendant formal institutions in Indian Country.

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Table 1

**ECONOMIC PERFORMANCE AND INSTITUTIONAL FORMS ON AMERICAN INDIAN RESERVATIONS**

| | Change in Income 1977-89 | 1989 BLS Employment[1] | Employment Rel. to Fitted Expectation[2] | Governmental Form[3] | Independent Judiciary | Cultural "Match" |
|---|---|---|---|---|---|---|
| Flathead | 16% | 80% | +11% | Parliamentary | Yes | Yes |
| White Mtn Apache | 12% | 89% | +23% | Executive | No | Yes |
| Cochiti Pueblo | 10% | 90% | +20% | Theocracy | No | Yes |
| Mescalero Apache | 9% | 80%-90% | +33% | Executive | No | Yes |
| Muckleshoot | 6% | 74% | +5% | Parliamentary | No | Yes |
| Pine Ridge Sioux | -1% | 50% | -20% | Executive | No | No |
| San Carlos Apache | -7% | 49% | -15% | Executive | No | No |
| Rosebud Sioux | -10% | 10% | -38% | Executive | Yes | No |
| Hualapai | -11% | 26% | -18% | Executive | No | No |
| Yakima | -12% | 39% | -1% | Athenian | Yes | No |
| Crow | -12% | 33% | -7%- | Athenian | No | No |
| Northern Cheyenne | -15% | 52% | -4% | Executive | No | No |
| All Reservations | -1% | 60% | 0% | -- | -- | -- |

## Notes to Table 1

[1] BLS Employment is one hundred percent minus the BLS unemployment rate (with the latter measuring the percent of the workforce actually looking for employment and not finding it).

[2] Employment Rel. to Fitted Expectation represents the difference between actual employment levels and the employment levels predicted by a model of 67 reservations, controlling for reservation governmental form, local economic conditions in surrounding counties, human and resource capital endowments, and on-reservation property rights structures. This model is presented and estimated in Cornell and Kalt (1991).

[3] Parliamentary refers to governments in which the tribal chief executive is selected by the representative tribal council. Executive refers to governments in which the tribal chief executive is directly elected by the tribe's reservation citizens. Theocracy indicates that the tribal religious leader(s) appoints the key tribal authorities and establishes central tribal policies. Athenian refers to democratic decision making authority being vested in a tribal council in which all adult members of the tribe serve on the tribal council.

[4] Cultural Match refers to possible congruence between historical self-selected governmental form and modern (largely imposed) governmental form (see Cornell and Kalt, 1991, 1993).

SOURCES: Bureau of Indian Affairs, U.S. Department of the Interior, *Indian Service Population and Labor Force Estimates*, var. issues.

Table 2

## CONTRIBUTIONS OF ALTERNATIVE GOVERNMENTAL FORMS TO RESERVATION EMPLOYMENT LEVELS[1]

| | General Council | Parliamentary System | Independent Chief Executive |
|---|---|---|---|
| **No Independent Judiciary** | -- | 10.8% | 14.9% |
| **Independent Judiciary** | 5.0% | 15.8% | 19.9% |

[1] Contributions at mean sample values, as determined by the model estimated in Cornell and Kalt (1991). The effects of resource endowments and adjacent non-reservation economic conditions, human capital (education and labor force experience), and degrees of mixed jurisdiction re: on-reservation property rights due to allotment history are held constant. Contributions are measured relative to a reservation with a general council form of government, with no independent judiciary.

SOURCE: Cornell and Kalt (1991).