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Economic development lessons from and for North American Indian economies*

Terry L. Anderson and Dominic P. Parker†

This paper reviews the literature on economic development as it relates to indigenous people in the United States and Canada, and focuses on how institutions affect economic development of reservation and reserve economies. Evidence shows that strong property rights to reservation and reserve land and natural resources, whether communal or individual, are and always have been important determinants of productivity. Political and legal institutions that are perceived as stable and predictable to tribal members and to non-Natives also improve economic opportunities for indigenous people living on reservations and reserves. Research reviewed here also shows that culture and acculturation are important in the development process. Although our emphasis is on North America, the findings are applicable to indigenous people in other parts of the world and shed light on growth questions that loom large for developing countries around the world.

Key words: American Indian, Native American, rule of law, property rights, economic growth.

In United States and Canadian territories that were occupied by indigenous peoples and settled by European colonists, poverty persists among indigenous people. Most American Indian reservations and Canadian First Nation reserves are islands of poverty in a sea of relative wealth. Despite recent economic growth partly due to casino gaming, per-capita income for American Indians living on reservations in 1999 was US$7846 compared to US$14 267 for Indians living off reservations and US$21 587 for all United States citizens. In Canada, the per-capita income of Aboriginals living on reserves in 2000 was Can$9257 compared to Can$14 258 for Aboriginals living off reserves and Can$23 712 for all Canadian citizens. Other measures of human welfare, including infant mortality rates, life expectancy and single-parent families are generally consistent with this pattern: the welfare of indigenous people living off reservations and reserves lags behind that of non-Indians but remains higher than that of indigenous people living on reservations and reserves.

Explanations for reservation and reserve poverty focus on several possible factors categorised as follows by Cornell and Kalt (1992):

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† Terry L. Anderson (email: tla@perc.org) is Executive Director of the Property and Environment Research Center (PERC), Bozemon, MT, USA. Dominic P. Parker (email: dparker@bren.ucsb.edu), University of California, Santa Barbara, CA, USA.

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1. 'those that attribute underdevelopment to powerlessness, dependency, and expropriation' (p. 225) – this explanation focuses on past expropriation of resources and on the current Indian dependence on the federal government for income. According to this theory, Indian economies will only prosper 'as tribes are freed from paternalistic controls and exploitative economic relations with the larger society' (Cornell and Kalt 1992, 225).
2. 'those that treat differential outcomes as factorial in economic terms' (p. 225) – this explanation is in keeping with traditional development economics in that it focuses on endowments of human and physical capital and on natural resources. But as with international comparisons of economic performance, these endowments tend to be neither necessary nor sufficient conditions for economic growth. Cornell and Kalt (1992, 226) note that 'The Crows and the White Mountain Apaches are resource-rich, but the wealthier tribe in resource terms [the Crows] is the poorer tribe by almost every measure of performance.'
3. 'those that cite intrinsic aspects of Indian societies usually indigenous culture or tribal social organisation' (p. 226) – often this explanation focuses on markets being inimical to Indian culture. The argument is that western culture, coupled with market systems, encourage resource consumption, whereas indigenous cultures on the North American, African and Australian continents prior to colonisation were not based on consumption and therefore lived 'sustainably.' After reviewing several tribal differences, Cornell and Kalt (1992, 227) conclude that 'evidence suggests that indigenous culture, in and of itself, is not the obstacle to development that it is often portrayed to be. It may shape political and economic development in important ways, but it is probably not necessary to stop being tribal or "traditional" to develop economically.'
4. 'those that blame persistent poverty on the absence of effective governing institutions' (p. 227) – this explanation falls under the rubric of 'new institutional economics' and argues that institutions – formal and informal, private and collective – either encourage economic growth or stagnation depending on how they channel individual and collective behaviour. Herein lie many of the important lessons for and from indigenous economies.

Growing interest in institutional economics has shifted attention towards the fourth explanation (Cornell and Kalt 2000). Nobel laureate Douglass North defines institutions as 'a set of rules, compliance procedures and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interest of maximising the wealth or utility of principals' (1981, 201–02). In the case of indigenous peoples, such institutions are a combination of rules and compliance procedures that evolved over a long period prior to western contact and of rules and compliance procedures that were imposed by the westerners with whom indigenous people came in contact. Following North's definition, the evolutionary institutions devised by the principals themselves are more likely to have been wealth maximising than those

imposed by people with less knowledge of the circumstance of time and place and with less of a stake in wealth maximisation.

This paper reviews the literature on economic development as it relates to indigenous people in the United States and Canada and focuses on how institutions affect economic development of reservation and reserve economies. Although the emphasis is on North America, the findings are applicable to indigenous people in other parts of the world.

Studying development of reservation and reserve economies has relevance to the broader issues of economic development because such economies provide an excellent laboratory for testing the impact of institutions on economic growth. In their review of the impact of institutions on economic development, Pande and Udry (2005, 2–3) find that the cross-country literature (e.g. Keefer and Knack 1997; Hall and Jones 1999; Acemoglu *et al*. 2001; Acemoglu and Johnson 2005), 'has successfully focused attention on the complex interactions between economic growth and institutional development. It has uncovered important correlations across countries between growth and the nature and quality of a core set of economic, political and social institutions.' In doing so, however, that literature has had to be 'careful in noting, and accounting for, the fact that institutions and economic growth jointly cause each other. A positive correlation between "good" institutions and growth may reflect reverse causation.' Cross-country studies also must use coarse indices to quantify a country's institutions and these indices do not capture variation in the enforcement of formal rules and laws. To better estimate the effects of specific institutions, Pande and Udry (2005) recommend focusing on variation in institutions within a country rather than between countries.

Studying the impact of institutions on economic development among indigenous people helps eliminate some of the endogeneity problems found in cross-country comparisons. In the United States, for example, reservation economies operate within the broader legal institutions of local, state, and federal governments and have many institutional constraints exogenously imposed upon them by the federal government. Reservation land tenure was largely determined by federal laws passed in the 19th century, and judicial processes requiring state courts to adjudicate disputes for some reservations resulted from a federal law passed in 1953. Studying the impact of such exogenous institutions removes some of the noise and endogeneity that is difficult to purge in cross-country analysis.

We approach this survey of the impact of institutions on indigenous people being careful not to suggest policy prescriptions, especially those imposed from the top down. On the reserves in Canada and reservations in the United States, top-down institutions generally have had deleterious effects on economic development. Our goal is to provide a positive, rather than a normative, analyses of institutions. We begin by considering whether neoclassical economics is appropriately applied to non-western cultures. In that context we find the indigenous peoples did respond to prices and did devise institutions that

often got the incentives right for efficient resource use and economic progress. Although the aggregate data on economic performance of modern reservation and reserve economies paint a less than rosy picture, some indigenous economies have managed to perform relatively well. Our review of recent empirical studies indicates that institutions are at the heart of a robust explanation for why some of these economies prosper while others stagnate. We conclude by suggesting where additional research could provide even more robust analyses of the nexus between institutions and economic development for indigenous peoples.

1. Indigenous peoples as *Homo economicus*

Before turning to explanations of modern economic growth or stagnation among indigenous people, it is useful to consider how neoclassical economics can help us understand aboriginal behaviour prior to western contact. Posner (1980, 1–2) notes that the debate over 'the applicability of the economic model of human behaviour to primitive man' is left 'sterile' because the 'contending groups share an excessively narrow view of what is economic.' This narrow view has centred mostly on explicit market transactions involving goods and services traded at market prices, but students of modern economics know that its application is far broader.

For example, the first law of demand has important implications outside formal markets. American Indian consumption, for example, reflected times of abundance when the cost of acquiring food was low and times of scarcity when the cost of acquiring food was high. Hence the distinction between 'light butchering,' meaning that only the best parts of the animal were used when meat was plentiful, and 'heaving butchering,' meaning full utilisation of the animal when scarcity prevailed (Wissler 1910, 41–42).

Responding to relative prices and exploiting gains from trade required rules and compliance procedures. It is a common myth that American Indians did not utilise what today we would call property rights, choosing rather to live in communal societies where resources were shared and used only in sustainable ways. It is true the formal property rights in a modern sense were generally not part of Indian culture, but rules and compliance procedures as North calls them certainly were. Huffman (1992, 907) captures the essence of Indian institutions as they relate to property rights.

> It is not entirely true that Native Americans knew nothing of ownership. The language of the common law of property, like all of the English language, was unfamiliar to them. But the concepts of the tenancy in common was not foreign to bands and tribes who claimed and defended entitlements to hunting and fishing grounds. Nor was the concept of fee simple title alien to Native American individuals who possessed implements of war and peace, and even lands from which others could be excluded.

In a seminal article, Demsetz (1967) theorised that property rights to resources will only evolve when it is economical to establish and enforce them and applied his theory to beaver trapping territories in the North-east. Extending his theory to other regions shows that property rights to land were common among some tribes and not among others, the former being those which practiced sedentary agriculture requiring long-term investment in cultivation and irrigation and the latter being those which were nomadic, following bison herds over vast territories. Private garden plots were common in the eastern United States as were large community fields with plots assigned to individual families. The Mahican Indians in the north-eastern United States possessed hereditary usufruct rights to well-defined tracts of garden land along the rivers. The Hopi and Zuni branches of the Pueblo Indians had property rights to irrigated fields which were marked 'by numerous boundary stones . . . placed at the corners and junction points' and 'engraved on their faces with symbols of the appropriate clan' (Forde 1931, 367).

Property rights to fishing streams were common among the tribes of the Pacific North-west where anadromous fish were an important part of their diet and wealth. Johnsen (2007) concludes that these tribes

> relied on a corporate form of tribal organisation that vested resource control in the chief and encouraged him to invest in accumulating a body of stream-specific knowledge of salmon husbandry to maximise the long-run productivity, or 'wealth,' of stocks. . . . Any doubt is laid to rest by a mid-nineteenth-century naturalist's report that '[i]t is common practice among the few tribes whose hunters go far inland, at certain seasons, to transport the ova of the salmon in boxes filled with damp mosses, from the rivers to the lakes, or to other streams.' Transplanting fertilised ova to a different river or lake would be irrational unless salmon were known to return to their natal streams to spawn.

'Clam gardens' were another example of stewardship of tidal waters, investment into which would have been unlikely without secure property rights. According to the natives of the Pacific North-west, a clam garden 'was a clam beach that was tended with great care and a lot of work. Rocks were gathered up from the sandy beach and piled in a ring along the low-tide perimeter. The removal of the rocks made more room for the clams, and the wall of stones prevented the sandy beach from eroding' (quoted in Williams 2006, 9). Williams (2006, 29) notes that 'clam beds nearest a village belonged to the dominant family, and families of lesser rank had to enhance remoter beds to ensure clam supply.' This arrangement was similar to privately owned land gardens marked with flags. Williams (2006, 49), therefore, concludes that 'private ownership would appear to be a key to the amount of work undertaken making a clam garden.'

In northern Canada where hunting provided the dominant food source, Speck (1939) claims the Algonkian Indians were 'aboriginal conservators' because they

> carried on their hunting in restricted, family hunting territories descending from generation to generation in the male line. It was in these family tracts that the supply of game animals was maintained by deliberate systems of rotation in hunting and gathering, and defended by the family groups as a heritage from some remote time when the country had been given to their ancestors by the Creator. (258–259)

What Speck called 'naked possession' led to 'the maintenance of a supply of animal and vegetable life, methods of insuring its propagation to provide sources of life for posterity, the permanent family residence within well-known and oftentimes blazed property boundaries, and resentment against trespass by the family groups surrounding them who possessed districts of their own' (259).

That North American Indians devised institutions for maximising their wealth from natural resource should not be surprising to economists. Just as Darwin's theory of evolution predicts that surviving species must change in response to ecological constraints, successful institutional change requires adaptation to resource constraints. According to Bailey (1992, 183) the evolution of culture and institutions in aboriginal societies occurred

> at the margin of subsistence. In more developed societies, departures from optimality means lower living standards and lower growth rates – luxuries these societies can afford. By contrast, in societies near the margin of subsistence, with populations under Malthusian control, such departures had harsher effects. . . . Unsound rights structures generally implied lower population size and, perhaps, the disappearance of the society.

In summary, people, indigenous or immigrants, produce institutions in response to changes in the costs and benefits of doing so (see Anderson and Hill 1975). When those institutions successfully reward productive activity and penalise non-productive activity, the individual and collective wealth increases, and vice versa. Institutions encompass a gamut of cultural elements including religious beliefs, social norms, codes of conduct, private contracts and formal laws, all of which combine to form the rules and compliance procedures that determine social and economic interaction. The institutional history of Native Americans is replete with evidence that a bottom-up evolution took place that got the incentives right for many tribes enabling them to prosper through production and trade. Contact with Europeans, however, brought rapid institutional change, mostly from the top-down. Understanding what those institutions are and how they affect economic activity can provide valuable lessons for and from indigenous economies.

2. The economic status of modern indigenous people

Approximately 1.9 million individuals self-reported themselves as members of the American Indian race in the 2000 U.S. Census (note that this number

is much larger if individuals reporting themselves as multiple races including American Indian are included) (U.S. Census Bureau 2000). Only 512 431 of these individuals were living on federally recognised reservations. Table 1 shows the distribution of reservations and Indians living on those reservations across the United States. Although 37 states contain at least one reservation, only 22 states contain at least one reservation with an Indian population exceeding 1000. The most populated reservations are concentrated in Arizona, South Dakota, Montana, New Mexico, Washington and Minnesota. Other states with significant reservation populations include California, Wisconsin, New York and North Dakota.

As Table 2 shows, the per-capita incomes and unemployment rates of reservation Indians lag behind those for Native Americans living off reservations in every region of the United States. The differences are most pronounced within the Navajo, South-west and Western Bureau of Indian Affairs (BIA) regions. Here the 1999 per-capita income of reservation Indians was $7109 and their unemployment rate was 23.6 per cent. In contrast, the per-capita income of Indians living off reservations in these regions was $13 079 and their unemployment rate was 11.5 per cent. Similarly large differences between per-capita incomes and unemployment rates between reservation and off-reservation Indians are found in the North-west and Rocky Mountain BIA regions. Less pronounced but still striking differences are found in the Great Plains, Midwest and Pacific regions. The Eastern region is distinct in that labour market participation and unemployment rates are nearly identical for American Indians living on and off reservations. Yet even within this region, the per-capita income of reservation Indians ($11 273) is markedly less than that of non-reservation Indians ($14 128).

Table 3 indicates there is also significant variation in the economic performance of large reservations within BIA regions. Within the Midwest region, for example, the per-capita income of American Indians on the best performing reservation was $17 436 (Michigan's Isabella reservation) compared to the $7229 for the worst performing reservation (Michigan's Sault Ste. Marie reservation). Unemployment rates also vary within this region from a low of 8.1 per cent to a high of 24.5 per cent. The differences between the best and worst economies within the South-western region are also stark. Here the per-capita income of Indians on the Southern Ute reservation in southern Colorado was $13 043 compared to $5620 on the Santo Domingo Pueblo in New Mexico. Also within the south-western region, unemployment rates ranged from a low of 7.5 per cent to a high of 27 per cent. Nationwide, the poorest reservation in 1999 was South Dakota's Crow Creek. Per-capita incomes were an impoverished $4043 with a labour participation rate of only 40 per cent and unemployment rates exceeding 37 per cent.

Table 4 shows data on income and employment for Canadian Aboriginals living on and off reserves in 2000. The general pattern is very similar to the United States comparisons shown in Table 2. With the exception of Newfoundland, Labrador and Prince Edward Island, the incomes and labour

Table 1 Federally recognised American Indian reservations by United States

State	All census reservations		Reservations with American Indian population > 1000	
	Number of reservations	American Indian population	Number of reservations	American Indian population
Alabama	2	198	0	0
Alaska	1	1204	1	1204
Arizona	20	244 253	11	239 014
California	98	14 219	2	3484
Colorado	2	3073	2	3073
Connecticut	3	217	0	0
Florida	11	1170	0	0
Georgia	1	55	0	0
Hawaii	5	25	0	0
Idaho	4	6964	3	6910
Iowa	1	619	0	0
Kansas	3	1209	0	0
Louisiana	3	344	0	0
Maine	5	1615	0	0
Massachusetts	2	62	0	0
Michigan	10	4853	2	2378
Minnesota	14	17 064	4	13 765
Mississippi	1	4108	1	4108
Montana	8	43 373	8	43 373
Nebraska	5	4305	2	3640
Nevada	25	7297	1	1198
New Jersey	1	0	0	0
New Mexico	22	30 044	11	25 813
New York	9	7375	3	5720
North Carolina	1	5832	1	5832
North Dakota	2	7127	2	7127
Oklahoma	1	6338	1	6338
Oregon	10	4844	2	4380
Rhode Island	1	7	0	0
South Carolina	1	358	0	0
South Dakota	9	44 264	8	43 947
Texas	3	1107	0	0
Utah	4	3087	1	2824
Virginia	1	33	0	0
Washington	26	25 949	9	21 390
Wisconsin	11	13 446	5	10 377
Wyoming	1	6394	1	6394
TOTAL	327	512 431	81	462 289

Notes: (1) According to the U.S. Census, a federal reservation is land that has been set aside for the use of the tribe, either by tribal treaties, agreements, executive orders, federal statutes, secretarial orders or judicial determinations. Although Alaska and Oklahoma have large indigenous populations, most American Indians and Natives in these states do not live on federally recognised reservations and are therefore omitted from our sample. (2) The Census does not report any American Indian reservations in the following states: Delaware, Illinois, Indiana, Kentucky, Maryland, Missouri, New Hampshire, Ohio, Pennsylvania, Tennessee, Vermont and West Virginia. (3) In cases where reservations straddle multiple states, the reservation is considered part of the state in which the majority of the reservation land lies.

Table 2 Population, income and labour market status of American Indians living on and off federal reservations

	American Indian population (1999)		American Indian per-capita income (1999 US $s)		American Indian labour force participation rates (1999)		American Indian unemployment rates (1999)	
Bureau of Indian Affairs Region(s)	*on fed. res.*	*off fed. res.*	*on fed. res.*	*off fed. res.*	*on fed. res.*	*off fed. res.*	*on fed. res.*	*off fed. res.*
Eastern	20 859	291 345	11 273	14 128	62.4	61.4	11.4	11.3
Great Plains	55 696	52 757	6255	9080	54.2	61.0	26.5	16.7
Midwest	35 982	138 352	11 223	14 868	63.1	65.9	16.3	11.7
Navajo, South-west and Western	287 754	236 296	7109	13 079	45.9	65.2	23.6	11.5
North-west and Rocky Mountain	87 524	131 318	8689	14 182	58.9	65.8	22.2	13.2
Pacific	14 219	297 996	11 950	15 382	52.2	61.8	18.3	12.4
TOTAL	502 034	1 148 064	7843	14 101	49.5	63.0	22.3	12.0

Notes: (1) The source is the U.S. Census (2000). (2) The BIA Eastern region includes Alabama, Connecticut, Florida, Louisiana, Maine, Mississippi and North Carolina; Great Plains includes Nebraska, North Dakota and South Dakota; Midwest includes Iowa, Michigan, Minnesota and Wisconsin; Navajo includes parts of Arizona and parts of New Mexico; North-west includes Idaho, Oregon, Washington and parts of Montana; Pacific includes California; Rocky Mountain includes Wyoming and parts of Montana; South-west includes Colorado and parts of New Mexico; Western includes Nevada, Utah, and parts of Arizona. Other BIA regions not included in the table include parts of Alaska and Oklahoma. (3) Census income is the sum of wage and salary earnings, net self-employment income, investment income, retirement income and government payments. (4) The employment status data are for the American Indian population 16 years and older.

Table 3 Differences in the economic performance of U.S. reservations within BIA regions (for reservations with 1999 American Indian populations exceeding 1000)

BIA Region	Number of reservations	American Indian per-capita incomes (1999 US $s)			American Indian labour force participation rates (1999)			American Indian unemployment rates (1999)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Eastern	5	6864	12 318	11 101	59.6	67.1	62.9	7.8	15.2	12.1
Great Plains	12	4043	7915	6371	40.3	60.6	55.1	16.4	37.2	25.0
Midwest	11	7229	17 436	10 528	55.9	74.8	63.9	8.1	24.5	16.9
Navajo	1	–	–	6807	–	–	43.6	–	–	26.4
North-west	15	8535	12 439	9978	55.7	66.2	60.9	10.7	27.6	18.8
Pacific	2	8858	9757	9308	53.2	60.3	56.8	18.5	26.0	22.2
Rocky Mountain	8	6730	8383	7557	52.5	61.7	58.3	20.2	29.0	25.0
South-western	13	5620	13 043	9098	25.5	66.7	53.0	7.5	27.0	16.0
Western	12	4970	10 878	7097	40.2	63.1	50.5	11.3	37.1	20.9
All	79	4043	17 436	8693	25.6	74.8	57.1	7.5	37.2	19.8

Notes: (1) The source is the 2000 U.S. Census. (2) The BIA Eastern region includes Alabama, Connecticut, Florida, Louisiana, Maine, Mississippi and North Carolina; Great Plains includes Nebraska, North Dakota and South Dakota; Midwest includes Iowa, Michigan, Minnesota and Wisconsin; Navajo includes parts of Arizona and parts of New Mexico; North-west includes Idaho, Oregon, Washington and parts of Montana; Pacific includes California; Rocky Mountain includes Wyoming and parts of Montana; South-west includes Colorado and parts of New Mexico; Western includes Nevada, Utah and parts of Arizona. Other BIA regions not included in the table include parts of Alaska and Oklahoma.

Table 4 Population, incomes and labour market status of Canadian Aboriginals living on and off reserves

	Aboriginal population (2000)		Aboriginal per-capita income (2000 Can. $s)		Aboriginal labour force participation rates (2000)		Aboriginal unemployment rates (2000)	
Province or territory	On reserves	Off reserves	On reserves	Off reserves	On reserves	Off reserves	On reserves	Off reserves
Newfoundland and Labrador	755	18 025	14 955	12 606	78.8	59.6	43.8	32.9
Prince Edward Island	380	970	11 244	11 057	61.2	64.9	26.7	23.5
Nova Scotia	7375	9640	8311	13 691	53.0	65.5	30.2	17.5
New Brunswick	6025	10 965	8658	12 771	54.9	65.7	39.7	23.5
Quebec	32 805	46 595	11 697	15 809	53.4	60.3	23.7	15.6
Ontario	40 495	147 820	10 531	16 728	57.9	66.2	22.0	13.1
Manitoba	52 065	97 975	7488	12 671	46.4	65.1	30.4	15.1
Saskatchewan	47 070	83 120	6748	11 330	43.5	60.5	33.0	19.1
Alberta	37 495	118 730	7502	14 389	46.2	69.3	27.6	12.5
British Columbia	46 380	123 645	10 869	14 460	58.5	64.6	28.9	20.4
Yukon Territory	1960	4585	14 204	15 705	70.2	72.9	30.0	25.3
North-west Territories	13 290	5440	14 459	17 737	63.1	70.1	19.7	14.7
TOTAL	286 095	690 230	9257	14 258	52.1	65.0	27.6	16.5

Notes: (1) The source is the 2001 Canadian Census (Statistics Canada 2001). (2) Income includes earnings from wage and salaries, net farm income, net non-farm income from unincorporated business and/or professional practice, investment income and income from government sources. (3) The labour force participation rates and unemployment rates are for the Aboriginal population 15 years and older. (4) Nunavet is excluded from the list of provinces and territories because it has no reserves.

force participation rates of Aboriginals living on reserves lag well behind those of Aboriginals living off reserve in every province or territory. The income gap is most pronounced in Alberta, where the per-capita income of Aboriginals living off reserves exceeded that of Aboriginals living on reserves by $6887. Unemployment rates for Aboriginals living on reserves also lag behind those of Aboriginals off reserves in every province or territory. The gap in unemployment rates exceeds ten percentage points in six of the twelve territories and provinces.

Sandefur and Liebler (1997) summarise the family demographics of American Indians using 1990 census data and these data are consistent with the patterns observed in income and employment data. Compared to non-reservation Indians, a significantly lower percentage of reservation children reside in homes with two parents. Reservation families are larger on average, but fewer women marry. Female to male ratios on reservations exceed the sex ratio of Native Americans living off reservations. Across reservations, there is considerable variation in all of these measures of family welfare with the percentage of children under 18 residing in a home with two parents ranging from a low of 35.2 per cent on the Pine Ridge reservation (South Dakota) to a high of 57.2 per cent on the Navajo reservation (Arizona).

Snipp (1997) uses data from the Indian Health Service to summarise the life expectancies and infant mortality rates of American Indians. The reported data do not distinguish reservation Indians from off-reservation Indians, but allow for comparisons between Indians and non-Indians over time. Not surprisingly, the life expectancy of American Indians is lower than that of whites (71.5 compared to 75.6 for Whites in 1988). However, the gap in life expectancy has narrowed considerably since 1973. A similar pattern is evident in infant mortality rates. From 1979 to 1988, infant mortality for Indians declined from 16.5 deaths per 1000 live births to about 11 deaths. This mortality rate is close to that of whites (8.5 deaths per 1000) and smaller than the reported mortality rates of black Americans (about 18 deaths). Snipp, however, notes that Indian infant deaths may have been under-reported.

3. Institutional explanations for poverty on native lands

A survey of empirical literature shows important institutions combine with traditional variables such as education, culture, region and natural resource base to explain stark differences in the performance of reservation and reserve economies.

3.1 Human capital and culture

This section summarises four empirical studies that ask how much of the differences in wages and employment are explained by traditional, observable measures of human capital. The first three papers described analyse wage and employment gaps between Canadian Aboriginals and non-Aboriginals and the fourth employs a U.S. dataset.

Using data from Statistics Canada's Labour Market Activity Survey, Patrinos and Sakellariou (1992) decompose the difference in mean wages between employed Aboriginals and non-Aboriginals into explained and unexplained components. Their empirical analysis uses a cross-section sample of employed Aboriginal males living off reserves and employed non-Aboriginal males, all between the ages of 16 and 65 years. With these data, Patrinos and Sakellariou find that both Aboriginals and non-Aboriginals earn positive returns to education, experience, and other factors such as being married and being a member of a union. However, Aboriginals tend to earn a lower return for these factors when compared to the returns earned by non-Aboriginals. The authors attribute more than 50 per cent of the overall wage gap to factors not controlled for in their analysis. Uncontrolled for factors that may be important include differences in ability, health, quality of education, culture and wage discrimination.

George and Kuhn (1994) also use Canadian data to examine the wage gap between Aboriginals and non-Aboriginals. They first assess the extent to which differences in the observable characteristics of Aboriginals and whites explain the large wage gap between off-reserve Aboriginals and whites. This wage gap shrinks, but still persists, when George and Kuhn control for differences in an individual's education, training, marital status and region of residence. George and Kuhn also compare the effects of observable characteristics on the earnings of Aboriginals living on vs. off reserves. Interestingly, they do not find statistically significant differences in the education and training of Aboriginals living on vs. off reserves. But Aboriginals living on reserves were systematically different in terms of culture: a greater percentage spoke a native language first as a child and came from a single native ethnic origin (as opposed to mixed ethnic origins). George and Kuhn also find evidence that higher levels of education did not improve the wage earnings of full-time employees living on reservations.

Kuhn and Sweetman (2002) analogize Aboriginals to Canadian immigrants – albeit unwilling ones – in order to study the role of assimilation into mainstream culture. Unlike other immigration studies that measure an immigrant's assimilation with the number of years since relocation, Kuhn and Sweetman use self-reported ethnicity data from the Canadian census to measure differences in the assimilation of Aboriginals living off reserves. Aboriginals descending from ancestors that intermarried with non-Aboriginals are considered more assimilated than Aboriginals with pure or 'single' ethnic origins. Within the group of Aboriginals from a single origin, the authors consider those living on reserves and living in the remote Canadian territories of the far north to be less assimilated because these Aboriginals have less contact with non-Aboriginals in everyday dealings.

Kuhn and Sweetman generate three key findings with their cross-section data. These findings provide compelling support for the assimilation hypothesis when evaluated in unison. First, the employment rates and wages of multiple-origin Aboriginals living off reserves and not in territories are higher than

those of single-origin Aboriginals living in comparable areas. Especially for males, these gaps are large and persist after controlling for geographical location, age, and education and training. Second, employment rates and wages for single-origin Aboriginals on reserves are significantly lower than those of single-origin Aboriginals living off reserves and these gaps are also robust to all controls. Third, non-Aboriginal males in the remote northern territories are paid wage premiums that far exceed those earned by male Aboriginals living in the territories such that the wage differential between Aboriginals and non-Aboriginals is highest in the remote North-west. Considered together, these results imply the cultural autonomy maintained by some indigenous people helps to explain why this ethnic group as a whole fails to perform better economically.

Gitter and Reagan (2002) examine how living on a reservation affects the employment status and wages of American Indian males in the United States, using a pooled dataset from the National Longitude Survey of Youth 1979 (NLSY79). Their core finding is that the probability that an Indian survey participant will be employed at a given time during the survey period is negatively affected by living in a county containing a reservation. This finding is robust to individual controls including age, performance on the Armed Forces Qualifying Test, education levels, overall county unemployment rates and regional dummies. What makes the study particularly compelling is the fact that non-Indian employment is not negatively affected by living in a county with a reservation in the regression analysis. Thus, Gitter and Reagan's results imply that neither systematic differences in traditional human capital nor systematic differences in the economic environment of reservation counties alone explain the higher unemployment rates of reservation Indians. Interestingly, Gitter and Reagan find no direct effect of living in a county with a reservation on the wages earned by Indians who are employed. The authors point out that living in counties with reservations indirectly lowers Indian wages, however, because this affects employment rates and thus human capital accumulation which in turn affects wages.

The research described above suggests, among other things, that living on a reservation or reserve depresses employment opportunities and wages for reasons not explained by standard control variables used to account for differences in human capital (e.g. education, training, standardised test scores). Kuhn and Sweetman's (2002) analysis provides suggestive evidence that acculturation is an important factor in explaining an individual Indian's economic outcomes. Living on a reserve or reservation can slow the rate of acculturation into mainstream culture, and this may help to explain why Gitter and Reagan (2002) find a negative relationship between living in a U.S. county with a reservation and the employment status of male Indians. However, the institutions governing reserve or reservation property rights and contracts are also important determinants of economic outcomes as the literature discussed below indicates.

3.2 Institutions of land tenure

The U.S. Supreme Court ruled in the nineteenth century that American Indian reservations are sovereign 'nations within nations.' Sovereignty means that tribes can create and enforce laws that govern activities within reservation boundaries. Tribal sovereignty, however, has been attenuated by U.S. congressional actions that have reshaped both property rights to land and the legal and political institutional environment on reservations.

One of the most blatant examples of congressional influence on reservation property rights was the Dawes Act of 1887. Under this act, congress allowed reservation lands to be allotted to individual Indians, but required that they be held in trust by the federal government until the allottees were deemed 'competent.' When competency was declared and lands were privatized, many of them were transferred to non-Indian owners. As a result between 1887 and 1933, the acreage of Indian lands fell from over 136 million acres to under 70 million acres (see Anderson 1995, 95).

To halt this precipitous decline in Indian land holdings, Congress passed the Indian Reorganisation Act (IRA) in 1934. Under it, lands that had not been privatized were locked into trust status, some held by individual Indians to whom they had been allotted but not released from trusteeship and some by tribes. Studies of how trusteeship affects land use suggest that this extra layer of bureaucracy may help keep land in Indian ownership, but that it reduces productivity. As Carlson (1981, 174) concludes, 'no student of property-rights literature or, indeed, economic theory will be surprised that the complicated and heavily supervised property rights that emerged from allotment led to inefficiencies, corruption, and losses for both Indians and society.'

Before considering the impact of trusteeship, it is useful to note that prior to congressional meddling with Indian land property rights, some tribes were developing their own institutions for land management as discussed in Section 2. Between the time when many Indians were placed on reservations and when allotment policies were implemented, Indians were mostly left to develop their own institutions. Without abundant buffalo and without much government support, tribes had little choice but to provide for themselves with the resources at hand. This meant devising institutions that would work under the new resource constraints. Some, such as the Cherokee, returned to settled agriculture which they had known before their 'trail of tears' to lands west of the Mississippi. Others, such as the Blackfeet, however, had never known settled agriculture having been nomadic hunters following the great buffalo herds. As Josephy (1968, 351) put it, 'particularly those who had traditionally been nomadic hunters and gatherers, could not or would not become farmers overnight; they had neither the cultural background nor the necessary training.'

For this reason nomadic tribes turned to cattle ranching, adapting their horse management skills and institutions. Given economies of scale in grazing and a tradition of private ownership of horses, it made sense to have

individual ownership of livestock and common ownership of land (especially before barbed wire). Carlson (1992, 73) captures the result.

> Once a tribe was confined to a reservation, it needed to find a land tenure system suitable to the new environment. On the closed reservations, the system that evolved was one of use rights. Typically, the [BIA] agent and members of a tribe recognised an individual's title to animals and, where farming was practiced, a family's claim to the land it worked. . . . What is remarkable is how similar this system of land tenure was to that which existed among agricultural tribes before being confined to reservations.

The 1900 U.S. Census concluded that 'notwithstanding the numerous difficulties, . . . [a] number of tribes are now peaceable, self-supporting agriculturalists . . .' (U.S. Bureau of the Census 1900, 717). Carlson (1981, 123) concludes that for the unallotted reservations in 1900, 'the average number of head [cattle] per family ranged from 16 to nearly 40. These figures do not indicate that Indian cattlemen were self-sufficient, but they do indicate a healthy beginning.' Such a beginning is testament to ability of Indians to adapt their institutions to the constraints of their environment.

Trosper (1978) was one of the first economists to formally identify the importance of land tenure to agricultural productivity after the allotment era had ended and when reservation lands were effectively frozen in trust status. He observed that ranches operated by Indians on Montana's Northern Cheyenne reservation generated less output per acre than ranches operated by non-Indians adjacent to the reservation. Two possible explanations for the productivity difference were that Indians lacked technical and managerial knowledge of ranching and that Indians had ranching goals other than profit maximisation. A third explanation is that land tenure on reservations constrained Indians from operating their ranches at an efficient scale and from using the optimal mix of land, labour and capital.

Like many reservations, much of the land on the Northern Cheyenne is held in trust by the BIA. Some of this trust land is owned by the tribe, with other trust lands being owned by individual Indians or families. In contrast to fee-simple lands, trust lands are subject to BIA regulations that can raise the costs of land-based resource production. It grants or denies permission to change land use, make capital improvements and to lease lands. Trust lands cannot be sold nor can they typically be used as collateral for loans. In addition, the individual trust lands have often been inherited several times over leaving multiple landowners who must collectively agree on land-use decisions. Under these conditions, it is costly for Indian owners to combine lands into optimal sized ranches under single ownership – especially because the original allotments were generally too small for profitable ranching in Western states. Thus, Indian operators are more likely than whites to lease lands, but this regime discourages investment in ranching capital and it exposes tenants to discretionary changes in BIA policy.

Considering these BIA constraints on land use, Trosper argues that the lower output chosen by Indian ranchers on the Northern Cheyenne is actually profit-maximising. According to his estimates, Indian ranchers are as productive as non-Indians operating nearby ranches when accounting for the different – in a sense exogenously determined – input ratios used. Because the implication is that Indian ranch managers are at least as technically competent as non-Indians, Trosper concludes by noting that the effects of land tenure should be examined further.[1]

Anderson and Lueck (1992) take up this challenge by estimating the impact of land tenure on the productivity of agricultural land using a cross-section of large reservations. They benchmark the productivity of tribal and individual trust lands against those of fee-simple lands on reservations. When controlling for factors such as the percentage of trust lands managed by Indian operators and whether the tribe was indigenous to the reservation area, Anderson and Lueck estimate the per-acre value of agriculture to be 85–90 per cent lower on tribal trust land and 30–40 per cent lower on individual trust land. They attribute the larger negative effect of tribal trust land to collective action problems related to communally managed land. In addition to having to overcome BIA trust constraints, agricultural land held by the tribe is subject to common-pool resource management incentives that can lead to exploitation and neglect.

Alcantara (2007) describes three forms of land tenure on First Nation reserves: customary rights, certificates of possession and leases. As the name implies, a customary right goes to individuals or families who can demonstrate traditional occupation of a tract of reserve land. Alcantara (2007, 424) concludes that 'Unfortunately, members are constrained and indeed discouraged from using their customary allotments in. . . . economically productive ways because customary rights lack security of tenure. . . . they [customary rights] are creatures of band councils and are unenforceable in Canadian courts.' As with trust lands in the United States, high transaction costs associated with the band approval procedures account for lower productivity.

Certificates of possession provide somewhat more secure property rights than customary rights, but land use under the certificates still requires band council approval, which raises transactions costs and lowers productivity. As a result, certificate of possession holders 'incur a time delay in all of their land transactions' (Alcantara 2007, 425). To make matters worse, certificates of possession as well as customary tenure lands cannot be used as collateral in the private finance market. Not surprisingly this restricts private investment on First Nation lands.

Finally, leases are a more productive form of land tenure because they are governed by the Indian and Northern Affairs Canada (INAC) rather than by band councils. Still reserve land leases are not as efficient as off-reserve leases

[1] Trosper also dismisses the claim that Indians on the Northern Cheyenne do not seek to maximise profits. His data suggest that Indian ranchers used inputs efficiently.

causing the Canadian Supreme Court to conclude that 'reserve lands may be worth much less than their off-reserve equivalents due to the unique "Indian reserve features" ' (quoted in Alcantara (2007, 426)).

To test whether the 1999 Canadian First Nations Land Management Act (FNLMA) meets its objective of making tenure more secure and reducing transaction costs, Alcantara examined how the act has been applied on two reserves. FNLMA was designed to give bands the authority to take over administration of reserve lands. On the Mississaugas of Scugog Island Reserve, Alcantara finds that the evidence 'suggests that there has been significant progress towards these goals [strengthening customary rights and reducing transactions costs]' (Alcantara 2007, 428). 'In general, the Muskoday [First Nation Reserve] land code does reduce transaction costs but it falls short in strengthening individual property rights . . .' (Alcantara 2007, 429). Unlike the Scugog Island code that clearly specifies ownership rights, the Muskoday code leaves them unclear and specifically does 'not entitle the member to benefit from the resources arising from the interest' (quoted in Alcantara 2007, 429). In summary, the FNLMA may reduce transaction costs and strengthen property rights, but that depends on the governance by the band.

3.3 Political and judicial institutions

Cornell and Kalt (2000) study political governance on American Indian reservations to assess which forms of tribal governments generate the most economic benefits for tribal members. The most successful governments, they hypothesise, will meet two conditions. First, these governments will credibly separate powers between executive, legislative and judicial branches. Second, the most successful governments will also operate in a way that 'matches' the culture of the tribe. A cultural match means that collective decision-making today resembles the way decisions were made prior to European colonisation. According to Cornell and Kalt, such a match gives legitimacy to formal governance today.[2]

Cornell and Kalt test the first part of their hypothesis with standard cross-section regression analysis of 67 large reservations. To measure differences in tribal governance, they use variables that indicate whether governments have strong executive and legislative branches as opposed to a general council form of government where virtually all tribal members have legislative power. They find that strong executive and legislative forms of government have a positive effect on reservation employment levels in 1989 and on income growth rates from 1977 to 1989 relative to general councils. This result, they argue, is consistent with their hypothesis because general councils 'lack even rudimentary separation of power' (p. 458). Their regressions also include variables to control for high school graduation rates, adjacent county income growth, the percentage of reservation land held in fee-simple and the percentage

[2] Mismatches occur because the BIA imposed constitutions on some tribes during the 1930s as part of the Indian Reorganisation Act.

of the current reservation population that has always lived on the reservation. Education rates and their measure of an insular labour force do not have statistically precise effects on employment rates or on income growth. Adjacent county income growth has a positive effect on both dependent variables and, interestingly, the percent of fee-simple land has a negative effect on employment levels.

The second part of Cornell and Kalt's hypothesis – that a cultural match is important – is evaluated with what is essentially a detailed case study analysis. Here they argue that strong chief-executive governments, for example, work better for Apache tribes than for Oglala Sioux for cultural reasons. Historically, the Oglala organised themselves around decentralised, subtribal and kin-based political units. In contrast, Apache political allegiance centred around one individual leader. Thus, the strong executive government should work better for the Apache than the Oglala Sioux, which is consistent with what Cornell and Kalt's case studies indicate.

Anderson and Parker (2008) also focus on the role of governance institutions in explaining variation in the economic performance of large American Indian reservations. They view the sovereignty of tribes to make and enforce rules governing commerce as a 'two-edged sword.' On one side, sovereignty lets tribes embed culture into reservation politics and law. On the other side, this sovereign power allows tribal governments to act opportunistically by selectively enforcing contracts for short-term benefit to the tribe or certain tribal members. The potential for such opportunistic behaviour can thwart economic development if tribes are unable to make credible commitments to stable contract enforcement (also see Haddock and Miller 2006).

One avenue for credible commitments is Public Law 280. This law was passed by Congress in 1953 and implemented during the 1950s and 1960s, requiring some tribes to turn judicial jurisdiction over to the states in which they reside. This Act left approximately one-third of the 81 largest Indian reservations in the United States under the judicial jurisdiction of state courts, while the other tribes retained their judicial sovereignty. Anderson and Parker argue that P.L. 280 created a natural experiment to examine the effect of a stable contracting environment because it was not imposed on those reservations best suited for future growth but rather for their 'lawlessness,' to use the description of the U.S. Congress. Using data for 1969 to 1999, they find that per-capita income for American Indians on reservations subjected to state jurisdiction grew about 30 per cent more than on reservations not subjected to such jurisdiction. This finding is robust to controls for resource endowments, geographical isolation, education levels, acculturation, land tenure, and economic conditions in surrounding regions. More generally, their finding is consistent with the hypothesis advanced in the development literature that stable contracting over time and space is a necessary condition for economic growth (see, e.g. North and Weingast 1989; Acemoglu *et al*. 2001).

Table 5 summarises the key results of some of the empirical papers described in this section. Most papers find that increases in traditional

Table 5 Summary of the empirical literature on the economic outcomes of American Indians and Canadian Aboriginals

Study	Unit of observation	Dependent variable (DV)	Time period	Key finding(s)	Discussion of key control variables		
					Traditional human capital	Geography and/or resource endowments	Acculturation and culture
Anderson and Lueck	Reservation	Agricultural productivity	1987	An increase in the percentage of fee-simple has a (+) effect on the DV	NA	Data imply raw land quality is comparable across trust and fee-simple lands on a reservation	% of land farmed by Am. Indians & tribal history of farming has no or weak effect
Anderson and Parker	Reservation	American Indian PCI growth	1969–1999	The presence of state jurisdiction has a (+) effect on the DV	High school grad rates tend to have (+) effects on DV	Natural resource endowments have (+) effect; adjacent county income growth has (+) effect	Robustness checks suggest percentage of non-Indians on reservation and percentage speaking native language have no or weak effect
Cornell and Kalt	Reservation	American Indian employment and PCI growth	1989 and 1977–1999	A general-council form of government has a (–) effect on both DV	High school grad rates have no effect on either DV	Adjacent county income growth has (+) effect on both DV	% of tribal population that has worked off reservation has no or weak effect on both DV; cultural match of institutions is important
Gitters and Reagan	Individual	Probability of employment and wage level	1979–1990	Living on a reservation has a (–) effect on the first DV for Am. Indians but no effect on the second	Education and training tend to have (+) effect on both DV	Not applicable	Not directly controlled for
Kuhn and Sweetman	Individual	Probability of employment and annual earnings	1990	Living on a reserve has a (–) effect on both DV for Canadian Aboriginals	Education and training tend to have (+) effect on both DV	Not applicable	A multiethnic origin has a (+) effect on both DV for Aboriginals; living in remote regions have (–) effects on both DV; living on reserves has (–) effect on both DV
Trosper	Ranch	Agricultural productivity	1967	Land tenure affects productivity; no evidence that Am. Indian ranchers are less skilled than non-Indians	Farming experience does not explain gap in Indian v. non-Indian production	Attempts to hold land quality constant by examining 'control' ranches in close proximity to the N. Cheyenne Res.	Finds no evident that culture deters profit-maximisation behaviour

measures of human capital (e.g. education and training) improve economic outcomes, but Cornell and Kalt's (2000) results and George and Kuhn's (1994) estimates of on-reserve Aboriginals are exceptions. Most researchers also find that geography and resource endowments can have an influence on economic outcomes. The research also suggests an important role for culture and acculturation in the development process that is perhaps complementary to institutional development. There is also evidence that federal government trust constraints on land have reduced agricultural productivity on reservations. Finally, there is evidence that creating reservation institutions that are perceived as stable and predictable to non-Indians can improve economic opportunities for American Indians living on reservations.

4. Conclusion

Economic development lessons from indigenous peoples mirror those from less developed countries where institutions go a long way toward explaining why poverty persists. The popular work of Hernando De Soto (2000) points out that insecure property rights hinder investment by making it difficult for people to secure capital and by reducing the incentive to invest because it is hard to capture future returns. Empirical studies (see Galiani and Schargrodsky 2006) of what happened when squatters in Argentina secured property rights to homes show that investment in the homes increased, women participation in the labour force increased because women no longer had to stay home to guard their property, family size decreased and investment in human capital increased. Although we can never ignore the *ceteris paribus* conditions, there is little doubt that secure property rights and the rule of law are indispensable to economic growth.

If indigenous peoples are to experience economic development, they will have to find institutions that solidify a property rights structure (communal or private) to land and capital and that facilitate contracting between themselves and others. At the tribal level, this means creating and maintaining political structures that limit and separate powers of government. At the clan, family, or individual level, it means giving resource owners more control of their resources – human, natural or capital – and reducing the transaction costs associated with managing those resources.

Economists can play a useful role in fostering this institutional change by continuing to muster aggregate data on the effects of institutions on the growth process and by getting their hands dirty in case studies. The key will be to find examples of institutional change that have worked and to build coalitions amongst tribes and within governmental agencies to support those changes. Not only will such research help indigenous people extract themselves from poverty, it will shed light on growth questions that loom large for developing countries around the world.

Meaningful institutional change will probably have to come from indigenous people themselves who are best able to capitalise on time- and place-specific

information, including resource endowments and institutional heritage, and who will benefit from getting the incentives right. But to initiate this change, indigenous people may have to wrest power from political and bureaucratic forces that are not likely to go away without resistance, both at the tribal and national levels of government. They will have to find ways of credibly committing to the institutional changes necessary for long-term contracting and investment.

Lessons discussed here such as the positive impact of connecting to an established rule of law and of having the ability to strengthen property rights and reduce transaction costs (e.g. First Nations Land Management Act in Canada) suggest some options for indigenous peoples. Further research using the new institutional economics paradigm can only provide further fuel for the engine of institutional change.

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