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Endogenous Institutional Change on First Nations Reserves: Selecting into the First Nations Land Management Act

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Abstract

In Canada, First Nations reserve lands are governed according to the *Indian Act*. This arrangement complicates land management and is opposed by most First Nations. The *First Nations Land Management Act (FNLMA)* enables interested First Nations to opt-out of sections of the Indian Act and increase their autonomy over land management. Using detailed data on land transactions, institutions, and socioeconomic conditions on reserves, this study empirically assesses the factors influencing the adoption and implementation decisions. Our results demonstrate the significance of self-selection into the FNLMA. Specifically, we identify property rights, trust, and socioeconomic conditions as factors influencing adoption and implementation.

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I – Introduction

Throughout North America, Indigenous people experience worse economic and health outcomes than their non-Indigenous counterparts (Anderson & Parker, 2009). This is particularly true for those living on government-administered reserves and reservations, where many Indigenous people in Canada¹ and the United States² reside. An important and growing literature examines the impact of property rights and land tenure on economic development in these communities. For example, Akee (2009) finds evidence of under-investment on Native American tribal trust lands compared to proximate fee-simple properties; Anderson and Lueck (1992) find similar evidence with respect to agricultural productivity on Native American reservations.

More recently and in the context of Canada, Aragón (2015) finds that formal treaties have led to improved economic conditions on First Nations reserves. Similarly, Pendakur and Pendakur (2018) assess a host of optional reforms, including the First Nations Land Management Act³ (FNLMA) – the focus of this study – and find mixed results with respect to improvements in average incomes. A common limitation of both studies is that they focus on the outcomes of adopting an optional reform without developing the selection model. The endogeneity of formal treaties and the FNLMA, while a natural condition of institutional change, complicates empirical analysis as it is difficult to separate the effect of the reform from the selection process.

¹ The Indigenous peoples of Canada are the First Nations, Métis, and Inuit. Reserves were only created for First Nations, although not all First Nations live on a reserve.

² The Indigenous peoples of the United States are the Native Americans, Native Hawaiians, and the Native Alaskans. Reservations were only created for Native Americans, although not all Native Americans live on a reservation.

³ The FNLMA is an optional institutional reform that is available to First Nations. The reform focuses on the development of a land code and more formal land management system.

The issue of self-selection is a common theme in the economics and programme evaluation literatures. Topics such as the returns to education (Dale & Krueger, 2002), the benefits of adopting a new agricultural technology (Suri, 2011), and the gains from emigration (Borjas, Kauppinen, & Poutvaara, 2019) all involve considerable self-selection. While some factors influencing self-selection can be identified and controlled for, other factors are commonly unobservable (e.g. ability in the returns to education literature). With respect to the FNLMA, a key unobservable variable is a First Nation's trust in the federal government⁴.

The three studies identified in the previous paragraph explore the selection problem in terms of both observable and unobservable factors. This paper applies a similar logic to better understand the selection model that undergirds a First Nation's decision to adopt and ultimately implement the FNLMA. This approach allows us to identify and control for characteristics that have been excluded in previous literature. First, in assessing the selection process⁵ we separate the initial adoption⁶ decision from implementation⁷. More specifically, we assess whether the factors influencing adoption differ from the factors influencing implementation. Past studies of the

⁴ Jobin and Riddle (2019) highlight some of the concerns that have been raised about the FNLMA. They discuss the concern that by implementing the FNLMA, a First Nation is implicitly acknowledging the governments jurisdiction over their lands. Some First Nations contend that the governments long-term goals are to municipalize First Nations' reserves, thereby maintaining the government's authority over reserves, rather than allowing for true self-governance.

⁵ Figure 1 summarizes the post-adoption process for the FNLMA, culminating in the implementation of a land code.

⁶ Adoption refers to the first-stage decision that allows a First Nation to begin the process of implementing the FNLMA. First Nations that have completed the adoption step are considered signatories to the Framework Agreement on First Nations Land Management (the agreement that forms the basis of the FNLMA). The phase in-between the adoption and implementation decisions is referred to as the developmental phase.

⁷ Implementation refers to the completion of the FNLMA process, whereby a land code has been developed, approved by the community, and ultimately implemented. First Nations that have completed the implementation step are referred to as being operational under the FNLMA.

FNLMA have focused on the adoption decision, which is less informative than implementation, as it is only an indication of intent and is not an actual change in land management. Second, we assess whether differences in property rights influence adoption or implementation. Neither Aragón (2015) nor Pendakur and Pendakur (2018) include measures of the existing structure of property rights on reserves, which may be an important factor influencing both adoption and economic outcomes. Finally, like Dale and Krueger (2002), we control for motivational variables which are unobserved, but are associated with other observable choices. By identifying and controlling for these other related choices, we can control for some of the variation in the unobserved variables. More specifically, we use past adoption decisions of other optional reforms to assess whether trust is an important factor influencing FNLMA adoption or implementation.

The purpose of this article is to assess the factors influencing adoption and implementation of the FNLMA, highlighting key issues that have been ignored by previous studies. More specifically, we use publicly available census data, as well as administrative data from Crown-Indigenous Relations and Northern Affairs Canada, to assess the importance of property rights and trust for adoption and implementation of the FNLMA. Our results suggest that property rights are a key factor influencing institutional change on First Nations reserves. We also find some evidence that trust is an important unobserved variable influencing adoption. Finally, we confirm the key result from Doidge, Deaton, and Woods (2013), that more urban and more educated First Nations are more likely to pursue adoption.

This article contributes to a long and important discussion regarding institutional change. Specifically, we contribute to the privatization literature by examining whether the structure of property rights influences adoption of an institutional reform. Our analysis helps to clarify why, in the more than 20 years since the FNLMA was signed into law, less than 15% of First Nations (94

of 634) have successfully implemented a land code. In this regard, we find that variation in property rights across First Nations and their relationship with the federal government are important considerations. Specifically, we find an inverse relationship between individualized property rights and FNLMA implementation, suggesting the possibility that these reforms are substitutes. While our analysis focuses on Canada, our results raise important considerations for Indigenous policy and reform in other countries, particularly those with similar colonial histories and institutional arrangements, namely the U.S., Australia, and to a lesser extent New Zealand.

The remainder of this article is organized as follows. Section II provides a brief background on First Nations reserve lands in Canada, summarizes the multi-step process for adopting and implementing the FNLMA, characterizes property rights and land tenure on reserves, and describes several other optional reforms that may influence FNLMA adoption. Section III develops a model of institutional change to better contextualize our research questions and to derive testable hypotheses. Section IV summarizes the data and empirical methods used. Section V presents results and discusses implications. Finally, section VI summarizes the study.

II – Background

When the *British North America Act*⁸ was issued in 1867, it granted the Canadian federal government, under Section 91(24), exclusive authority and jurisdiction over “Indians and lands reserved for the Indians”. This ‘transfer’ was further codified eight years later in the *Indian Act*

⁸ The British North America Act, also referred to as the Constitution Act, 1867, is the act of British Parliament by which three British colonies in North America—Nova Scotia, New Brunswick, and Canada—were united as “one Dominion under the name of Canada” and by which provision was made that the other colonies and territories of British North America could join.

and remains in force today for most First Nations communities⁹. The Indian Act regulates most activities on reserves. This includes how land is managed and used, who gets Indian Status, how Chiefs and Band Councils are elected, how Band membership is determined, and how funding is allocated. Land, in particular, is subject to over 40 regulations and all land transactions require some mixture of approval from the Band Council, a majority of the community, and/or the Federal Government. This arrangement has been frequently cited as a barrier to economic development, as it creates uncertainty and raises the cost of transacting reserve land (Alcantara, 2007; Anderson & Parker, 2009; Aragón, 2015; Aragón & Kessler, 2020; Flanagan & Alcantara, 2005; Pendakur & Pendakur, 2018).

In response to these concerns, among others, the Indian Act was reformed in 1985¹⁰ with an emphasis on increasing the autonomy of First Nations. The Framework Agreement (FA) on First Nations Land Management, developed in 1996 as a result of a collaboration between the federal government and representatives from fourteen First Nations, is a direct result of this change in policy. The FA was approved and implemented as federal legislation in 1999 as the First Nations Land Management Act (FNLMA). The FNLMA is a formal process that enables interested First Nations to opt out of 44 land-related provisions in the *Indian Act*, develop their own local land codes, and ultimately expand their control and authority over their reserve lands, thereby reducing the cost of transacting reserve land. Importantly, First Nations are not required to pursue the FNLMA, as it is an exclusively optional reform. The expected benefits of the FNLMA include increased investment and business activity, which are expected to influence employment, incomes,

⁹ Several First Nations have previously opted-out of the Indian Act via a treaty, settlement, or related agreement.

¹⁰ The 1985 reform of the Indian Act was made under Bill C-31, which focused on removing discrimination, restoring status and membership rights, and increasing First Nations' control over their own affairs.

and other common metrics of economic development. Despite these potential benefits, adoption of the FNLMA remains relatively low.

The purpose of this article is to understand the factors influencing adoption and implementation of the FNLMA and to develop an understanding of why take-up hasn't been more expansive. Importantly, our approach allows us to identify and assess key factors that have been excluded in previous literature. First, we develop an understanding of the distinction between being a *signatory* to the Framework Agreement (adoption decision) and being *operational* under the FNLMA (implementation decision). By separating these two steps, we can distinguish the selection process influencing adoption from the factors determining implementation. Second, we identify and assess the portfolio of existing property rights that exist on reserves; these differences may influence adoption of land reforms like the FNLMA. Finally, we characterize variation in First Nations participation in other optional reforms. Understanding these differences may account for different motivations regarding participation in a government-led reform, such as the FNLMA.

Separating Adoption from Implementation

There are several steps that are required before a First Nation can develop its own land code under the FNLMA. First, an interested First Nation must pass a band council resolution (BCR) seeking approval to pursue entry into the FNLMA. If approved, the BCR is sent to the Lands Advisory Board¹¹ and a second BCR is drafted, which, if passed, commits the band to meeting the requirements of the FNLMA's community approval process. Importantly, not all First Nations are invited to immediately become signatories to the FA. The Lands Advisory Board, based on their

¹¹ The Lands Advisory Board was established under Part VIII of the Framework Agreement on First Nations Land Management, for the purposes of assisting signatory First Nations in establishing their agreements with the Canadian government (Lands Advisory Board Resource Centre [LABRC], 2003).

budgetary constraints, selects the most qualified candidates on an ongoing basis. Those that are not selected are added to a waitlist. According to the Lands Advisory Boards' annual reports, this waitlist has exceeded 50 First Nations in most years since the Board was established in 1999.

If a First Nation is approved and successfully passes both BCRs, the Lands Advisory Board makes a recommendation to the federal government to add the First Nation to the schedule of the FNLMA and is then considered to have adopted the Framework Agreement (FA) on First Nations Land Management. This makes the First Nation an official *signatory* to the FA but does not guarantee that they will develop their own land code. Many First Nations have adopted the FA but are yet to successfully implement their own land codes and become operational under the FNLMA. These First Nations are referred to as being in the developmental stage. Importantly, the initial adoption decision does not require input from the community and is strictly the decision of the Chief and Council. Conversely, the implementation decision requires a community vote. Figure 1 provides a graphical summary of the implementation process and Figure 2 summarizes the number of operational and signatory First Nations over time (1995-2020).

Once a First Nation has become a signatory to the FA, it takes an average of 1,423 days to ratify a land code. The First Nation must develop and draft a land code, submit it to a verifier that is jointly approved by the First Nation and the federal government, negotiate a funding agreement with the federal government, and finally ratify the land code and the funding agreement with a community vote (Alcantara, 2007). Importantly, the land code must cover the entirety of the First Nation's reserve lands and must also include allowances for the creation and regulation of a dispute resolution process, an environmental approval process, and a policy governing matrimonial property. If the community vote is successful, the verifier certifies the land code, which is then implemented, and the First Nation officially reclaims land management responsibilities from the

federal government. At this point, the First Nation is considered operational under the FNLMA. Once the land code takes effect, it obtains full legal status and becomes enforceable in Canadian courts (Isaac, 2004). The First Nation can now manage its own lands without requiring federal approval for most day-to-day land transactions.

Previous studies of the FNLMA have largely focused on the adoption decision. For example, Doidge, Deaton, and Woods (2013), the only previous study to empirically assess adoption, focuses on the decision to adopt and become a signatory to the FA; they do not explicitly assess implementation. As of February 2020, 94 of 634 (14.83%) First Nations have ratified their land codes and are considered fully operational, 71 (11.2%) are in the developmental phase, and 61 (9.62%) are on the waitlist. Since our census data ends in 2016, we are only interested in those that have adopted the FA (127 of 634) and/or implemented the FNLMA (64 of 634) by the end of 2016. Importantly, we do not have information on which First Nations are on the waitlist. Figure 3 provides a map that identifies which First Nations are in the developmental phase (have adopted) and which are operational (have implemented a land code).

Property Rights and Land Tenure on First Nations Reserves

With few exceptions, reserve lands remain the property of the federal government and are held in trust for the benefit of band members; reserve lands are communal by design. Before land can be formally used, it must be allocated, either to the Band Council or to an individual band member. Land allocated to the Band Council may be used for community housing, education and recreation activities, administration, or economic development. While every First Nation is different, on most reserves, Band Councils control a significant proportion of land for band purposes (Flanagan & Alcantara, 2005).

Land can also be allocated to individual band members using a certificate of possession (CP). Land held under a CP can be subdivided, inherited, sold (to other band members), leased, extracted for surface resources, or used for housing or as a location for a business (Flanagan & Alcantara, 2005). CPs are the most marketable and secure form of individual property on First Nations reserves in Canada¹². Still, most transactions require approval from the Band Council and/or the federal government. Under the FNLMA, approval is only required from the Band Council.

Leases, both short and long term, are another common contractual instrument used on First Nations reserves. Leases can exist under the Indian Act and under the FNLMA and can be granted on land allocated for band purposes, as well as on CP land (Flanagan & Alcantara, 2005). Importantly, band land must be designated¹³ before it can be formally leased to a third party; this is not a requirement for CP land. The primary constraint on leases is that the Band Council or an individual band member must seek federal approval for the land they intend to lease before it can be formally transacted. Under the FNLMA, federal approval is not required, but CP holders must instead gain approval from the Band Council.

A final category of land tenure that exists on reserves are customary rights. These tracts of land are acquired through occupation, community recognition, or inheritance (Flanagan & Alcantara, 2005). Importantly, First Nations that employ customary rights rarely document them and the

¹²According to data from the Indian Land Registry System (ILRS), over 160,000 CPs exist across Canada, but only a subset of First Nations (270 of 634) have ever created a CP. Research by Brinkhurst and Kessler (2013) and Aragón and Kessler (2020) finds that a greater prevalence of CPs is associated with improved economic outcomes.

¹³ Designated lands are the reserve lands that the members of a First Nation have agreed to lease for a specified purpose. Before lands can be designated, the community must approve the designation with a vote.

Indian Act does not support their existence. Consequently, courts have been reluctant to enforce customary rights because they lack legal and legislative recognition.

Across First Nations, there is significant variation in the use of CPs, designations, leases, and customary rights. Table 1 provides summary statistics on reserve property rights in Canada, broken down by Year and FNLMA adoption status (as of February 2020); our data does not include customary rights, as they are not documented or included in the governments land registries. Importantly, First Nations that are signatories to the FA (including those that are also operational) have more land under CPs and leases, both before and after the FNLMA compared to non-adopters. Previous studies on the FNLMA have ignored the importance of this variation.

Other Optional Reforms

The FNLMA is a significant pillar of federal First Nations policy in Canada and the government continues to invest millions of dollars annually in ensuring its continuation. While some First Nations have eagerly pursued the FNLMA and related optional reforms, other First Nations are opposed to the concept of autonomy legislated by the federal government. This opposition generally originates from a lack of *trust* between the First Nation and the federal government and has broad implications for the government's approach to First Nations self-governance. This is an important omitted variable from past literature. Jobin and Riddle (2019) discuss several of the concerns that First Nations have with the FNLMA, including the possibility that implementing the FNLMA could have long-term implications for Indigenous rights and title negotiations. If we cannot identify the First Nations that are unwilling to adopt the FNLMA, regardless of the expected net-benefits, we risk misrepresenting these communities' motivations for not pursuing the reform.

While we cannot directly investigate the effect of a First Nation's trust in the federal government, there are methods to indirectly assess and control for unobservables. One approach is to find a reliable proxy variable for the unobserved factor, although this can be difficult to do with precision, particularly for more nuanced factors such as trust or willingness to participate. A related method involves identifying observable variables that are plausibly correlated with the unobserved factor. If these observable variables are truly correlated with the unobserved characteristic, including them in the regression will absorb some of the unobserved variation. An example of this comes from Dale and Krueger (2002) and their analysis of the returns from attending a more selective college. By controlling for the set of colleges that each student was accepted and rejected by, they control for unobserved differences in ability, as students with similar acceptances and rejections are likely to have similar abilities.

As trust is difficult to identify and quantify, we consider other factors that provide evidence of a First Nation's trust in the government. Our approach is to investigate other optional reform decisions to assess a First Nations past willingness to work with the federal government. On the assumption that no substantial changes in trust have occurred since the last adoption decision, this past behaviour provides a reliable indicator of a First Nation's current level of trust in the federal government. Importantly, optional reforms are a relatively new concept for First Nations policy in Canada. Prior to the revisions of the Indian Act in 1985 under Bill C-31, First Nations had very little say in how their communities were managed. Under pressure from First Nations, Bill C-31 began the process of allowing First Nations to self-govern in selective areas. In particular, two optional reforms were developed, one related to band membership and one related to Band Council elections.

Prior to Bill C-31, the federal government-maintained band membership lists for all First Nations. This system is maintained under section 11 of the Indian Act. Bill C-31 amended the Indian Act to include section 10, which allows interested First Nations to take control of their band membership by developing rules and codes that meet the government's standards. Similarly, prior to Bill C-31, Band Council elections were governed according to section 74 of the Indian Act. In 1988, shortly after the passing of Bill C-31, the government introduced an alternative that allows interested First Nations to develop their own custom election system, thereby removing themselves from the requirements of section 74¹⁴.

Both of these optional reforms share several important similarities with the FNLMA. First, while First Nations gain some autonomy under each reform, their autonomy is subject to the government's requirements. Many First Nations have raised objections to this style of self-governance as they believe it violates the core tenets of autonomy and self-determination (Jobin & Riddle, 2019). Second, the adoption process of each reform involves the development of regulations and codes which must be approved by the federal government and by a majority of the community. Finally, all three reforms are common components of self-government agreements and are therefore irrelevant for most self-governing First Nations. In addition, both reforms predate the FNLMA by over a decade, as do the majority of the adoption decisions for these two reforms. Importantly, other optional reforms do exist, but they either became available after the FNLMA or are directly related to land management (e.g. the First Nations Financial Management Act).

¹⁴ In 2014, the federal government introduced the First Nations Elections Act which further reforms Band Council elections, both for communities holding elections under the Indian Act and under their own community elections code. Importantly, this reform is optional.

By controlling for participation in these optional reforms, we can assess a First Nations willingness to participate in a government-led reform. According to data from CIRNAC, 36.40% of First Nations have adopted section 10 and 56.94% have developed their own custom election system. Participation in one or more of these reforms indicates that a First Nation is willing to at least consider a similar reform, such as the FNLMA. Importantly, First Nations that are signatory to the FA are more likely to manage their membership under section 10, although they are not more likely to use a custom election system. To further refine and contextualize these issues, the next section derives a model of the demand for an institutional reform, focusing on the importance of *property rights* and *trust*.

III – Conceptual Framework

The traditional model of institutional change considers the relative costs and benefits of different institutional structures. According to this model, institutional change will only be pursued if the benefits of reform exceed the costs of implementation. Economists such as Coase (1960), Demsetz (1967), and North (1990) have used this framework as a starting point for a large proportion of their scholarship. Still, this model is best suited to contexts where there is a single decision maker and there are no distributional concerns associated with the reform (e.g. a central government or a private property owner). In contexts where a reform must be approved by a group or collective – such as for the FNLMA – the median voter model has proven to be more applicable.

The median voter model relies on two key assumptions: one-dimensional voting and single-peaked preferences. One-dimensional voting requires that only one issue is being voted on at a time and single-peaked preferences requires that each voter has a preferred outcome under which their utility will be greater than under any other outcome (Mueller, 2003). The general result is that the

preferences of the median voter determines the outcome of the vote. This allows us to conceptualize how different factors influence the median voter's preferences, and therefore the outcome of the vote. Following from Cornes and Sandler (1984), Murdoch, Rahmatian, and Thayer (1993), and Goodman and Porter (2004), among others, we derive the implicit demand for a reform, where the reform produces both a public and private good. Importantly, we simplify the two-step decision process of the FNLMA into a one-step adoption process for the purposes of this model.

Let the median voter's preferences in First Nation i be represented by a strictly increasing, strictly quasi-concave, and twice continuously differentiable function.

$$U_i = U_i(y_i, x_i, L_i) \quad (1)$$

where:

- U_i = the utility of the median voter in First Nation i
- y_i = the consumption of a numeraire good
- x_i = the consumption of a private good
- L_i = the consumption of the public good (quality of land management)

We assume that First Nation i is deciding on whether to undertake a costly reform (g_i), which is expected to reduce transaction costs and increase economic activity within the community. To determine the path forward, a community vote is held where the issue being voted on is whether to adopt the reform or not (i.e. one-dimensional vote), and a simple majority determines the outcome. Importantly, the reform jointly produces a private (x_i) and public good (L_i).

The benefits of the private good are specific to each individual voter and are dependent on the availability of unallocated reserve land. Lands that have been previously allocated do not provide

private benefits, as land tenure is already formalized for those parcels and they are already in use prior to the reform. Conversely, unallocated lands can be used for private consumption (e.g. housing, business location, etc.) and benefit from the expansion of economic opportunities created by the reform. We define $\theta_i \in [0,1]$ as the percentage of reserve land that has been previously allocated, either to the Band Council, or another band member. We assume the following relationship describes the production of the private good (x_i):

$$x_i = f(\theta_i, g_i) = (1 - \theta_i) \cdot g_i \quad (2)$$

Therefore, production of the private good is declining in θ_i . As more land is individualized, prior to the reform decision, the private benefits associated with the reform decline. Conversely, the public good benefits the entire community and can be viewed as the benefits of formalizing land management and reducing transaction costs. We assume that the provision of the public good is not certain and is dependent on the level of trust between the First Nation and the federal government. If First Nation i does not fully trust the federal government, the benefits of the public good will be uncertain. We define $\gamma_i \in [0,1]$ as the level of trust between First Nation i and the federal government. We assume the following relationship describes the production of the public good (L_i):

$$L_i = h(\gamma_i, g_i) = \gamma_i \cdot g_i \quad (3)$$

This implies that production of the public good is increasing in γ_i . Therefore, communities that are more trusting of the federal government will expect larger benefits from adopting the reform. Substituting equations (2) and (3) into equation (1) allows us to express the median voter's utility in terms of y_i , g_i , θ_i , and γ_i , where y_i and g_i are the decision variables.

$$U_i = U_i(y_i, (1 - \theta_i) \cdot g_i, \gamma_i \cdot g_i) \quad (4)$$

The median voter selects their utility maximizing level of reform subject to their budget constraint:

$$m_i = y_i + \tau_i \cdot g_i \quad (5)$$

where:

- m_i = the income of the median voter in First Nation i
- τ_i = the cost per unit of reform
- g_i = the reform activity by First Nation i

Importantly, the first order conditions for maximizing equation (4) subject to equation (5) are both necessary and sufficient to identify an optimum, given our utility function assumptions. Within the neighbourhood of this optimal point, we use the implicit function theorem to derive the demand for reform by the median voter in First Nation i .

$$g_i^* = g_i(\theta_i, \gamma_i, m_i, \tau_i) \quad (6)$$

This allows us to conduct comparative statics, which inform our expectations about our empirical results. Most notably:

$$\frac{\partial g_i^*}{\partial \theta_i} < 0 \quad (7)$$

Equation (7) implies that the demand for the reform decreases as the proportion of reserve land that has been individualized increases. The private benefits of implementing the FNLMA require that a Band Member has access to land that can be used for domestic or commercial purposes. As θ_i goes up, unused reserve land becomes more scarce.

$$\frac{\partial g_i^*}{\partial \gamma_i} > 0 \quad (8)$$

In terms of trust, equation (8) implies that First Nations with greater trust in the federal government are more likely to adopt the reform. A growing literature demonstrates the theoretical and empirical importance of trust for economic activity. Trust has been shown to induce cooperation in the prisoners dilemma (James, 2002), reduce transaction costs in business and exchange (Wilson, 2000), and facilitate the emergence of collective action and agricultural cooperatives (Jones, 2004). More recently, Teraji (2008) finds that trust is a necessary precondition to securing property rights. This literature motivates our analysis of trust as a factor influencing the adoption and implementation of the FNLMA.

While property rights and trust are the focus of our analysis, it is worth reviewing the comparative statics for the other two variables included in the model – income and reform costs. Importantly, if we assume that the reform is a normal good, we find that the demand for the reform is increasing in income. This aligns with previous work by Doidge et al. (2013), which finds that urban distance negatively influences adoption of the FA, as income and urban proximity are closely related.

$$\frac{\partial g_i^*}{\partial m_i} > 0 \quad (9)$$

Finally, with respect to the cost of implementing the reform (τ_i), the effect on demand is unclear, due to both an income (positive or negative) and substitution (negative) effect.

$$\frac{\partial g_i^*}{\partial \tau_i} \quad (10)$$

Murdoch et al. (1993) argues that it is common to assume a negative sign for equation (10). If a negative sign is assumed, it implies that the demand for reform declines as the costs of the reform increase. In the context of the FNLMA, the cost of implementing the reform is likely associated

with a First Nation's capacity and experience with land management, as well as their ability to coordinate a community vote with at least 50% participation.

For several reasons, the model developed in this section is more applicable to the FNLMA implementation decision than the FA adoption decision. First, the adoption decision is made exclusively by the Chief and Council, whereas the implementation decision is made by a community vote. In addition, there are concerns about the nature of the selection process by the Lands Advisory Board for the adoption decision. For implementation, once a First Nation has become a signatory to the FA, the implementation decision is not dependent on the Lands Advisory Board. Finally, since the adoption decision is largely costless, it does not accurately resemble the cost-benefit analysis detailed in the theoretical model. Conversely, the implementation decision is a multi-year costly process that results in a significant reform to land management. For these reasons, we focus on the factors influencing implementation of the FNLMA, although we do assess the adoption decision as well.

IV – Empirical Framework

To estimate the model motivated by equation (6), we need measures of property rights (θ_i), trust (γ_i), income (m_i), and reform costs (τ_i), as well as accurate information about which First Nations have adopted the FA and/or implemented the FNLMA and when they made those decisions. Importantly, since we have observations of First Nations over time, our data is organized in a panel format. Therefore, the probability that First Nation i adopts or implements the FNLMA in year t can be written as:

$$Pr(y_{it} = 1) = \alpha\theta_{it} + \beta\gamma + \omega\mathbf{X} + \delta_t + \epsilon_{it} \quad (11)$$

where:

- y_{it} = indicates whether First Nation i has adopted/implemented FNLMA by year t
- θ_{it} = the percentage of reserve land that has been individualized by year t
- γ = contains variables for past adoption of Section 10 and Custom Election Systems
- X = contains other relevant economic, geographic, and community-level factors
- δ_t = are time fixed effects

Since the adoption decision is made by the Chief and Council, whereas the implementation decision is made by a community vote, we treat these processes as independent of each other. It is possible that this assumption is too strong. To mitigate potential concerns, we perform a sensitivity analysis later in the paper where we allow for dependencies between the adoption and implementation decisions.

Data

We use data from Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to identify which First Nations have adopted the FA, when they became a signatory, and, if applicable, when they achieved full implementation. This data covers 1996 to early 2020, although we are only interested in decisions made up to 2016. This allows us to separately assess the adoption and implementation decisions. We also use publicly available information from CIRNAC to identify which First Nations manage their membership under section 10 and which First Nations use custom election systems. Importantly, this data is not available over time, so these variables are included as simple time-invariant dummies. Our property rights data comes from the Indian Land Registry System, the First Nations Land Registry System, and the Self-Governing Land Registry System, which are land registries maintained for First Nations managing land under the

Indian Act, the FNLMA, and Self-Governing agreements, respectively. This data is technically available back to the early 1900's, but is far more accurate beginning with the 1950's.

We also use shapefiles from Statistics Canada to estimate the distance from each First Nation to a population centre of at least 30,000¹⁵. Importantly, this variable represents the distance from the First Nation's band office to the nearest city, as many First Nations have multiple reserves. Finally, our socioeconomic data comes from four rounds of the Canadian Census (1996, 2001, 2006, and 2016) and one round of the National Household Survey (2011). This data is publicly available at the Census Sub-Division (CSD) level. A CSD is the general term for municipalities or areas treated as municipalities for statistical reporting purposes (e.g. reserves). Since many First Nations have multiple reserves, we aggregate all available data to the band level.

Descriptive Statistics: FNLMA Adoption and Implementation

As of February 2020, 94 First Nations have ratified and implemented their land codes and are considered fully operational under the FNLMA, 71 are in the developmental phase, and 61 are on the waitlist. Importantly, we do not have names of the First Nations on the waitlist so we cannot separate them from the non-adopter group. Table 1 contains summary statistics of our property rights data, broken down by adoption status as of 2020 (e.g. operational, signatory, non-adopter) over time. This data provides a baseline of the key differences across these three groups in terms of property rights. Importantly, we also find socioeconomic and geographic differences across these three groups.

¹⁵ Statistics Canada classifies population centres as small, medium, or large. Medium population centres have populations between 30,000 and 99,999.

On average, First Nations that have implemented the FNLMA or are currently in the developmental phase are more urban, live in more densely populated areas, and make greater use of individualized property rights (i.e. CPs and designations) than First Nations that are yet to adopt the FA. On average, operational First Nations are located 84 kilometres away from an urban area, compared to 117 kilometres for signatory First Nations and almost 275 kilometres for non-adopters. In terms of property rights, as of 2016, operational and signatory First Nations have almost 15% of their reserves under CP or designated for lease, compared to around 6.25% for non-adopters. In addition, operational First Nations have more educated populations and lower rates of unemployment than those that are yet to adopt the FNLMA.

Descriptive Statistics: Property Rights

Our property rights data contains information on CPs, band land, leases, and designations. Table 1 contains summary statistics for each category. Importantly, there are significant differences in property rights across First Nations. According to data from the government's land registries, over 160,000 CPs exist across Canada, but only a subset of First Nations (270 of 634) have ever created a CP. Similarly, 353 of the 634 First Nations in Canada have no designated land on any of their reserves. In terms of leases, over 400 First Nations have no active leases, as of the end of 2019. These are important differences that have been excluded from previous studies of the FNLMA. Still, a growing number of studies have assessed the importance of property rights on reserves. Most notably, research by Aragón and Kessler (2020) and Brinkhurst and Kessler (2013) finds that a greater prevalence of CPs is associated with improved economic outcomes.

Descriptive Statistics: Other Optional Reforms (Trust)

Our data on other optional reforms contains information about which First Nations manage their membership under section 10 and which First Nations use custom election systems. Past adoption of these two reforms provides an indication that a First Nation is willing to consider a government-led reform, such as the FNLMA. As of late 2019, 361 of the 634 First Nations in Canada managed their elections using a custom election system. Similarly, 231 First Nations manage their membership according to section 10 of the Indian Act. Importantly, the vast majority of these adoption decisions occurred in the 1980s and 1990s, prior to the development of the FNLMA. Issues of trust may explain why less than half of all First Nations have shown any interest in the FNLMA and less than 15% of First Nations have successfully ratified and implemented a land code. Importantly, signatory First Nations are far more likely to have adopted section 10, but there are no consistent differences in the use of custom election systems.

Variable Selection

To assess the importance of individualized property rights, we include a variable for the percentage of a First Nation's total reserve land that is under CP or designation at time t . We expect that as this proportion increases, the probability of both adoption and implementation of the FNLMA will decline. We also control for the percentage of reserve land that is under active lease at time t . This controls for the relative demand for reserve land, which influences the potential benefits of implementing the FNLMA. Importantly, since the adoption decision is relatively costless and the implementation decision is more representative of a cost-benefit decision, we expect the implementation decision to be more impacted by differences in property rights.

For trust, we include two dummy variables, one for adoption of a section 10 membership system and one for adoption of a custom election system. We anticipate that First Nations that have adopted either of these reforms are more likely to adopt the FNLMA. Importantly, we expect the adoption decision to be more impacted by these variables, as a lack of trust suggests that a First Nation may not even consider the relatively costless adoption decision.

To account for differences in incomes, we control for median household income at the Band level, measured in thousands of dollars. In addition, based on previous work by Doidge et al. (2013), we include the log of the distance in kilometres to the nearest urban area with a population of at least 30,000. Urban distance helps control for the scale of economic activity surrounding a First Nation, which may be an important factor influencing adoption and/or implementation.

With respect to reform costs, we control for the average education of the community. More specifically, we include a control for the percentage of the adult population that does not have a high school certificate. This education variable helps to control for the capacity of the community and the Chief and Band Council. Finally, we control for the percentage of the population that identifies as Aboriginal. Since implementing the FNLMA requires a successful vote with at least 50% participation by eligible voters, communities with a larger proportion of their population living off-reserve are more likely to face difficulties in managing a vote. Unfortunately, detailed information about band membership is not publicly available over time. Still, communities with larger numbers of non-Aboriginal people commonly have larger off-reserve populations, due to band members being displaced from on-reserve homes in favour of commercial and rental opportunities. Finally, to control for differences across time, we include yearly dummies.

Our final dataset includes information on 565 First Nations, although gaps exist for some census variables. Table 2 contains summary statistics for each covariate included in our empirical

analysis. There are 634 First Nations in Canada. We exclude 69 of these First Nations because they are not eligible for the FNLMA due to the structure of their landownership. These 69 First Nations have either previously implemented a self-governance agreement, have exclusively non-reserve land due to a treaty or other claims process, only have shared reserves¹⁶, or in a few cases were never allocated reserve lands. Importantly, three First Nations (*Westbank*, *Tla'amin*, and *Tsawwassen*) adopted the FNLMA and used it as a first step towards negotiating a self-governance agreement. These three First Nations are included in our dataset. Finally, there are a number of First Nations that are either excluded from the publicly available census data because their populations are too small or because they refused to participate in the census. Due to data limitations we cannot include these First Nations in our dataset.

Estimation Strategy

The standard empirical approach to studying the diffusion of policy across units is Survival Analysis, also referred to as Event History Analysis, Duration Analysis, and Hazard Rate Analysis (Berry & Berry, 2018). These types of models are well-suited to dealing with censored datasets, particularly right-censored data. Right-censoring occurs when a subject does not experience an event before the end of the study period but may still experience that event in the future. With respect to the FNLMA, our dataset ends in 2016, but adoption continues to be an option today. All post-2016 adoption decisions are therefore excluded from our analysis. Our dependent variable is structured such that y_{it} equals 0 until First Nation i decides to adopt (or implement) the FNLMA, at which point y_{it} equals 1, and after which First Nation i is removed from the dataset.

¹⁶ Prior to the passing of Bill C-86 in 2018, the FNLMA did not apply to shared reserves.

The dichotomous structure of the dependent variable requires that we consider binary regression models. We use a logistic model because of the flexibility to interpret both marginal effects and odds ratios. Importantly, our results are consistent regardless of whether a probit, logit, or linear probability model is used. We also cluster our standard errors at the Band level.

Since the FNLMA has been available since 1996 and is still available today, we use a panel framework to account for variations in the timing of adoption and implementation. Importantly, there are several approaches to modelling panel data, each with a different set of assumptions and constraints. While a fixed effects model will help to manage unobservable time-invariant characteristics, it is not well suited to our analysis. This is due to two factors. First, our main interest is in cross-sectional variation across First Nations; a fixed effects framework is focused on within variation. Second, because a large proportion of our sample did not adopt or implement the FNLMA prior to 2016, these units have no variation in the dependent variable and a fixed effects estimator will perfectly determine non-adoption. If a logit model is used, these units are dropped from the sample, which eliminates the non-adopter group as a control.

This leaves us with the choice between a random effects framework and a pooled framework. To decide between pooled and random effects, we use the likelihood ratio test for both the adoption and implementation models. The results of these tests are included in Tables 3 and 4. At all reasonable levels of statistical significance, we fail to reject the null that rho equals zero for the adoption model, which implies that the panel-level variance is unimportant and pooled estimation can be considered. Conversely, we reject the null for the implementation model at the 2% level of statistical significance, which suggests that a random effects framework should be considered. Importantly, for both models, our results are consistent across both a pooled and random effects framework. In addition, our key interest is in cross-sectional differences between First Nations.

For these reasons, we use a pooled logit model with panel-corrected standard errors for both the adoption and implementation models.

As previously mentioned, due to the different decision-making processes (i.e. Chief and Council vs community vote), we treat the adoption and implementation decisions as independent. To assess the sensitivity of this assumption, we use a pooled bivariate probit that explicitly allows for dependencies between the adoption and implementation decisions. These results are discussed later in the paper.

V – Results and Discussion

In this section we present several different sets of results related to the adoption and implementation of the FNLMA. Due to data limitations, we are not able to include all 565 of the First Nations in our dataset in our empirical analysis. For the adoption model, our sample includes 1,144 observations, across 414 First Nations, and over the period of 1996 to 2016. Our dataset is in five-year intervals due to the nature of the census and the national household survey. Importantly, no adoption decisions took place between 1996 and 2001, so 2001 is excluded from our adoption model. Importantly, our sample is relatively balanced, but gaps do exist. For implementation, our sample only includes those First Nations that have previously adopted the FA, as non-adopters do not have the option to pursue implementation. Our implementation sample includes 371 observations from 129 First Nations for the period of 2001 to 2016, again in five-year intervals. Importantly, due to the uncertain nature of our *trust* variables, we present both sets of results with and without these variables. Complete results for the adoption and implementation models are in Table 3 and Table 4, respectively. To begin, we provide a brief overview of the results and highlight key differences between the adoption and implementation results. The results

of our two main variables of interest – *property rights and trust* – are developed in more detail below.

Doidge et al. (2013) – the only previous study to assess FA adoption – finds that urban distance and average education are important determinants of adoption. This result was also replicated in a master’s thesis by Chen (2015). We confirm this result and find that urban distance, and to a lesser extent average education, are key determinants of adoption of the FA. On average, a 1% increase in urban distance is associated with a 1-2% decrease in the probability of adoption. We also find that the proportion of reserve land under lease positively influences adoption. A 1% increase in the proportion of land under lease is associated with an approximate 0.15-0.24% increases in the probability of adoption. This indicates that First Nations with more demand for their land and more experience leasing their land are more likely to pursue the FNLMA. Finally, we find some evidence that past adoption of section 10 increases the probability of FNLMA adoption. This is discussed in more detail below.

With respect to implementation, only two factors are found to influence the decision. First, we find that the proportion of reserve land under lease is an important determinant of implementation. On average, a 1% increase in the proportion of land under lease increases the probability of implementation by between 0.29% and 0.44%. This supports the argument that implementation involves a comparison of costs and benefits. First Nations may select into the first stage of the FNLMA but may not proceed with developing their own land code or meeting the other costly requirements of the FNLMA unless they are confident net-benefits will be positive. Leases are clearly an important determinant of net-benefits. The second factor that influences implementation is the proportion of reserve land that has been individualized, either through CPs or designations.

This result is examined in detail in the next section. The remaining variables do not significantly influence implementation.

Property Rights

Assessing whether differences in property rights explain differences in adoption and implementation is an important contribution of this paper. As mentioned above, we find that leases are an important factor influencing both adoption and implementation, although lease activity is not really a measure of property rights. CPs and designations are the property rights that allow for leases to be created on First Nations reserves. Importantly, we find that the proportion of reserve land that has been individualized does not influence adoption of the FA. This is not necessarily surprising, as adopting the FNLMA is relatively costless and doesn't require that the First Nation takes any further action.

With respect to implementation, we find that the proportion of reserve land that has been individualized negatively influences implementation. For a 1% increase in individualized land, First Nations are between 0.16% and 0.25% less likely to implement the FNLMA. This supports our hypothesis and the argument that CPs and designations may be a partial substitute for the FNLMA and may limit the benefits of implementation.

Trust

Trust is an important unobserved factor influencing the adoption and implementation of the FNLMA and other related reforms. Our indirect approach to assessing trust is an important first step to understanding the split between First Nations that will consider a government-led reform and those that will not. We find that First Nations that manage their membership under section 10

are between 1.8% and 3% more likely to adopt the FNLMA. The use of a custom election system is not found to be statistically significant in either model. These results provide some support for our hypothesis that past adoption of government-led reforms positively influences adoption of the FNLMA. Importantly, we do not find that either of these variables influence implementation. This is intuitive, as a willingness to consider a government-led reform does not guarantee that the net-benefits of implementation are positive. In other words, past adoption may influence a First Nations willingness to investigate the FNLMA (and possibly adopt the FA), but no level of trust will convince a First Nation to implement a reform that will have a net-negative impact.

Threats to Identification

Our analysis of the FNLMA provides a more nuanced and in-depth assessment of the determinants of adoption and implementation than previous studies. Still, there are issues that may complicate interpretation of our results. First, while we have attempted to identify key factors that may explain a First Nations hesitation to consider the FNLMA (i.e. *trust*), it is possible that other unobserved characteristics are biasing our results. For example, customary rights, which we do not have information on, may influence both FNLMA participation and the use of formal property rights. This may raise concerns about the interpretation of our property rights results. To mitigate concerns related to customary rights, we run both of our models with only those First Nations that have individualized at least some of their land and are therefore unlikely to make significant use of customary rights. In general, both our adoption and implementation results are consistent between this restricted sample and the full sample, although we do lose significance on our section 10 trust variable.

Similarly, our trust variables may be influenced by a host of factors, including the use of formal property rights. Implementing a CP or designation requires filing paperwork with the federal government and meeting their requirements. A First Nation that does not trust the government is unlikely to register their land transactions and instead may rely on customary rights. This may cause issues with interpretation of our variables for trust and property rights. There may also be concerns that our key metric of trust, adoption of section 10, may influence FNLMA adoption through its impacts on band membership and the ease of holding a community-wide vote. To mitigate these concerns, we present results with and without the trust variables. Importantly, our estimated coefficients are very consistent across both specifications. Following from Oster (2019), coefficient stability is an important measure of the importance of unobservables.

Finally, it is possible that we have not properly captured the nature of the selection process into the FNLMA. Two issues are worth mentioning. First, the Lands Advisory Board, the body established to facilitate entry into the FNLMA, prioritizes adoption for First Nations with certain characteristics (e.g. experience with land management). It is possible that our adoption results represent this selection process better than they represent the factors influencing the decision of a Chief and Council. Importantly, our focus is not on the adoption decision, since it is relatively costless and therefore far less informative than implementation.

The final issue to mention relates to the dependency between the adoption and implementation decision. Due to the different decision-making processes, we treat these decisions as independent. To assess this assumption, we rerun our analysis using a pooled bivariate probit, which allows for dependency between the two decisions. These results are included in Table 5. Importantly, our key results remain largely unchanged. Still, we test the hypothesis of no correlation between models and fail to reject the null at all levels of significance. This implies that these decisions are

correlated, and it may not be accurate to treat them as separate. Still, our results are robust across both specifications. This may be due to our approach of restricting our implementation sample to include only those that have previously adopted the FA; this may be partially managing the dependency between the adoption and implementation decisions.

VI – Conclusion

The FNLMA is a significant pillar of federal First Nations policy in Canada and the government continues to invest millions of dollars annually to ensure its continuation. Despite this, there are concerns about how few First Nations have pursued the FNLMA to-date and whether the reform path preferred by the government is palatable for all First Nations. This study provides an in-depth assessment of the factors influencing adoption and implementation of the FNLMA. Our conceptual and empirical analysis focuses on three previously unexplored factors. First, we analyze both the adoption and implementation decisions, separately assessing their determinants. We find that the adoption decision is influenced by the prevalence of leases, urban distance, average education, and past adoption of section 10 style management of band membership. Conversely, we find that the implementation decision is influenced by the prevalence of leases and the proportion of reserve land that has been individualized.

Our second contribution is to assess the importance of property rights. As expected, we find that the proportion of reserve land that has been individualized is an important determinant of FNLMA implementation. This suggests that past investments in individualizing reserve lands have significant benefits and may be at least a partial substitute for the FNLMA. We also find that the prevalence of lease activity increases both adoption and implementation; leases are the only variable that influences both decisions. There is growing evidence of the benefits of

individualizing reserves – see, for example: Aragón and Kessler (2020) – but there continues to be First Nations that are opposed to this approach to land management. A better understanding of this opposition is necessary for the development of good policy.

Finally, we explore whether past adoption decisions can provide information about a First Nations willingness to participate in a government-led reform. This is our approach to approximating trust. We find that First Nations that manage their membership under section 10 are more likely to adopt the FA. We do not find that custom elections systems influence the adoption or implementation decisions, although this may be due to the fact that almost 60% of First Nations use a custom election system. These results provide some support for the argument that trust is an important determinant of FNLMA participation and a basic measure of trust can be approximated by observing past adoption decisions.

The results of this study have important implications for the FNLMA and the federal government's sector-by-sector approach to reform. First, concerns about First Nations located in rural and remote areas not benefiting from the FNLMA are to some degree validated by our results. First Nations farther from urban areas and with less educated populations are less likely to pursue the FNLMA. This may be due to a multitude of factors, including the lack of economic activity in these areas and limited experience with commercial opportunities, such as leases. This raises concerns that self-governance is only available when it is economically beneficial. Many First Nations may be interested in self-governing their land but are deterred by the costs and complications of the FNLMA. Jobin and Riddle (2019), reference concerns by First Nations that the operational and insurance costs of land management under the FNLMA are significant and not well supported by the government. Our results related to property rights highlight the potential for smaller, less costly, and more piecemeal reforms that allow First Nations to slowly adapt their institutions based

on their operational and financial capacities. Finally, with respect to trust, our results highlight concerns that First Nations without a good working relationship with the federal government do not have a path to reform.

Our institutional review of property rights and the FNLMA contributes to a long and important discussion regarding institutional change. We also contribute to the privatization literature by examining whether the structure of property rights influences adoption of an institutional reform. Finally, we identify key barriers to reform in Indigenous communities and provide, to the best of our knowledge, the first empirical assessment of trust as a factor influencing institutional change on First Nations reserves. While our analysis is specific to Canada, our results have relevance for Indigenous policy and reform in other countries with similar colonial histories, particularly the U.S., Australia, and to a lesser extent New Zealand.

References

- Akee, R. (2009). Checkerboards and Coase: The Effect of Property Institutions on Efficiency in Housing Markets. *Journal of Law and Economics*, 52(2), 395–410.
- Alcantara, C. (2007). Reduce transaction costs? Yes. Strengthen property rights? Maybe: The First Nations Land Management Act and economic development on Canadian Indian reserves. *Public Choice*, 132, 421–432.
- Anderson, T. L., & Parker, D. P. (2009). Economic development lessons from and for North American Indian economies. *Australian Journal of Agricultural and Resource Economics*, 53(1), 105–127.
- Aragón, F. M. (2015). Do better property rights improve local income?: Evidence from First Nations' treaties. *Journal of Development Economics*, 116, 43–56.
- Aragón, F. M., & Kessler, A. S. (2020). Property rights on First Nations reserve land. *Canadian Journal of Economics*. <https://doi.org/10.1111/caje.12434>.
- Berry, F. S., & Berry, W. D. (2018). Innovation and Diffusion Models in Policy Research. In C. M. Weible & P. A. Sabatier (Eds.), *Theories of the Policy Process* (pp. 253–297). Routledge.
- Borjas, G. J., Kauppinen, I., & Poutvaara, P. (2019). Self-selection of emigrants: Theory and evidence on stochastic dominance in observable and unobservable characteristics. *Economic Journal*, 129(617), 143–171.
- Brinkhurst, M., & Kessler, A. (2013). *Land Management on First Nation Reserves: Lawful Possession and its Determinants*. SFU Department of Economics Working Paper.
- Chen, Y. (2015). *An Economic Analysis of Factors Influencing the Adoption of the First Nations Land Management Act and the Consequences of Adoption*. University of Guelph. [Unpublished Master's Thesis].
- Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law and Economics*, 3, 1–44. <https://doi.org/10.1086/466560>.
- Cornes, R., & Sandler, T. (1984). *Easy Riders, Joint Production, and Public Goods*. Source: *The Economic Journal* (Vol. 94).
- Dale, S. B., & Krueger, A. B. (2002). Estimating the payoff to attending a more selective college: An application of selection on observables and unobservables. *Quarterly Journal of Economics*, 117(4), 1491–1527.
- Demsetz, H. (1967). Toward a theory of property rights. *The American Economic Review*, 57(2), 347–359. <https://doi.org/10.4324/9780203878460>.

- Doidge, M., Deaton, B. J., & Woods, B. (2013). Institutional Change on First Nations: Examining factors influencing First Nations Adoption of the Framework Agreement on First Nation Land Management. *Journal of Aboriginal Economic Development*, 8(2), 70–78.
- Flanagan, T., & Alcantara, C. (2005). Individual Property Rights on Canadian Indian Reserves: A Review of the Jurisprudence. *Alberta Law Review*, 42(4), 1019–1046. <https://doi.org/10.29173/alr1271>.
- Goodman, J. C., & Porter, P. K. (2004). *Political equilibrium and the provision of public goods*. *Public Choice* (Vol. 120).
- Isaac, T. (2004). First Nations Land Management Act and Third Party Interests. *Alberta Law Review*, 42, 1047.
- James, H. S. (2002). The trust paradox: A survey of economic inquiries into the nature of trust and trustworthiness. *Journal of Economic Behavior and Organization*, 47(3), 291–307. [https://doi.org/10.1016/S0167-2681\(01\)00214-1](https://doi.org/10.1016/S0167-2681(01)00214-1).
- Jobin, S., & Riddle, E. (2019). *The Rise of the First Nations Land Management Regime in Canada: A Critical Analysis*. Yellowhead Institute. Retrieved from <https://yellowheadinstitute.org/wp-content/uploads/2019/09/fnlma-report.pdf>.
- Jones, E. C. (2004). Wealth-based trust and the development of collective action. *World Development*, 32(4), 691–711. <https://doi.org/10.1016/j.worlddev.2003.10.009>.
- Junankar, P. N. R. (2016). Land tenure and Indian agricultural productivity. In *Development Economics: The Role of Agriculture in Development* (Vol. 35, pp. 25–45). <https://doi.org/10.1057/9781137555229>.
- Lands Advisory Board Resource Centre [LABRC]. (2003). *Annual Report: 2002-2003*. Retrieved from <https://labrc.com/wp-content/uploads/2014/03/2002-2003.pdf>.
- Mueller, D. C. (2003). *Public choice III*. *Public Choice III* (Vol. 9780521815). Cambridge University Press. <https://doi.org/10.1017/CBO9780511813771>.
- Murdoch, J. C., Rahmatian, M., & Thayer, M. A. (1993). A spatially autoregressive median voter model of recreation expenditures. *Public Finance Review*, 21(3), 334–350. <https://doi.org/10.1177/109114219302100306>.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. <https://doi.org/10.1017/cbo9780511808678>.
- Oster, E. (2019). Unobservable Selection and Coefficient Stability: Theory and Evidence. *Journal of Business and Economic Statistics*, 37(2), 187–204. <https://doi.org/10.1080/07350015.2016.1227711>.

Pendakur, K., & Pendakur, R. (2018). The Effects of Modern Treaties and Opt-In Legislation on Household Incomes in Aboriginal Communities. *Social Indicators Research*, 137(1), 139–165.

Suri, T. (2011). Selection and Comparative Advantage in Technology Adoption. *Econometrica*, 79(1), 159–209.

Teraji, S. (2008). Property rights, trust, and economic performance. *The Journal of Socio-Economics*, 37, 1584–1596. <https://doi.org/10.1016/j.socec.2007.06.008>.

Wilson, P. N. (2000). Social Capital, Trust, and the Agribusiness of Economics. *Journal of Agricultural and Resource Economics*, 25(1), 1–13. <https://doi.org/10.2307/40987045>.

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Table 1: Property Rights on First Nations Reserves by FNLMA Adoption Status (1996, 2006, & 2016)

	Total Sample			Operational First Nations			Signatory First Nations			Non-Adopting First Nations		
	<i>n=565⁴</i>			<i>n=94</i>			<i>n=71</i>			<i>n=400</i>		
	1996	2006	2016	1996	2006	2016	1996	2006	2016	1996	2006	2016
Reserve Land %	0.838 (0.249)	0.790 (0.298)	0.781 (0.296)	0.803 (0.239)	0.732 (0.304)	0.729 (0.298)	0.775 (0.269)	0.718 (0.301)	0.693 (0.314)	0.856 (0.245)	0.817 (0.292)	0.809 (0.288)
Band Land %	0.111 (0.215)	0.148 (0.260)	0.157 (0.257)	0.115 (0.181)	0.161 (0.233)	0.166 (0.224)	0.129 (0.223)	0.167 (0.258)	0.191 (0.267)	0.107 (0.221)	0.141 (0.267)	0.149 (0.263)
Desig. Land %	0.011 (0.047)	0.017 (0.083)	0.023 (0.085)	0.021 (0.076)	0.032 (0.109)	0.037 (0.104)	0.011 (0.035)	0.011 (0.035)	0.017 (0.044)	0.008 (0.040)	0.015 (0.083)	0.020 (0.085)
CP Land %	0.051 (0.122)	0.062 (0.150)	0.063 (0.157)	0.082 (0.137)	0.107 (0.176)	0.106 (0.176)	0.096 (0.172)	0.115 (0.197)	0.119 (0.221)	0.035 (0.103)	0.042 (0.123)	0.044 (0.134)
Leased Land %	0.009 (0.044)	0.013 (0.063)	0.015 (0.068)	0.037 (0.100)	0.053 (0.133)	0.058 (0.142)	0.004 (0.012)	0.006 (0.013)	0.008 (0.025)	0.003 (0.013)	0.005 (0.032)	0.005 (0.033)

1. Values are sample means with standard deviations in parentheses

2. Categories do not add to 100%

3. Data is from the Indian Land Registry System, First Nations Land Registry System, and the Self-Governing Land Registry System

4. Categories are based on adoption/implementation status as of 2020

Table 2: Summary Statistics (1996-2016)

	<i>Tot</i>	<i>Min</i>	<i>Mean</i>	<i>Tot</i>	<i>Min</i>	<i>Mean</i>	<i>Tot</i>	<i>Min</i>	<i>Mean</i>	<i>Tot</i>	<i>Min</i>	<i>Mean</i>	<i>Tot</i>	<i>Min</i>	<i>Mean</i>
	<i>Obs</i>	<i>Max</i>	<i>(sd)</i>	<i>Obs</i>	<i>Max</i>	<i>(sd)</i>	<i>Obs</i>	<i>Max</i>	<i>(sd)</i>	<i>Obs</i>	<i>Max</i>	<i>(sd)</i>	<i>Obs</i>	<i>Max</i>	<i>(sd)</i>
	<i>1996</i>			<i>2001</i>			<i>2006</i>			<i>2011</i>			<i>2016</i>		
Individual Land (%)	565	0.000 0.786	0.061 (0.133)	565	0.000 0.810	0.068 (0.140)	565	0.000 0.897	0.079 (0.165)	565	0.000 0.973	0.083 (0.717)	565	0.000 0.980	0.085 (0.154)
Leased Land (%)	565	0.000 0.574	0.009 (0.044)	565	0.000 0.574	0.011 (0.051)	565	0.000 0.747	0.013 (0.063)	565	0.000 0.799	0.014 (0.062)	565	0.000 0.811	0.015 (0.068)
Average¹ Education	428	0.000 0.667	0.333 (0.098)	428	0.000 0.667	0.276 (0.103)	422	0.000 1.000	0.554 (0.183)	445	0.000 0.929	0.511 (0.167)	485	0.000 0.895	0.462 (0.166)
Med Hsld² Income	259	3.336 71.474	21.921 (8.931)	263	6.485 74.874	24.668 (9.623)	280	5.952 79.713	26.451 (9.576)	284	10.733 69.201	32.551 (10.411)	420	13.168 106.816	40.559 (12.427)
Aboriginal Pop (%)	485	0.000 1.000	0.917 (0.172)	485	0.052 1.000	0.916 (0.164)	420	0.057 1.000	0.921 (0.159)	445	0.117 1.000	0.898 (0.169)	485	0.138 1.000	0.905 (0.159)
Urban³ Distance	634	0.000 7.444	4.582 (1.666)												
Section 10 Member⁴	634	0 1	0.363 (0.481)												
Custom Election⁴	634	0 1	0.568 (0.496)												

1. Average education is measured as the percentage of the adult population without a high school certificate
2. Median household income is measured in thousands of dollars
3. Urban distance is the log of the kilometres to an urban area and is constant over time
4. Section 10 and Custom Election data is not available over time

Table 3: Pooled Logit Adoption Results

<i>FA Adoption</i>	Base Model	With Trust Variables	Marginal Effects at Mean	Average Marginal Effects
Individualized Land	-0.223 (0.762)	-0.184 (0.741)	-0.007 (0.026)	-0.011 (0.043)
Leased Land	4.633*** (1.602)	4.152** (1.695)	0.148** (0.063)	0.242** (0.097)
Average Education	-3.222*** (0.972)	-3.320*** (0.979)	-0.118*** (0.034)	-0.194*** (0.057)
Med. Household Income	0.011 (0.011)	0.010 (0.012)	0.000 (0.000)	0.001 (0.001)
Aboriginal Pop.	0.467 (0.926)	0.426 (0.954)	0.015 (0.034)	0.025 (0.056)
Urban Distance	-0.390*** (0.096)	-0.381*** (0.098)	-0.014*** (0.004)	-0.022*** (0.006)
Membership System		0.506** (0.254)	0.018* (0.009)	0.030** (0.015)
Election System		-0.058 (0.257)	-0.002 (0.009)	-0.003 (0.015)
	Observations: 1,144	Observations: 1,144		
	Clusters: 414	Clusters: 414		
	Pseudo R ² : 0.2208	Pseudo R ² : 0.2273		
	Wald Chi: 94.78	Wald Chi: 104.41		
	Prob(Chi): 0.0000	Prob(Chi): 0.0000		
	LR test of rho=0: ChiBar ² = 0.56 (Prob ≥ ChiBar ² = 0.226)			

1. Year dummies are also included but not presented
2. Errors are clustered at the Band level

Table 4: Pooled Logit Implementation Results

<i>FNLMA Implementation</i>	Base Model	With Trust Variables	Marginal Effects at Mean	Average Marginal Effects
Individualized Land	-3.162*** (1.092)	-3.065*** (1.133)	-0.163** (0.072)	-0.250*** (0.096)
Leased Land	5.337*** (1.455)	5.401*** (1.596)	0.288** (0.124)	0.440*** (0.134)
Average Education	-2.130 (1.642)	-2.344 (1.699)	-0.125 (0.097)	-0.191 (0.139)
Med. Household Income	-0.004 (0.016)	-0.003 (0.017)	-0.000 (0.001)	-0.000 (0.001)
Aboriginal Pop.	-1.110 (0.942)	-1.056 (0.944)	-0.056 (0.047)	-0.086 (0.076)
Urban Distance	-0.087 (0.113)	-0.080 (0.120)	-0.004 (0.007)	-0.007 (0.010)
Membership System		-0.081 (0.443)	-0.004 (0.024)	-0.007 (0.036)
Election System		0.266 (0.405)	0.014 (0.022)	0.022 (0.033)
	Observations: 371	Observations: 371		
	Clusters: 129	Clusters: 129		
	Pseudo R ² : 0.1729	Pseudo R ² : 0.1748		
	Wald Chi: 68.14	Wald Chi: 70.79		
	Prob(Chi): 0.0000	Prob(Chi): 0.0000		
	LR test of rho=0: ChiBar ² = 4.38 (Prob ≥ ChiBar ² = 0.018)			

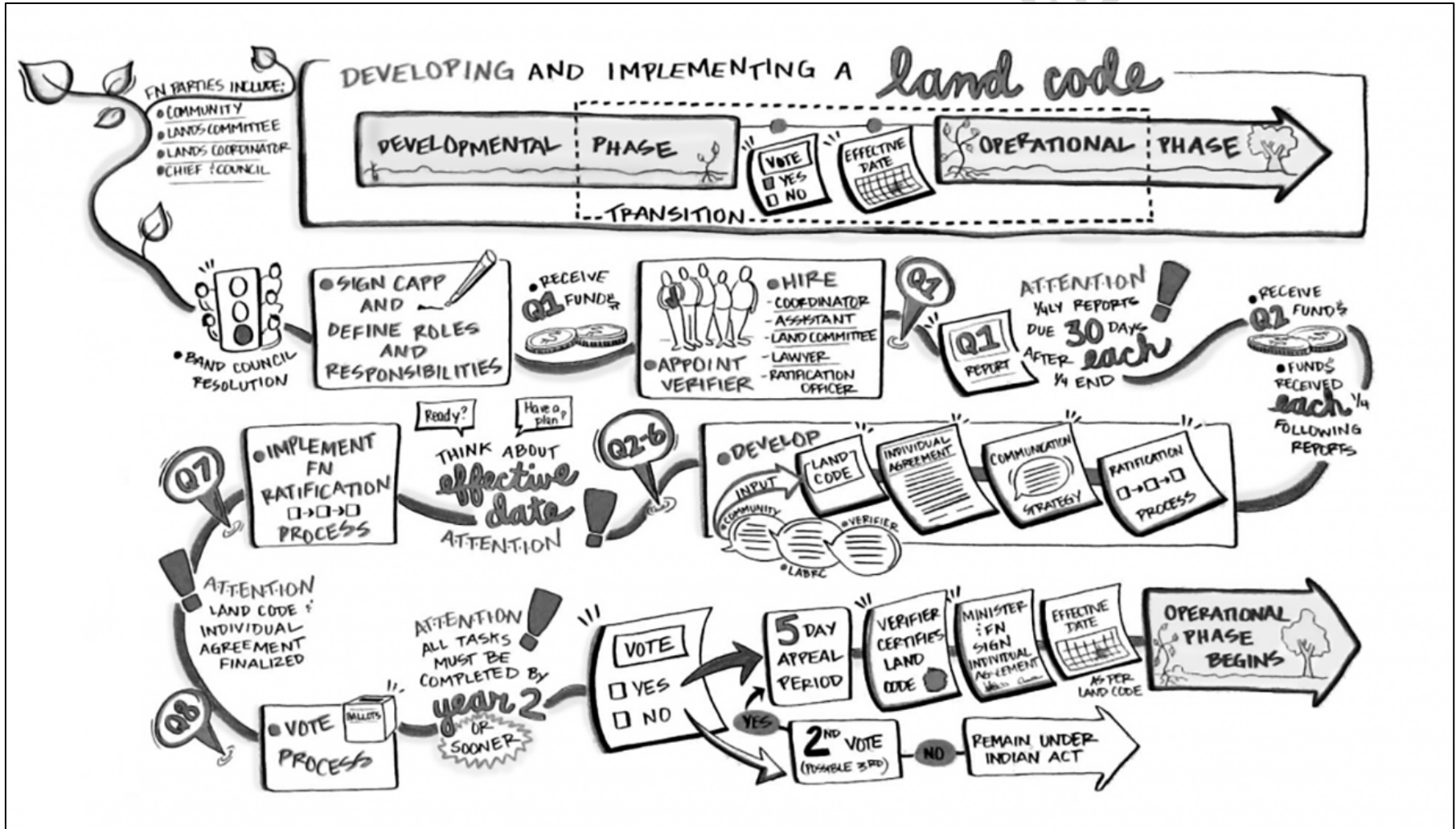
1. Year dummies are also included but not presented
2. Errors are clustered at the Band level

Table 5: Pooled Bivariate Probit Results

	FA Adoption	FNLMA Implementation	Average Marginal Effects
Individualized Land	-0.695 (0.498)	-1.841*** (0.605)	-0.159*** (0.049)
Leased Land	3.091*** (1.087)	4.057*** (1.581)	0.351*** (0.085)
Average Education	-2.388*** (0.556)	-2.105*** (0.713)	-0.182*** (0.055)
Med. Household Income	0.003 (0.006)	-0.001 (0.009)	-0.000 (0.001)
Aboriginal Pop.	0.179 (0.571)	-0.685 (0.594)	-0.059 (0.041)
Urban Distance	-0.256*** (0.057)	-0.128* (0.066)	-0.011** (0.005)
Membership System	0.322** (0.151)	0.263 (0.197)	0.023 (0.017)
Election System	-0.055 (0.159)	0.039 (0.201)	0.003 (0.016)
Observations:	1,245		
Clusters:	426		
Wald Chi:	190.43		
Prob(Chi):	0.0000		
	Wald test of rho=0: Chi2=19.943 (Prob>chi2=0.000)		

1. *Bootstrapped clustered errors used*

Figure 1: Process for Implementing the First Nations Land Management Act



Source: First Nations Lands Advisory Board Resource Centre (2012)

Figure 2: Total Signatory and Operational First Nations (1995-2020)

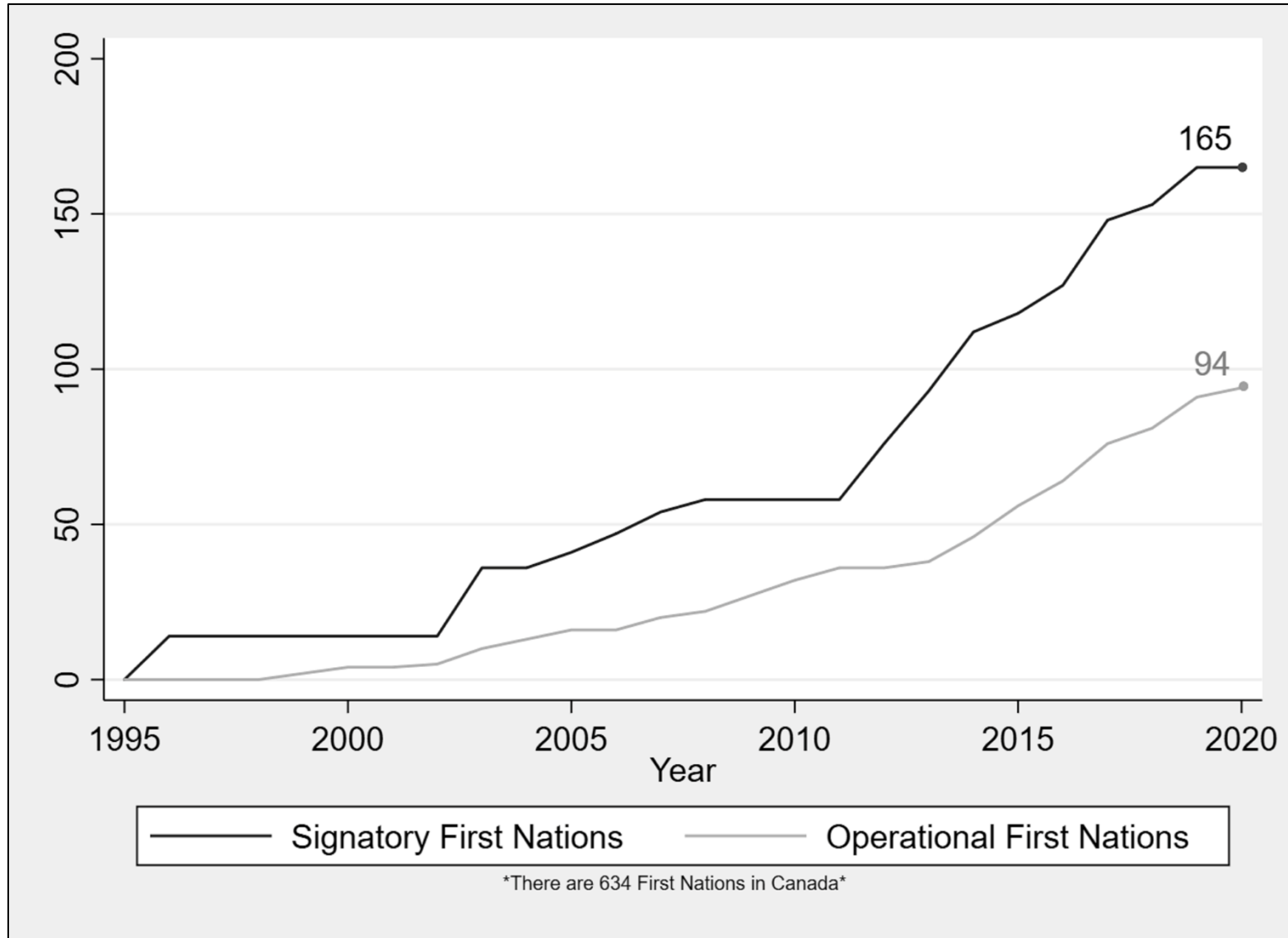
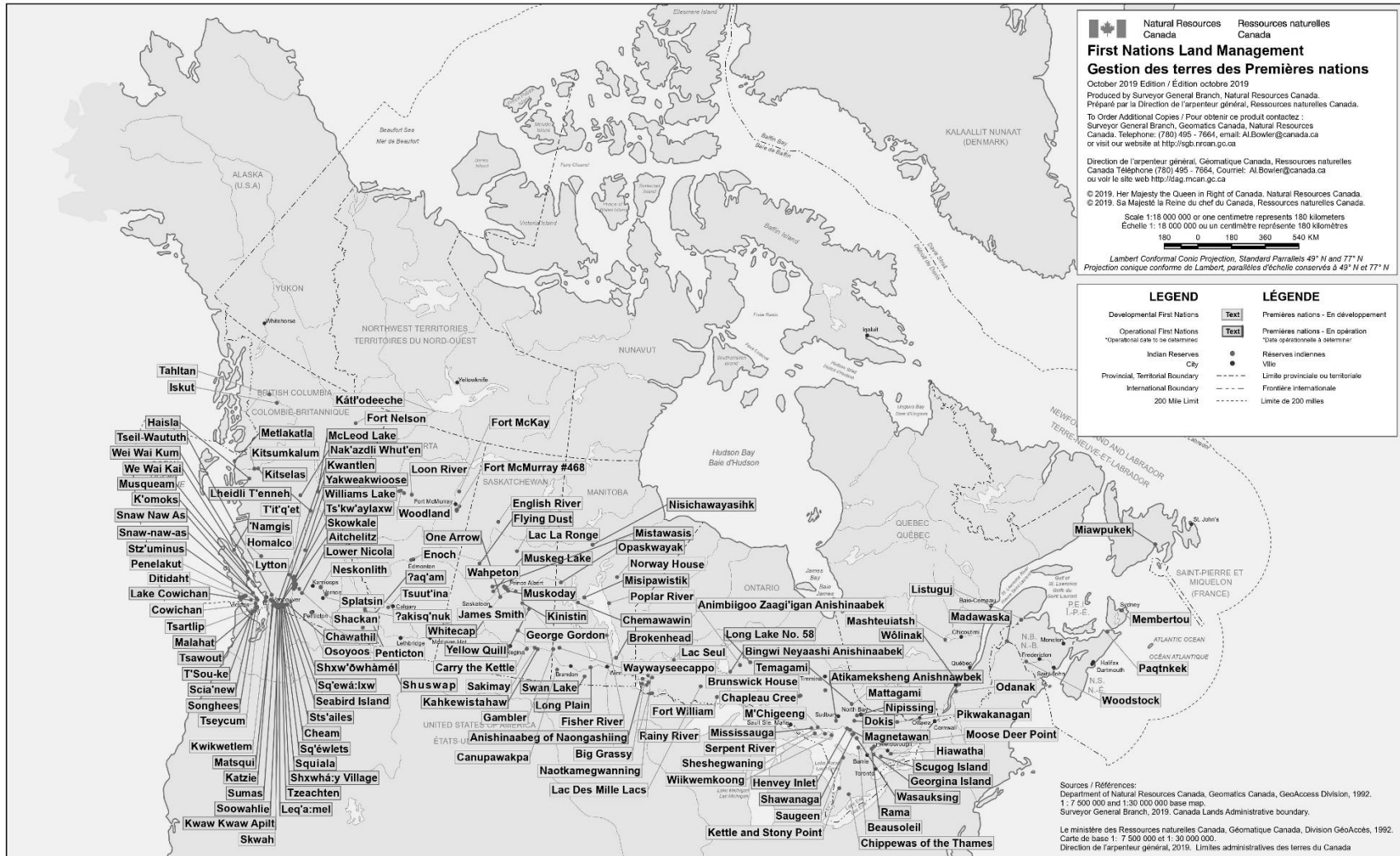


Figure 3: Map of Operational and Developmental (FA Signatories) First Nations



Source: Natural Resources Canada (2019)

