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“Land Management on First
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Possession and its
Determinants”

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Land Management on First Nations Reserves: Lawful Possession and its Determinants*

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Abstract

Much debate concerning property rights on reserves in Canada focuses on socio-economic impacts and the potential for individualized land tenure to support economic development, thereby reducing poverty. Study of existing forms of individual property on reserves is needed to inform these debates. In this article, we examine data on the lawful possession (Certificate of Possession) system that is currently used on reserves across Canada. We provide descriptive statistics regarding the variability of lawful possessions across First Nations and using regression analysis we assess which socio-economic, demographic, and locational variables influence the use of lawful possessions instead of communal land or other customary land holding systems. We show that use of the lawful possession system is surprisingly low and very uneven. As well, our regression results suggests that using the system requires a relatively educated community with low levels of poverty, with a favourable geographic location. Overall, the results are consistent with the view that lawful possessions are not primarily used to foster economic development.

JEL Classification: R14, P48

Keywords: First Nations, land use, lawful possession, property rights, economic development.

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1 Introduction

Many researchers have argued that private property is critical for reducing poverty and improving standards of living, both in developing countries and in Indigenous communities (Anderson & Parker, 2009; De Soto, 2000; Flanagan, 2000). First Nations Bands across Canada struggle with poverty and lower well-being measures than the rest of Canada (Mchardy & O' Sullivan, 2004) and some point to the communal nature of reserve land as being a major contributor to these challenges (Fiss, 2005a, 2005b; Kline, 2012).⁴ However, forms of individualized property do already exist on many reserves, including individual land holdings created under the *Indian Act* (R.S.C., 1985) termed 'lawful possessions' and evidenced by 'Certificates of Possession'. The socio-economic, political, legal, and practical impacts of this property system have not been widely studied. Some researchers have suggested that there are significant benefits, both for individual Band members and overall community well-being and development, of using the lawful possession system, though further reforms to the system are still needed (Alcantara, 2003; Baxter & Trebilcock, 2009; Flanagan, Alcantara, & Le Dressay, 2011).

The lawful possession system presents many compelling and challenging questions for practitioners, researchers, and policy-makers who are working on questions of land management and community economic development on First Nations reserves in Canada. This article uses data on existing lawful possessions on reserves across Canada to describe the current use of this tenure system, as well as document statistical relationships between lawful possessions and socio-economic, demographic and locational factors. We provide information regarding the variability of lawful possessions across First Nations. Using regression analysis, we also study the determinants of lawful possession usage, assessing which variables cause First Nations to favour lawful possession over communally held land or customary

⁴We use the term 'reserve' to denote land that has been set apart for the use and benefit of an Indian Band, as defined in Section 2(1) of the federal *Indian Act*, R.S.C. 1985, c. I- 5 [*Indian Act*], the legal title to which is vested in the federal government (under Canadian law). First Nations themselves often use alternative definitions for their communities and lands.

holdings, and which variables have no influence. We first show that the majority of reserves in most provinces have no lawful possessions, and that the distribution is very uneven. Our regression results suggests that lawful possessions are currently not being viewed as a tool to foster economic development, and that using the system requires a relatively educated community with low levels of poverty. Our findings are of interest to First Nations leaders and land managers, policy-makers, researchers, and other practitioners working on First Nations lands issues and property rights systems more generally.

2 Certificates of Possession in Canada

We begin with a brief overview of the *Indian Act* land tenure system on reserves and descriptive statistics on current lawful possessions.

2.1 First Nations reserves

First Nation communities are officially referred to as Bands and are typically governed by a Band Council government as structured in the *Indian Act* or according to a customary governance arrangement as negotiated with the federal government. Under the *Constitution Act*, 1867 and *Indian Act*, title to reserve land is held in trust for Bands by the federal government. Official jurisdiction over First Nations reserve lands is divided between federal and local Band governments. Recently, some authority over land management has been devolved to a selection of Band Councils through federal legislation such as the *First Nations Land Management Act* (S.C., 1999) (FNLMA) or under Sections 53/60 of the *Indian Act*.⁵

As of February 2013, there are 617 officially recognized First Nations Bands in Canada (AANDC, 2013) and 3,003 reserves⁶ with a combined area of over 3.8 million hectares (Geomatics Services AANDC, 2012). 534 of these reserves are classified as remote or special

⁵These delegations are typically part of the RLAP (Regional Lands Administration Program) or RLEMP (Reserve Land and Environment Management Program), see AANDC (2012).

⁶Reserves with the same Administrative Land Identifier were removed from the data as duplicates. With duplicates included, there are a total of 3,185 reserves.

access (no year-round road access), 694 are urban, and 1660 are rural (14 are unclassified) (Geomatics Services AANDC, 2012).⁷ The current First Nations population⁸ in Canada is estimated at 530,000 and the 2006 census estimated that 40% of this population lives on reserves (Statistics Canada, 2010). Reserve populations vary widely, ranging from multiple thousands to less than 50 permanent residents, or only seasonal use for some hunting or fishing reserves.

2.2 The *Indian Act* Land Tenure System

There is no single land tenure system that applies to all reserves. Reserve land tenure systems are categorized into those that follow the *Indian Act* regime; those based on Land Codes under the FNLMA; those established under other self-governance regimes (modern treaties or self-government agreements); or locally determined customary land tenure systems.⁹ Customary systems are not formally recognized or enforced by the government or Canadian courts (Alcantara, 2008, p. 423; Bartlett, 1990, p. 138). Customary allotments are made at the discretion of the Band Council and not formally registered with the federal government, and thus offer less legal protection and tenure security if the Band Council decides to change the allotment or direct the use of that land (Bartlett, 1990, p. 138). Even so, many First Nations have preferred customary systems as a way to localize control over their lands and avoid the federal supervision and approvals required by the *Indian Act* (Bartlett, 1990, p. 138; Kydd, 1989, p. 11; Rakai, 2005, p. 117).

This paper presents data on the *Indian Act* land system, under which several forms of land tenure can exist (*Indian Act*, s.20; Imai, 2011; INAC, 1982, p. 2):

⁷AANDC uses a Band classification system of four geographic zones based on distance to nearest service center with year-round road access: Urban (<50 km), Rural (50-350 km), Remote (>350 km), and Special Access (no year-round road access to nearest service center). A service center is a municipality where First Nations individuals can access to social services and living supplies (Wassimi, 2009, p. 34). See (INAC, 2005).

⁸Registered Status Indians.

⁹See Ballantyne & Dobbin (2000) for details on these various land tenure models.

- Collectively held Band land that is managed by the Band government;
- Land allotted as individual land holdings (lawful possessions), evidenced by Certificates of Possession (CPs), typically held by individuals but can also be held by the Band;
- Conditional or temporary forms of CPs known as Certificates of Occupation;¹⁰
- Locatee leases, leaseholds of CP lands;
- Leases of designated Band land;
- Various leases or permits for specific activities (agriculture, timber harvesting, mining, oil and gas extraction, etc.)

The CP system was introduced by the federal government in 1951 to replace earlier instruments for registering individual holdings (Location Ticket, Notice of Entitlement, and Cardex holdings) and to increase individuals legal rights to their land allotments (Alcantara, 2003). These reforms and encouragement of registration by federal officials increased use of the system significantly as can be seen from Figure 1, which plots the annual number of lawful possession registrations in the time period 1880–2011.

A CP is permanent¹¹ and, if Ministerial approval is granted, a CP can be transferred to other Band members (in whole or subdivided), leased to members or non-members, and used as collateral in specialized Band-backed mortgages or housing loans (Alcantara, 2003, p. 408, 2005; Baxter & Trebilcock, 2009, p. 91). Revenue from a CP lease goes to the individual holder(s), though some nominal amount may be paid to the Band (Cowichan Tribes, 2011).

A CP interest functions almost like fee simple title¹² (Alcantara, 2003; Ballantyne, 2010, p.

¹⁰Certificates of Occupation are issued when the Minister withholds a full CP for the time being and so might have conditional requirements, such as the cultivation of the land or the building of a house, before the land is allotted as a full CP. Certificates of Occupation may also be used for time-limited allotments of land, though this appears less common. For more on Certificates of Occupation, see Kydd (1989).

¹¹Bands cannot cancel CPs. A CP can only be cancelled with consent in the case of an error or without consent in the case of fraud, a Band surrender of the land, or an expropriation by the Minister. However, you may be required to sell your CP if you become a non-Band member or if you are a non-member who inherit a CP.

¹²Fee simple is a legal term used to refer to freehold tenure; it is also used to refer to private ownership as is commonly conceptualized in Western land tenure systems (Bruce, 1998).

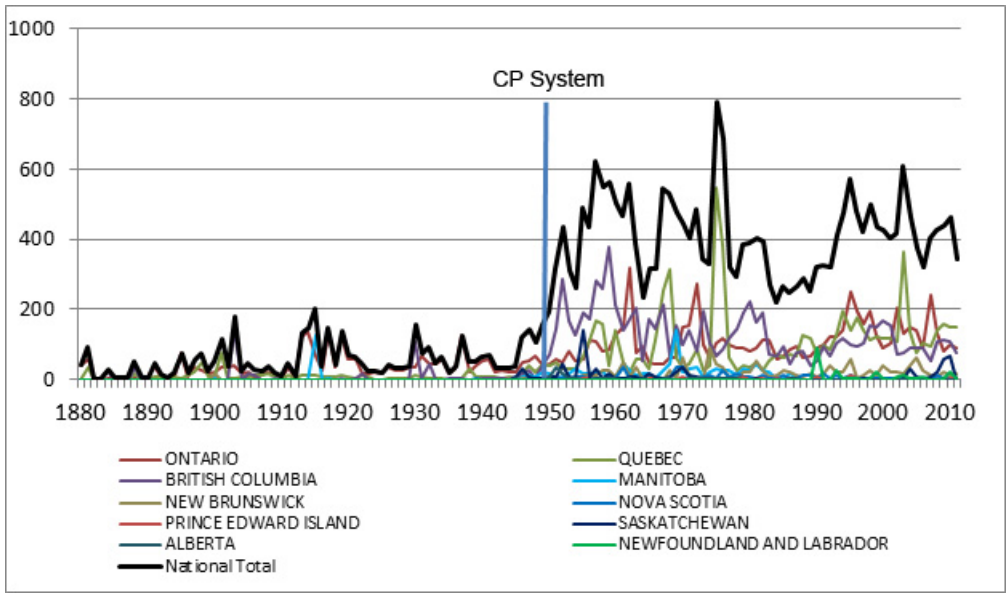


Figure 1: Annual number of Lawful Possession registrations, 1880 – 2011

41; Place, 1981; Yuen, 2009), except it cannot be alienated to non-Band members and legal land transactions require Ministerial approval. Also, CPs, like all reserve lands, are exempt from legal seizure and taxation (except for Band taxation policies).

Individuals can secure a lawful possession in several ways: requesting a new allotment, or through the sale, transfer, or inheritance of an existing CP. The creation of a new lawful possession through allotment is decided by the local Band Council, followed by federal approval and registration in the federal Indian Lands Registry System (ILRS). Band Councils determine the location and size of an allotment, however AANDC does exercise certain controls over how much land can be allotted and how lots are arranged (particularly if the lots are to be used for housing developments and require road access and servicing) and these requirements have increased since the initial reform of the system in the 1950s (Brinkhurst, 2013). For example, today AANDC and the Canadian Mortgage and Housing Corporation (a major funder of on-reserve housing developments) require that house lots be under a quarter of an acre and be spatially planned for cost-effective access and servicing

infrastructure, whereas historically house lots were typically between 1-5 acres and more spatially dispersed (Brinkhurst, 2013). Once an individual has a lawful possession, he or she can use the land exclusively and as he or she chooses (e.g. build a house, business, or other development) provided that uses do not conflict with local land regulations that may exist and provided that Ministerial approval is granted where required (such as for a lease).

2.3 Descriptive statistics on current lawful possessions under the *Indian Act*

We obtained data on lawful possessions in November 2012 from the Geomatics Services Office of Aboriginal Affairs and Northern Development Canada (AANDC). These data are based on records in the Indian Lands Registry System (ILRS) and the Canada Lands Survey System¹³ and contain information on reserve lands and the surveyed parcels on reserves, as well as the status of each parcel (Band Land, Lawful Possession, Leased Land, Designated Land) and the date on which an Evidence of Title was issued.

According to data from the ILRS, 414 reserves currently have at least some lawful possessions created under the *Indian Act* (Geomatics Services AANDC, 2012), up from 301 in 2003 (Alcantara, 2003, p. 393). In the ILRS individual holdings are modified or transferred over time and the certificate is reissued for the same parcel, or a holding may be subdivided and two new certificates issued in place of the previous one. This means that data reporting the number of Evidences of Title issued does not equate to the number of distinct, current parcels held under lawful possessions. This detail is sometimes overlooked when reporting on the CP system. For instance, Flanagan et al. (2011, p. 91) reported that since 1951, over 140,000 CPs had been issued across the country,¹⁴ with 40,000 in 2002-2004 alone, which could be seen as a dramatic increase. However, many of those CPs were for already

¹³The Indian Lands Registry System is database of instruments registered in the Indian Lands Registry relating to Reserve Lands and Crown Lands. An Instrument is a formal legal document dealing with transactions relating to interests in Indian land: the document specifies the type of transaction, the parcel of land, the parties to the transaction, and any legal details and specifications required.

¹⁴As of February 2013, 160,600 CPs have been issued since federal records began, along with 74,658 other EOTs (Evidences of Title) (ILRS AANDC, personal communication, 2013).

Table 1: Registered Current Lawful Possessions (LPs) by Province

Province	Reserve land in province (hectares)	Number of current LPs	%of national total number current LPs	Area under LPs (hectares)	LPs as % of all LPs	Province's share of all LP land nationally
ON	812,807.42	22,003	53.87	60,839.63	7.49	53.82
PEI	781.01	80	0.20	56.46	7.23	0.05
BC	351,820.57	7,688	18.82	22,193.34	6.31	19.63
QC	415,425.00	9,002	22.04	14,230.99	3.43	12.59
NB	16,340.80	903	2.21	280.08	1.71	0.25
MB	480,462.06	505	1.24	6,460.75	1.34	5.72
NS	12,197.55	273	0.67	115.03	0.94	0.10
NF	6,641.93	164	0.40	47.04	0.71	0.04
SK	949,318.27	142	0.35	6,702.57	0.71	5.93
AB	763,252.82	76	0.19	2,094.55	0.27	1.85
YT	2,826.18	4	0.01	3.60	0.13	0.00
NT	52,339.77	0	0.00	0.00	0.00	0.00

^a **Note:** Data source: Geomatics Services AANDC, 2012. (Retired, Unresolved, and Easement class registrations removed.) One current LP that with missing data on which reserve it was located within was also removed.

existing lots so this data alone does not necessarily show an equivalent increase in the total number of current lawful possessions, or land parcels under them. To assess the total number of distinct, current lawful possession holdings, additional data is needed. When past CPs and duplicate CPs for the same parcel of land are removed, there remain 40,841 current lawful possessions in existence in 2012,¹⁵ each representing a distinct parcel of land (Geomatics Services AANDC, 2012). The total acreage of land held under these current lawful possessions was 113,032.76 hectares, or 2.93% of the total reserve area in Canada (Geomatics Services AANDC, 2012).¹⁶

Table 1 shows the national data by province. We see that land under lawful possessions are relatively concentrated in a few provinces, namely British Columbia, Ontario and Quebec. Within province, the extent to which different First Nations use lawful possessions is also

¹⁵The same data reports a total of 43,633 if parcels that are classified as retired and unresolved are included.

¹⁶Note that this includes lawful possessions that are registered in a Bands name as well as lands held by individual members.

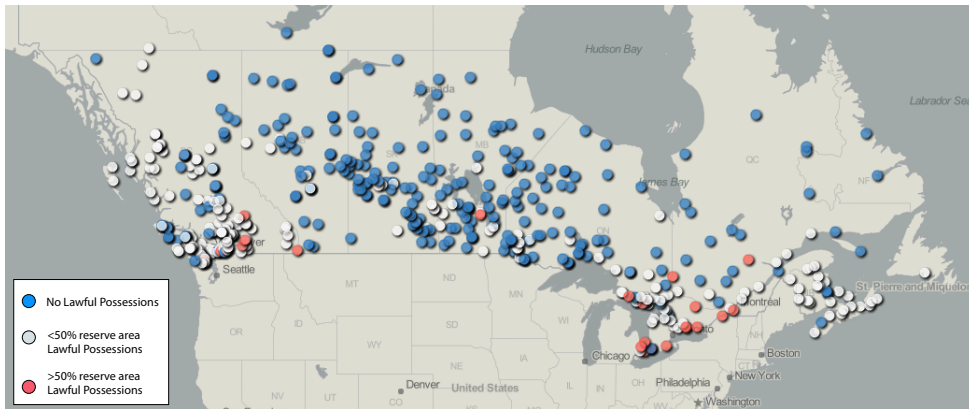


Figure 2: Lawful Possession across Canada

variable and surprisingly low. Even in Ontario and PEI, the two provinces with the highest share of reserve land under lawful possession, the corresponding number is less than 7.5 percent. In many provinces, the lawful possession system has been adopted minimally or not at all. These observations are also illustrated in Figure 2, which documents the share of lawful-possession land on reserves across Canada in 2006. The red dots represent Bands whose land under lawful possession exceeds 50% of the total area of their reserve(s). The white dots are Bands whose share of lawful possession land as a percentage of the total reserve land is between zero and 50 percent. Finally, the blue dots represent Bands with no lawful possession land at all.

Taking this first slice at the data, the most eye-catching observation from Figure 2 is that the majority of reserves have no lawful possessions, and that the distribution is very uneven. However, these descriptive statistics, while interesting, are challenging to interpret, particularly because it is unclear why there is such an uneven use of lawful possessions across reserves. Applying regression analysis techniques can help to illuminate some of the potential relationships that influence this descriptive data.

3 Data and Methods

3.1 Description of the Data

This study uses data from a variety of sources. Data on lawful possessions was provided by the Geomatics Services Office of AANDC, as described in the previous section. This information was combined with geographic data relating to Reserve location from Google Earth and a host of socio-economic information on First Nations Reserves, both from the Canadian Census (years 1991, 1996, 2001, and 2006) and AANDC. Our primary dependent variable is the share of reserve lands held under lawful possession. We created this variable by adding up the area of all parcels registered as being held by members of a Band under the title of Certificates of Possession (CPs), divided by the aggregated area of all registered parcels of land of the same Band.¹⁷

Our first set of explanatory variables includes a range of geographic indicators. Using Google Earth and the location address of a Band's reserves, we obtained the latitude and the longitude of the reserve, and took the mean in case of multiple reserves. To account for remoteness, we also calculated the (mean) distance to the nearest major city. The nearest major city location is provided in the ILRS data and is used by the AANDC to calculate a Geographic Zone Index and an Environmental Index designed to capture remoteness and climate.¹⁸ Rather than using those categorical variables, we prefer continuous variables as they do not involve a loss of information. The geo-location is a Band's (average) latitude and longitude, while remoteness is directly measured by the geodesic distance between (mean) reserve location and nearest major city, where the latter is defined as a major population centre closest to the most populous site of the First Nation.¹⁹ To the extent that geography

¹⁷As a base to calculate the individual land holdings per Band, we used the sum of the registered parcels of a Band, rather than the total area of all reserves of that Band as recorded by the ILRS. The two figures do not always match perfectly. For roughly 82 % of all Reserves, the ratio of sum of parcels in a reserve to the reported area of the reserve is between 0.99 and 1.01.

¹⁸Those indicators are part of the AANDC's reserve classification system and are employed to determine the level of funding for Indian Government Support, Education and Social Development.

¹⁹We also ran robustness checks replacing our measures with the AANDC indices, and the results were qualitatively similar.

bears on commercial land value, cost of living in general and housing in particular, as well as alternative traditional uses of the land, we expect the spacial distribution of lands under lawful possession to Certificates of Possession be uneven.

We augment those geographical factors with other socio-economic and demographic Band-level factors that are likely to relate to the incentives of individuals to acquire Certificates of Possession (CPs) and to the incentives of Bands to grant them. Those are measures of population, age structure, income, unemployment rate, human capital (education), and poverty. We capture educational achievement by the fraction of the population with a high-school degree.²⁰ To measure poverty, we use the fraction of the population with no recorded income. All demographic and socio-economic variables are drawn from the Canadian Census for the years 1991, 1996, 2001 and 2006, aggregated at the census subdivision (CSD) level. Using information from AANDC, we then matched these data to First Nations reserves.²¹ We also use information on Band governance and treaty status, which are publicly available through the AANDC's First Nations Profiles and other information drawn from the AANDC website.²² The summary statistics of the variables used in the regression analysis can be found in Table 2.

Table 2 also confirms the low number of actual CPs that we pointed to earlier. The median share of land under lawful possession is zero. In other words, more than half of all Bands do not make use of this land tenure instrument at all. The bar chart in Figure 3 illustrates this point by breaking the distribution of land holdings under CP up into percentiles of the distribution of Bands. Even among those Bands who have issued CPs, the majority has less than 5% of their land under this title. Only roughly 10 percent of all Bands have more than 50% of their reserve land allotted in this way. In very few cases, almost the entire reserve

²⁰Our results are robust to using alternative measures, such as the fraction of the population with no degree, or the fraction of the population with a post-secondary degree.

²¹The census data are freely available through Abacus (data from CSDs with very small populations are missing). Since we track reserves over time we first identified CSDs comparable over time. AANDC provides information of which CSDs are considered Indian reserves. This information was then used to identify CSDs that are Indian reserves, and CSDs that were suppressed for lack of information or small sample.

²²We wish to thank Fernando Aragon (SFU) to make and Ross Hickey (UBC) for making their data on treaties and First Nations Profiles available to us.

Table 2: Summary Statistics

Variable	Obs.	Median	Mean	St. Dev	Min	Max
land under lawf poss (%)	3,968	0.00	5.33	12.77	0.00	81.25
mean latitude	3,968	50.39	50.84	3.52	42.57	60.82
mean longitude	3,968	-103.20	-102.56	19.55	-133.69	-55.71
distance to near. city (km)	3,968	151.89	196.21	163.67	0.38	1,079.97
median income (\$)	944	24,906.50	26,204.12	9,490.09	6,672.00	83,812.00
unempl. rate (%)	1,532	25.00	25.67	14.21	0.00	106.25
pop no income (%)	997	6.86	7.68	5.12	0.00	33.33
pop high school degree (%)	1,548	7.84	9.21	7.77	0.00	50.00
pop aged 65+ (%)	1,569	3.75	4.83	6.59	0.00	69.44
aged 14- (%)	1,569	33.33	32.57	8.99	0.00	60.00
pop male (%)	1,569	51.35	51.54	3.40	36.84	73.81
total population	1,547	370	583.62	725.72	40	6,215
treaty impl. status (0-1)	1,569	0.00	0.18	0.39	0.00	1.00
electoral system (1-3)	3,536	2	1.56	0.54	1.00	3.00

^a **Note:** Observational Units are Bands in years 1991, 1996, 2001 and 2006. If a Band is located on more than one reserve, all information has been averaged across reserves whenever possible (if data on particular reserves were missing, those reserves (not the Band to which they belong) were dropped from the analysis.

Band base has been allotted. Some of these, it should be noted, are very small reserves that have been allotted to a family or single member because it is a particular familys fishing site (C. Walton, personal communication, 2012).

In Table 3, we report the means of some key geographic and socio-economic measures depending on whether the Band in question has some land under lawful possession ($share_law > 0$) or not ($share_law = 0$). We see that Bands that make use of CPs are quite distinct from those that do not: on average, the former are smaller both in population size and reserve area, their location is less remote, they tend to be better educated, have slightly higher median incomes, and a lower unemployment rate. They are also more likely to use the *Indian Act* electoral system (as opposed to customary electoral system, or self governance) and either already have a modern treaty agreement, or be currently engaged in negotiations. These descriptive statistics, however, tell us little about the relations underlying these patterns. For example, it does not allow us to answer the question whether education and income on the one hand, and the usage of lawful possession on the other hand are intrinsically related.

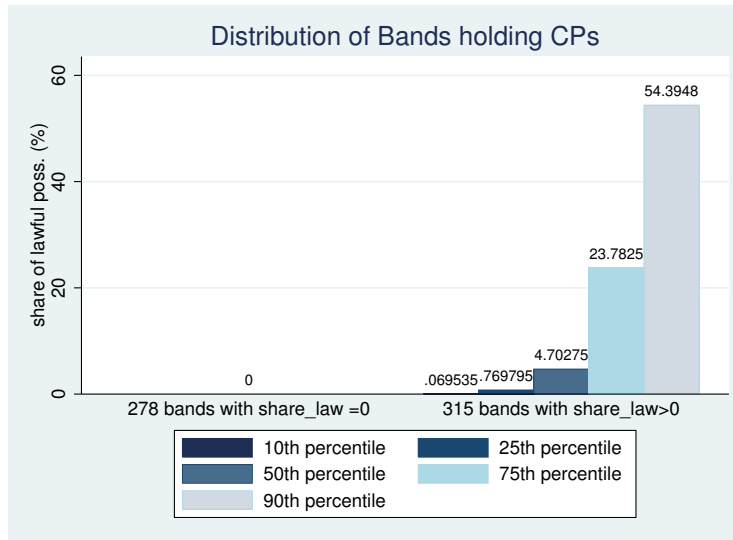


Figure 3: Usage of Lawful Possession across Bands

For example, the observed positive association could simply be a by-product of the fact that the purported benefits of lawful possession are arguably more pronounced for Bands located close to urban centres, and that those Bands also happen to be wealthier and better educated, on average, than their counterparts in more remote areas. Those questions are better addressed with a regression analysis, to which we turn next.

Table 3: Band Characteristics by Share of Lawful Possession

Variable (mean)	share_law = 0	share_law > 0
total area	9289.07	3643.87
total population	727.86	593.57
distance to near. city (km)	249.38	143.03
median income (\$)	29,448.21	29,667.31
unempl. rate (%)	23.65	22.91
pop high school degree (%)	13.81	19.04
treaty impl. status (0-1)	16.83	22.05
<i>Indian Act</i> elect. system	32.25	49.19

^a **Note:** Observational units are Bands in the year 2006

3.2 Methods

In our empirical estimation, we will make use of the fact that our dataset is a panel, that is, it contains successive observations over time for the same Bands. As a first step, however, we will use ordinary least squares (OLS) regressions in a pooled cross-section. Pooling the data for a Band over several years and using OLS increases the number of observations and therefore, increases efficiency in estimation and power in hypothesis testing. The model we estimate is

$$\text{share-law}_{it} = \alpha + \beta X_{it} + \delta_t + \epsilon_{it} \quad (1)$$

where share-law is the total share of land under lawful possession of Band i at time t , aggregated over all the Band's reserve land, X_{it} is a vector of Band characteristics, β is the vector of coefficients of interest, and ϵ_{ijt} is a Band and time specific error term. To account for possible differences across time, we also include a time fixed effect δ_t . OLS will yield consistent estimates of β under the assumption that the unobserved error term is uncorrelated with the explanatory variables, i.e., $E(\epsilon_{it}|X_{it}) = 0$.

In a second set of results, we will exploit the fundamental advantage that a panel has over a cross-section in capturing fundamental differences across Bands (fixed effects). To this end, we write the error ϵ_{it} as

$$\epsilon_{it} = \theta_i + v_{it} \quad (2)$$

where θ_i represents an unobserved Band characteristic and v_{it} is a Band-level error term. For instance, θ_i can be thought of as a Band level 'shock' that affects all observations of a Band equally. The random effects model assumes that θ_i is uncorrelated with the explanatory variables, but – unlike OLS – has the error v_{it} for the same Band to be correlated across time.²³ The fixed effect model allows θ_i to be correlated with X_i , and is the most general formulation. It enables us to account for unobserved confounding factors, provided those factors do not vary over the time span we consider.

²³Under the assumptions of the random effects model, OLS yields consistent estimates, but OLS standard errors are inconsistent because of the group-level errors are serially correlated.

4 Results

4.1 OLS Regressions

Table 4 below shows the results when equation (1) is estimated by ordinary least squares.²⁴ The regression in column (1) is our most parsimonious specification, which only includes geographic controls and time effects.²⁵ We see that the share of land under lawful possession has increased over time, and is larger for Bands whose reserves are located in the South (respectively, West) than for Bands with reserves in the North (respectively, East). Importantly, since the regression includes provincial fixed effects, those results need to be interpreted as within province variation, i.e., as deviations from the provincial mean of land under lawful possession. As expected, we also see that remoteness has a negative effect: the further away a Bands reserves are from the nearest city, the less land is held under lawful possession, all else equal.

The second specification (2) adds a number of demographic and socio-economic controls. The first important observation is that this reverses the time trend: accounting for demographic and socio-economic change, the uptake of lawful possession has slowed down in recent years. Next, note that Bands with better educated members tend to have relatively more land under lawful possession, possibly reflecting the fact that individual members that are better educated are more likely to perceive the benefits of ownership. The same is true for Bands with a more balanced age structure.²⁶ Interestingly, and somewhat unexpected given the raw correlation in Table 3, we also find that median income has a negative and strongly significant coefficient, suggesting that wealthier Bands do not necessarily face increased

²⁴We also ran all specifications as Tobit regressions, to account for the limited dependent variable. The results are qualitatively similar.

²⁵Specification (1) has almost four times as many observations because it does not make use of census data, which are only available for the years 1991, 1996, 2001, and 2006. The data from the ILRS are available from 1976 onwards.

²⁶Most Bands in the sample have a disproportionately low share of population aged 65 and older. The mean figure in our sample is 4.8 %, while the same figure for Canada as a whole was 13.7 %. Conversely, the average share of children aged 0 to 14 of the Bands in our sample is 32.5% compared to 17.7% national average (2006 Census).

incentives to make use of lawful possession. We will return to this finding when we estimate the fixed effects model below. Finally, the population size on reserve and the share of the population with no income (a measure of income inequality) do not add explanatory power to the model.

The third specification (3) adds two variables that aim to capture the institutional framework in which the Band operates, as well as proxy for unobserved governance quality. The first of these gives a Bands treaty implementation status. The estimated coefficient is positive and significant: Bands who have initiated or completed a treaty process have more land under lawful possession. On the other hand, the coefficients for the electoral system variables are both negative: Bands who have opted out of the *Indian Act* electoral system have a larger share of land under communal (Band) ownership, or at least not registered as lawful possessions (it could be held by individuals under customary allotments that are not registered with the federal government) possibly indicating that non-registered ownership is perceived a lesser problem in Bands where the leadership is elected by community-designed process.²⁷

Specification (4) includes two further demographic variables of interest. The first is the fraction of the population aged 15 or younger, which is another proxy for the quality of life in a community; it is strongly negatively correlated with income, and the composite community well being index provided by the AANDC. As expected, the estimated coefficient is negative and highly significant. The second variable is the share of the population that is male, and although this figure is not correlated with measures of well being, the estimated effect is once again negative and significant at the 5 percent level. One possible explanation for this finding is the link between land tenure and gender inequality that emerges because the current *Indian Act* provides no protection for the division of matrimonial real property

²⁷Roughly 40% of Bands hold elections in accordance to the election provisions of the *Indian Act*, while about 55 % have community-designed election processes under custom codes developed by their Bands and approved by their membership. The remaining 5 % elect leaders pursuant to the provisions of their self-government agreements.. Many First Nations have been critical of the electoral process under the *Indian Act*, stating that it is paternalistic and does not promote accountability.

on reserves following the dissolution of marriage. Alcantara (2006) argues that the adverse consequences of the missing provision are borne disproportionately by First Nations women, demonstrating that the courts have consistently issued rulings that lead to a bias against women when matrimonial property is divided.

One concern with the estimates presented so far is that Bands who have embraced the CP system subsequently experienced higher economic growth; after all, the purported incentives to acquire CP's is to increase investment in property, and foster entrepreneurship and resource exploitation. This would imply that the median income variable is endogenous. To address the issue of endogeneity, the final specification (IV) employs an instrumental variable strategy, instrumenting for community median income today with its 10-year lagged value, as well as the 10-year lagged share of the population with a high school degree. Both variables are strongly correlated with contemporaneous median income. Given the length of the elapsed time period, this procedure eliminates concerns of reverse causality.²⁸ We see that the negative coefficient on median income more than triples in size, suggesting that there indeed was a spurious positive correlation between income and share of lawful possession land that biased the estimated effect upward.²⁹ The other estimates are largely unaffected but some lose their significance, which is not surprising as the procedure introduces additional noise and reduces the number of observations by a large margin.

Overall, however, a fairly robust picture emerges: the Bands that tend to make most use of lawful possession certificates are located further in the South, are better educated, and have a more balanced age structure than their counterparts who do not have any land under lawful possession. One obvious interpretation of this finding is that First Nations communities who do better overall in socio-economic measures are also the ones that are

²⁸Using lags as instrumental variables does not necessarily eliminate concerns of omitted variable bias, though. IV would only yield unbiased estimates if the effect of income 10 years ago on today's share of lawful possession would solely be going through today's income. An important unobserved Band characteristic, however, would also be correlated with lagged income. We will address Band-fixed effect in the subsequent section.

²⁹In fact, a robust version of the (Durbin-Wu) Hausman test indicates that the hypothesis that the OLS estimates are not significantly different from the IV estimates can be rejected at the 1 percent level.

most in favour of registered individual land holding systems. Interestingly, however, they are not more wealthy on average. Indeed, controlling for other community characteristics, members of First Nation communities with higher median income are *less* likely to hold a Certificate of Possession. The magnitude of the corresponding estimate is quite large: an increase in median income by one standard deviations reduces the share of land held under lawful possession by on average 1.5 percentage points, all else equal.

4.2 Panel Regressions

One potential issue with the Ordinary Least Squares regressions is that unobserved confounding factors may not be adequately controlled for. One important such factor is governance. Scholars, practitioners, and First Nation themselves have noted that the governance structures imposed on communities by the *Indian Act* often results in a dysfunctional government. At the same time, the Band Council plays a key role in determining Indigenous tenure security under the *Indian Act*. A politicized or otherwise dysfunctional Band Council will lead to greater insecurity since land tenures on reserve are tied to social networks and authority distinct from the Band Council, thus undermining incentives to apply for CPs. At the same time, a low-quality local government will also negatively impact school attendance, income, and other socio-economic measures of well-being.

More generally, omitted variables that are correlated with the explanatory variables as well as the unexplained error term will cause OLS estimates to be biased. Making usage of the panel structure in our data can help alleviate these concerns, provided the unobserved variable is time invariant. To this end, we estimate a fixed-effects model, where the error term ϵ_{it} in (1) is replaced by (2). Intuitively, the regression solely uses the variation in the dependent variable and the explanatory variables *within the same Band over time*: the effect of each variable is identified by deviations from the within-Band average of that variable. Again, we include year fixed effects to account for the time trends in the data.

The corresponding results are shown in the first column (FE) of Table 5. As before, the

estimated effects of education and the share of population above age 65 are positive and significant. The coefficient on the poverty measure (share of population with no income) is negative and also highly significant: Bands who experienced a drop (respectively, increase) in poverty over a 5 year period relative to their all-time average saw their share of land under lawful possession rise (respectively, fall) over the same period, taking into account nation-wide time trends. While these results are to be expected, we also find that median income is no longer negatively associated with the share of land under lawful possession; the corresponding coefficient is positive but not significant. In other words, *across Bands*, Bands with higher income tend to have fewer lands under lawful possession, all else equal, whereas *within the same Band*, this relation no longer holds. This finding indicates that there is a Band-specific, unobserved, and positive income determinant, which is negatively correlated with the benefits of benefits of private property. One possible such determinant may be informal governance quality (i.e., a Band's cohesive structure), which is positively associated with income but reduces the need for formal property rights. Note that this argument stands in contrast to our earlier conjecture that good governance creates land tenure security, which would increase the incentives of individuals to apply for Certificates of Possession. A final noteworthy result that differs from the cross-section is that the share of children under 15 has a positive effect on the amount of land under lawful possession. Since we are now focusing on within-Band variation and since the time horizon is relatively short, a change in the share of children likely reflects an increase in the birth rate (as opposed to a long-term demographic change). Again, this finding is consistent with CP's being primarily granted for residential purposes, as an increase in the number of families with young children will naturally increase the need for housing.³⁰

One important limitation of the fixed-effect model is that we cannot identify the effects of variables that does not vary across time. For this reason, we also estimate a random-effects model, which assumes that the unobserved Band characteristic is uncorrelated with the

³⁰The measured effect of share of male population is no longer significant, but since this share varies very little within Bands, the corresponding estimate is bound to be very noisy.

explanatory variables, but allows for error terms to be correlated over time. The results are presented in the second column (RE) of Table 5. The picture that emerges for the time-varying variables is quite similar to the fixed-effect model; indeed, a Hausman specification test for fixed effects against random effects shows that the respective coefficients jointly are not significantly different at the 5 percent level, i.e., a random effects model fits the data equally well. The coefficients on the time-invariant variables also remain qualitatively similar to those in the OLS regression, and we therefore omit a discussion here for brevity. Finally, because the concern that income is endogenous is not fully alleviated by the panel structure, we ran a IV regression, similar to the OLS case. We see most coefficients are unchanged. The coefficient on median income itself turns negative again, but the standard error is too large to draw any definite conclusions. Instead, we would argue that the results confirm the previous panel findings, which suggest that income has *no* causal effect on the incentives to apply for Certificates of Possessions, while education does.

5 Discussion

Our analysis yields several interesting findings that warrant further discussion. In interpreting these results, one needs to exercise caution as there are limitations to our data and to what we accomplish with our methodology. Unobserved factors that are correlated with the dependent variable and the independent co-variables will cause our estimated coefficients to be biased, and will make causal inferences difficult. However, we have taken steps to address these issues; in particular, using panel data that filters out time-invariant unobserved differences between Bands (such as historical differences or variations in natural resource abundance). Our panel regressions uncover evidence of a positive effect of education on the degree to which a Band uses the lawful possession system, suggesting that Bands with more educated members are more likely to use the system. This effect could be operating at the individual level if education means that an individual is more likely to apply for and secure a lawful possession. Alternatively, it could operate at the Band level if education

influences Band leadership and members to be more favourable to using the system. In the panel, we also see a strong association between reductions in poverty and incidence of lawful possession. Holding the average income constant, an unusually low level of poverty (for a particular Band) is associated with an increase in the share of land under lawful possession (for the same Band). This result is fairly intuitive: allotting, registering and administering land through the federal system is likely not a priority for Bands or individuals struggling with poverty, given costs and effort involved, both on the Band and individual level. This dynamic may be amplified by AANDC's current policy that federal funds cannot be used to develop housing or other community infrastructure on individual-held land, creating an incentive for Bands that rely heavily upon federal funding to retain lands as Band land (Chawathil First Nation, 2010; Brinkhurst, 2013).

Another point of interest is that in the panel analysis we found no causal effect of median income on use of lawful possessions. An increase in income does not seem to prompt individuals or Bands to seek more CPs, all else equal. This is significant because one of the major purported benefits of private property is that it is a necessary institution to support economic growth, that as individuals secure economic resources they will seek tenure security to protect their investments in land. As CPs are currently the most legally secure form of land holding for individuals on reserves under the *Indian Act*, one would expect individuals to apply for, and Bands to grant, more CPs as their income grows. The absence of a strong link suggests that the security and benefits provided by CPs may be less than expected, or that there are Band-level controls operating that restrict increases in lawful possessions even in cases where individuals desire them (as is profiled in research by Brinkhurst, 2013).

Our OLS analysis of the cross-section data also generates several findings of interest. As expected from the distribution of lawful possessions across the country (recall Figure 2), latitude and longitude variables were strongly linked to lawful possession usage. The North–South location of a reserve also helped us to control for economic viability differences between communities, as land values in northern reserves are expected to be much less than in

southern reserves, given the distribution of population densities in Canada. A second finding of interest from the OLS results is that there was no statistically significant relationship between the remoteness classification of a reserve and how much of its land is held as lawful possessions. Remoteness was only significant if no other variables were controlled for; as soon as others were included the significance disappeared. This was an unexpected result, as we had anticipated that more urban reserves would have more incentive to allot lands given the value of land and potential for agriculture or other business developments by individual members. This finding is consistent with Bands and individuals favouring CPs for residential purposes, rather than to facilitate business development. This may be a reflection of the relatively low level of economic activity on most reserves, and the low level of financial capital that individuals can access to support on-reserve business ventures (Baxter & Trebilcock, 2009, p. 92). Another factor may be that Bands with economically valuable lands and development opportunities are choosing to retain the land as Band land to enable Band-led developments rather than individual developments (Brinkhurst, 2013). This may also be linked to AANDC policies that encourage, or in some cases require, allotments be small and planned for residential uses, as discussed previously.

A final noteworthy result that the relationship between median income and lawful possessions is not consistent across specifications. In the cross-section, income and lawful possession are strongly negatively correlated, whereas there is no significant correlation in the panel. This implies that there is some unobserved confounding factor that is causing income and CP usage to be negatively linked *across* Bands but not *within the same* Band. In other words, Bands that use lawful possession are systematically different – in a way that we cannot observe in our dataset – from Bands that do not, and this systematic difference is negatively correlated with income, but positively correlated with lawful possession usage, all else equal. One plausible explanation could be that other Band characteristics, such as governance effectiveness, or community cohesion, underlie this effect. Effective and trusted Band governance or an otherwise cohesive community could mean that a Band has ways of

increasing income without seeing the need to use the federal land tenure system. Another possibility is that Bands wider land management regimes may exert important influences on income. Between two Bands that use lawful possessions, economic development and incomes may differ significantly as a result of having reserve land management systems and supports in place, such as adequate surveying, comprehensive land use planning, planned community infrastructure, regulation of land uses, or taxation of landholders or leases. These types of land management authorities may be formalized with the federal government under the *Indian Act* or may operate locally and informally but effectively. As explained by Larry Pardy, Manager of Lands, Environment and Natural Resources in AANDC's Atlantic region, by looking only at CPs, we may see no correlation between CPs and community/economic development but when we consider the overall land management framework - formal or informal - the picture is far different (Pardy, personal communication, 2012). Further research is needed to determine whether factors such as these are causing the statistical relationship we identified.

6 Conclusions and Next Steps

To summarize, there are far fewer lawful possessions currently used than would be expected if most Bands and individuals actually perceived them as a beneficial tool. More than half of all reserves have no land under lawful possessions, and of those that do use the system, the majority only have a small percentage (less than 5%) of their land area as CPs. There are larger contextual factors to consider when trying to explain this situation, such as the history of the lawful possession system and socio-cultural considerations, as described by Nemoto (2002), Alcantara (2003), Baxter & Trebilcock (2009), Rakai (2005), and Brinkhurst (2013) as well as limitations of the current system, as described by Alcantara (2008), Baxter & Trebilcock (2009), Flanagan et al. (2011), and others. However, the point remains that the current system of individualized property on reserves has not been widely adopted and further investigation of the reasons for this would be beneficial for informing efforts to reform

or replace the system. If many Bands and individuals are not in support of the limited form of private property that the lawful possession system provides, this raises serious questions about the suitability and effectiveness of proposed efforts to increase privatization of reserve lands.

Our findings also show that Bands who are already advantaged in terms of reduced poverty and education, and are located in more densely populated and climatically more favourable areas, are the ones that tend to make more use of the lawful possession system. This suggests that only members of those Bands that are doing comparatively well are taking up the opportunity to further improve their well-being, while the opportunity is lost on those Bands who struggle. From this it seems likely that any benefits from further formalization of the reserve land tenure system would not be equally accessible for all Bands. While our findings have linked some positive factors to the uptake and use of the lawful possession system, the lack of strong link between remoteness and CPs also indicates that lawful possessions are not currently being used to support economic development; instead the evidence is consistent with CPs being predominantly used for providing members with residential lots. It may be that in practice, the transaction costs associated with the system (Alcantara, 2008), limited access to capital (Baxter & Trebilcock, 2009), or a lack of land use planning and other development supports (Brinkhurst, 2013) mean that the current lawful possession system, and the larger *Indian Act* reserve land management framework, does not yet provide effective tools for encouraging local economic development.

Many questions remain. Some individual Bands who are enjoying strong local economic development have credited individual land holding and the lawful possession system as encouraging entrepreneurship, improving housing quality, and support an overall better quality of life for their members and are putting their support behind efforts to reform the system to allow for further privatization (Fiscal Realities Economists, 2007, 2010; Flanagan et al., 2011; FNTC, 2010). However, national level data on the lawful possession system suggest that many Bands are experiencing a different story. It is important to continue research on

the practical social, economic, political, cultural, and environmental impacts of the lawful possession system at the local level for Bands across the country. In an upcoming extension of this research, we will explore in more detail the causal relationships between adoption and use of the lawful possession system and community well-being indicators (Aragon, Brinkhurst, and Kessler, forthcoming). There is also a need for more research on other reserve land tenure systems, such as customary land holdings, tenure forms under FNLMA land codes, and other unique types of tenure created by self-governing agreements such as the Nisgaa Final Agreement (2000) and the Tsawwassen Final Agreement (2007). First Nations and policymakers across Canada need more information on the empirical impacts and implications of various land tenure systems, particularly as efforts to reform the *Indian Act* lands system continue.

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Table 4: OLS regressions

dependent variable independent variable	share of land under lawful possession				
	(1)	(2)	(3)	(4)	(IV)
latitude (mean)	-1.206*** (0.075)	-1.118*** (0.172)	-0.955*** (0.193)	-0.819*** (0.183)	-0.164 (0.356)
longitude (mean)	0.432*** (0.054)	0.355*** (0.136)	0.332** (0.149)	0.322** (0.149)	0.248 (0.246)
distance nearest city	-0.828*** (0.180)	-0.851* (0.446)	-0.606 (0.478)	-0.425 (0.469)	-1.066 (0.886)
median income		-2.970* (1.661)	-3.700** (1.772)	-4.214** (1.793)	-16.425*** (5.948)
unemp_rate		-0.054* (0.031)	-0.071** (0.031)	-0.053* (0.031)	-0.219*** (0.081)
share of pop no income		0.084 (0.090)	0.005 (0.094)	0.040 (0.095)	-0.135 (0.216)
share of pop highschool		0.448*** (0.105)	0.465*** (0.111)	0.389*** (0.109)	0.315* (0.186)
share of pop 65+		43.494*** (13.924)	45.632*** (14.188)	32.502** (15.103)	24.485 (23.814)
population (log)		0.570 (0.705)	0.938 (0.751)	0.776 (0.753)	2.441* (1.395)
treaty impl. status			3.264** (1.465)	2.478 (1.522)	1.958 (2.245)
custom elect			-1.710* (0.982)	-1.468 (0.985)	-1.745 (1.650)
self govern. elect.			-10.157*** (2.497)	-8.671*** (2.546)	-9.057** (4.497)
share of pop 14-				-25.151*** (7.834)	-41.218** (16.131)
share males				-43.180** (21.371)	-66.548 (43.098)
1996.year	2.739*** (0.707)	-1.430 (1.164)	-1.760 (1.178)	-0.944 (1.232)	
2001.year	3.352*** (0.744)	-0.602 (1.231)	-1.063 (1.271)	-0.506 (1.313)	2.437 (1.982)
2006.year	4.191*** (0.799)	-4.298*** (1.326)	-4.674*** (1.385)	-4.193*** (1.382)	
Observations	3,624	909	839	839	351
R-squared	0.189	0.319	0.326	0.336	0.294

^a **Note:** All regressions include a provincial fixed effect. The standard errors reported in parentheses are heteroskedasticity-robust. The IV specification instruments median income with its 10-year lag as well as the 10-year lag of the share of the population who has a high-school degree. Superscripts ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table 5: Panel regressions

dependent variable independent variable	share of land under lawful possession		
	(FE)	(RE)	(RE-IV)
latitude (mean)		-1.467*** (0.367)	-1.256*** (0.436)
longitude (mean)		0.554** (0.262)	0.296 (0.255)
distance nearest city (log)		-0.483 (0.809)	-0.834 (1.004)
median income (log)	0.580 (0.430)	0.451 (0.425)	-.7469 (7.369)
unemployment rate	-0.002 (0.010)	-0.003 (0.010)	-.777 (5.123)
share of pop no income	-0.063*** (0.022)	-0.063*** (0.022)	-0.089* (0.071)
share of pop highschool	0.082** (0.033)	0.089*** (0.034)	0.106*** (0.053)
share of pop 65+	38.510*** (11.422)	38.609*** (11.580)	24.262*** (6.485)
population (log)	0.260 (0.257)	0.288 (0.229)	2.829 (1.864)
treaty impl. status		4.661 (2.849)	1.346 (2.657)
custom elect		-1.769 (1.748)	-2.783 (1.891)
self govern. elect		-8.689** (4.234)	-10.187* (5.656)
share of pop 14-	7.735** (3.328)	6.816** (3.117)	1.458 (6.236)
share males	1.062 (6.271)	0.078 (6.523)	6.304 (10.152)
Observations	839	839	351
R-squared	0.098	0.296	0.309
Number of Bands	265	265	212

^a **Note:** All regressions include provincial and year fixed effects. The standard errors reported in parentheses are heteroskedasticity-robust and clustered at the Band level. The IV specification instruments median income with its 10-year lag as well as the 10-year lag of the share of the population who has a high-school degree. Superscripts ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.