Institutional Change, Property Rights, and Economic Development: Evidence from the First Nations Land Management Act

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I: Introduction

The importance of land as a source of wealth, power, and pride is a commonality across all societies, modern and historical. Economists from Adam Smith to Harold Demsetz have theorized on the significance of land as a factor of production, a store of value, and an important source of influence. For many people, a parcel of land will be the most valuable asset they ever own. Yet, if the property rights are poorly defined or insecure, past literature has shown that many of the benefits of landownership may not be realizable (Skaperdas, 1992; De Soto, 2001). By clearly defining the ownership structure of a resource, property rights help to reduce information costs, spread risk, internalize externalities, and generally improve market efficiency (North, 1971). In fact, property institutions have been consistently identified as a key factor explaining cross-country differences in long-run economic performance (Acemoglu, Johnson, and Robinson, 2005).

Concern for the lack of socio-economic progress in many lower-income countries has led to the suggestion that institutions, particularly property institutions, should be reformed to promote economic development (Besley and Burgess, 2000). This parallels the situation on many First Nations reserves in Canada, where institutional constraints created by the federal *Indian Act* have been repeatedly raised as barriers to economic development (Flanagan and Alcantara, 2004). High unemployment, poor health and education outcomes, and a lack of quality housing are persistent and prevalent problems across most First Nations reserves in Canada.

In 1996, in response to the economic situation on their reserves, thirteen First Nation bands, in collaboration with the federal government, developed the *Framework Agreement on First Nations Land Management*, later implemented as the *First Nations Land Management Act (FNLMA).* This legislation allows signatory First Nations to opt-out of the 34 land-related provisions contained in the *Indian Act*, develop their own land codes, and reclaim land management authority from the federal government. Proponents have claimed that the FNLMA has been a success, resulting in increased investment and economic development for signatory bands, but there have been only limited empirical assessments of this claim.

There are over 600 First Nations bands in Canada and over 3100 reserves. While some First Nations have only one reserve, others have upwards of twenty; some reserves are even shared by multiple bands. While similarities exist, it is a mistake to treat First Nations as homogenous. The diversity that exists across First Nations and even across reserves provides important institutional context into the factors that influence economic outcomes. Of particular importance are the structures of property rights governing reserve lands. While collective forms of ownership are the most prevalent, more individualized forms of property (e.g. certificates of possession) do exist and in some cases are the dominant form of ownership. Importantly, the structure of property rights that exists on a First Nations' reserve(s) may influence both their decision to adopt the FNLMA and the benefits derived from achieving full implementation.

Since the decision to adopt the FNLMA is optional, and therefore non-random, standard regression comparisons between adopters and non-adopters may reflect both the effect of the reform and the selection process (Abadie, 2003). While modern methods have been developed to identify treatment effects (i.e. the effect of the reform) when selection exists, a thorough understanding of the adoption process and the underlying institutional context is essential to identifying the causal mechanism that explains the path from reform to economic outcome. Past research by Doidge, Deaton, and Woods (2013) has emphasized the importance of urban proximity as a factor influencing adoption of the FNLMA. In addition, their analysis highlights the significance of property rights, but they are unable to explicitly incorporate property rights into their regression because of data limitations.

This paper innovates on Doidge et al. (2013) by explicitly incorporating property rights into the adoption model. We use data from Crown-Indigenous Relations and Northern Affairs Canada for all registered on-reserve land transactions for every reserve in Canada. This data allows us to characterize the structure of property rights on First Nations reserves and separate collective band land from more individualized forms of property (e.g. certificates of possession). Using this data, we assess whether a First Nation's structure of property rights influences their decision to adopt the FNLMA or the benefits derived from adoption.

To complement our adoption model, we examine whether the FNLMA has improved economic development for signatory First Nations. While the consulting firm KPMG (cite) found that the

FNLMA increased investment and other economic outcomes, recent work by Pendakur and Pendakur (2018) found that the FNLMA did not impact employment or average incomes. Importantly, Pendakur and Pendakur (2018) do find marginally positive results for First Nations that have also adopted the First Nations Financial Management Act (FNFMA). Importantly, their study does not control for differences in property rights.

While income and employment are common measures of economic development, they are not the only metrics that should be considered. Improved institutional arrangements can also lead to enhanced health, education, and housing outcomes. While improvements in education and health can take decades to fully materialize, housing outcomes have been found to be more responsive. For example, Field (2005) finds that within four years of providing land titles to urban squatters in Peru, housing renovations had increased by over 68% compared to households that did not receive a land title.

On First Nations reserves, housing is one of the most pressing and visible issues. According to the most recent First Nations Regional Health Survey (Phase 3: Volume One), approximately 40% of adults living on-reserve reported having mould or mildew in their homes in the preceding 12 months (FNIGC, 2018). This compares to approximately 13% in the general Canadian population. Importantly, institutional constraints, particularly the lack of private property rights on reserves, have been repeatedly cited as explanations for the lack of progress in housing outcomes. Aragon and Kessler (2018), find that the use of more individualized forms of property rights on reserves is associated with an increase in homeownership, housing conditions, and average incomes. While numerous past studies have helped characterize the housing situation on reserves, no previous study has empirically investigated whether the FNLMA influences on-reserve housing outcomes.

This paper characterizes the institutional diversity that exists on Canadian reserves, empirically examines the factors that influence a First Nations' decision to adopt the FNLMA, and assesses whether adoption has led to improved housing outcomes for signatory First Nations. More specifically, we use a difference-in-differences framework, allowing for variable treatment timing (Goodman-Bacon, 2018), to investigate whether the FNLMA has led to an increase in the number of houses on signatory First Nations, a reduction in the proportion of homes requiring major repairs, or an increase in homeownership. 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 economic outcomes. Finally, we help to address the longstanding concern in the U.S. (Anderson and Lueck, 1992), Australia (Altman, 2004), and Canada (Aragon, 2015) that the structures of property rights that are prevalent on Indigenous lands constrain economic development.

This article is structured as follows. Section 2 reviews the literature on property rights, institutional change, and economic development. Section 3 summarizes the past literature on Indigenous institutions and economic development. While our focus is on First Nations reserves in Canada, we also review relevant literature from the United States and Australia. Section 4 characterizes the institutional diversity that exists on Canadian reserves, focusing on property rights, housing, and governance. This section also provides a comprehensive overview of the FNLMA and its formal adoption process. Section 5 discusses Besley (1995) and his analysis of the link between property rights and investment. Section 6 reviews the data and empirical methods used to assess the FNLMA. Section 7 presents the results and discusses relevant policy implications. Finally, section 8 summarizes the article and highlights recommendations for future research.

II: Property Rights, Institutional Change, and Economic Development

Property rights are a critical institution in every society. As Castle (1978) points out, property rights exist "to serve society in the face of changing conditions of resource availability" (Page 2). In other words, resource scarcity creates incentives to protect and invest in the resources that you have control over. Property rights seek to clarify the limits of how a resource can be used, and by whom. Early works, such as Coase (1960), Demsetz (1964, 1967), and Alchian and Demsetz (1973) demonstrate how stable institutions can reduce transaction costs and facilitate economic exchange. Along these lines, institutional constraints, including insecure property rights, have been theorized to explain the slow pace of economic development in some areas (Besley, Ghatak, Rodrik, and Rosenzweig, 2010; Chang, 2011; North, 1990, 1991).

Numerous studies have now found empirical support for the argument that well-defined property rights and stable institutions are important components of economic development. Cross-country studies have used macro-level indicators to link property institutions with economic growth and

increases in income (Acemoglu et al., 2001; Acemoglu and Johnson, 2005). Similarly, a wide range of single country empirical studies have used microdata to find evidence of a positive impact of property rights on investment, agricultural productivity, and land use, among other economic outcomes (Aragon, 2015; Banerjee and Iyer, 2005; Besley, 1995; Field, 2007; Galiani and Schargrodsky, 2010; Goldstein and Udry, 2008; Soule, Tegene, and Wiebe, 2000).

Alchian and Demsetz (1973) provides a useful framework for understanding property rights. Their framework highlights three key questions: (1) what is the structure of property rights? (2) What consequences stem from this particular structure of property rights? and, (3) How has this property rights structure come into being? Using examples, they demonstrate how different property structures influence transaction costs, and how when the benefits of change exceed the costs, new institutional structures will emerge. This explains why, in the absence of scarcity, private property rights are not necessarily required for social cohesion and economic development.

Bromley (1989) contends that a poor understanding of property arrangements has led policy makers to condemn property regimes that don't closely resemble private ownership. Ostrom and Schlager (1992) support this claim by arguing that there is ample evidence of resource degradation by private owners and there are numerous cases of efficient use of common property resources. Past literature has demonstrated that stable and well-defined institutions, including property rights, are more important than establishing fully private ownership.

While the importance of property rights is no longer in question, reforms to property right institutions are often fiercely debated and commonly unsuccessful (Ghatak and Roy, 2007). Issues of gender (Bose and Das, 2017), prior distributions of land (Swinnen, 1999), and institutional capacity (Besley and Persson, 2009) have impacted the success of past reforms. In particular, good governance and systems of enforcement and monitoring are necessary prerequisites to any successful institutional reform (Ostrom and Hess, 2010).

One of the main difficulties in evaluating institutional change is that stable institutions do not emerge spontaneously. Instead, institutions emerge endogenously and commonly develop in-parallel with other important determinants of economic development. (Acemoglu, Gallego, and Robinson, 2014). This complicates our ability to evaluate institutional reforms because standard regression techniques may reflect both the effect of the reform and the selection process. It is

important to separate the impact of the reform from the factors influencing the decision to adopt the reform. This motivates our characterization of reserve-level institutional diversity and our empirical examination of the factors influencing adoption of the FNLMA.

Besides reforms to property rights, other institutional reforms hold lessons for our analysis of the FNLMA. Past studies of changes in governance structures, such as political and fiscal decentralizations, can inform our understanding of the implications of the FNLMA and help motivate key questions to be addressed by our analysis. Martinez-Vazquez and McNab (2003) review the economics literature on the causal relationship between fiscal decentralization and economic growth. They reference Oates' (1993) argument on the direct impacts of fiscal decentralization, but they critique the lack of evidence supporting his claim of the superiority of decentralized over centralized public expenditures. They also identify a multiplicity of potential indirect effects of decentralization, such as changes in: consumer and producer efficiency, the geographical distribution of resources, macroeconomic stability, corruption, and capture by elites.

Similarly, Akai and Sakata (2002), use state-level cross-section data from the United States to assess the relationship between fiscal decentralization and economic growth. They find evidence that fiscal decentralization has a positive impact on economic growth, but they struggle to identify the specific causal mechanism driving improvements in economic growth. In addition, they find that decentralization processes do not necessarily impact all counties equally. They find that larger and more developed counties may benefit more from decentralization. This may be due to the higher capacity of larger counties and the fact that they are more prepared to take back authority from the federal government than smaller and less developed counties. Political and fiscal decentralization processes often constitute a formalization of the informal rules and norms that govern activities at the local level (Chen, 2005). While transferring decision-making to a local authority is a priority, aligning local institutions with centralized laws and regulations is also important. The capacity of a local authority to implement and enforce formal institutions and rules determines the magnitude of the effect of decentralization. In the context of First Nations, the capacity of the chief and band council likely influences both the decision to adopt the FNLMA and the benefits derived from implementation.

III: Indigenous Institutional Change and Economic Development

With few exceptions, Indigenous people have worse economic, social, and health outcomes than non-Indigenous people. "Indigenous peoples face systemic discrimination and exclusion from political and economic power [and] they continue to be over-represented among the poorest, the illiterate, the destitute" (UN-DESA, 2009, page 1). This is true in low income countries, such as Bolivia and Myanmar, as well as high income countries, such as Canada, the USA, and Australia. Despite considerable work, a robust explanation for why Indigenous people continue to be poorer than non-Indigenous people has remained elusive. While early work focused on issues of land quality, geographic isolation, and inadequate human capital, more recently, scholars have turned their attention to issues of institutions, property rights, and governance (Anderson and Parker, 2009).

Anderson and Lueck (1992), analyze the relationship between land tenure and agricultural productivity on American Indian reservations. They provide evidence that less secure forms of land tenure increase capital costs, facilitate ownership fractionation, result in suboptimal farm sizes, and lead to the general underutilization of reservation land. While their analysis is specific to farmland and agricultural productivity, their results are likely generalizable to other resources. Using a different context – housing instead of agriculture – Akee (2009), uses a unique natural experiment in Palm Springs, California to assess differences in the efficiency of the housing market on plots of reservation and non-reservation land. His analysis is facilitated by a late 1800s policy that evenly divided Palm Springs into 1-mile square blocks and assigned ownership rights on an alternating basis between the Aqua Caliente Tribe and non-Indian landowners. The results show that non-Indian parcels of land were developed more rapidly and more extensively than Indian parcels. It wasn't until after 1959, when the restrictions on Aqua Caliente land were lifted, that the number of homes and real estate values on Indian parcels began to converge with those on non-Indian parcels.

Both Anderson and Lueck (1992) and Akee (2009) demonstrate that the inefficient and costly nature of transacting reservation land can result in suboptimal outcomes compared to less restricted forms of land. This aligns with Aragon's (2015) study of economic development on Canadian First Nations reserves and the benefits of clarifying and reforming property rights via treaty agreements.

He finds evidence that modern treaties have increased real incomes for on-reserve band members, primarily due to increased commercial and resource development activities. In addition, consistent with a positive shock to local labour demand in the presence of a relatively inelastic labour supply, he finds evidence of increases in wages, house prices, and rental rates. He also finds that treaties increased incomes in nearby non-aboriginal communities, indicating the existence of economic spillovers. Importantly, Aragon (2015) describes treaties as a clarification of property rights. He does not provide any evidence that bands have moved towards more private forms of property rights after implementing a treaty.

Anderson and Parker (2009) provides a useful summary of the literature on Indigenous economic development. Their review produces two main conclusions. First, strong property rights to reserve lands and resources are important determinants of productivity. Importantly, they find that the strength and stability of property rights is more important than the level of privatization. Second, they find that stable political and legal institutions improve economic opportunities on reserve lands. Their review contests the common view that reserve lands require private property rights to meet their economic potential. Instead, they contend that governance and predictable institutions are more important than privatization. Previous literature on the economic development of First Nations has highlighted the importance of urban proximity and property rights as important determinants of economic development and the decision to adopt institutional reforms (Doidge, Deaton, and Woods, 2013; Aragon and Kessler, 2018). Similarly, Aragon and Kessler (2018), find that the use of more individualized forms of property rights on reserves is associated with improvements in homeownership, housing conditions, and average incomes.

The issue of property rights on Indigenous lands has dominated the past literature, but issues of governance are becoming increasingly prominent. Cornell and Kalt (2000) find that federal policies of tribal self-determination help explain some of the differences in unemployment levels and income growth on American Indian reservations. They argue that since self-determination policies were implemented, beginning in the 1970s, economic growth has taken off and has begun to close the gaps in income and development that exist between Native Americans and the rest of the US population. Importantly, similar to the FNLMA, these self-determination policies do not necessarily result in increased privatization. Instead, these policies facilitate an improvement in governance and a reduction in transaction costs.

An important question to consider when pursuing self-determination, is whether investors prefer to interact and contract with a federal or state/provincial government or a local Indigenous government (i.e. band council or tribal government). Anderson and Parker (2008) assess *Public Law 280* in the USA, which required some Native-American tribes to transfer judicial jurisdiction over civil disputes to state authorities, while allowing others to retain judicial sovereignty. Using data from 1969-1999, they find that per capita incomes grew significantly faster on reservations subject to state jurisdiction than on reservations under tribal authority. They argue that if tribal governments are unable to credibly provide stable contract enforcement, then they may thwart the opportunities created by being sovereign and therefore more responsive than a state government. This result has implications for the FNLMA and its signatories. While a formal land code provides certainty regarding rules and regulations and sends a signal of competence to potential investors, good governance practices are still required to take full advantage of the opportunities created by the FNLMA.

While the success of the FNLMA has been heralded by the federal government and many signatory FNs, there have been only limited empirical assessments of this claim. Alcantara (2007) conducts case studies for two FNs who have achieved full implementation of the FNLMA to assess whether land codes developed under the FNLMA have improved economic development. He finds that land codes are an effective mechanism for reducing transaction costs and improving economic development outcomes, but he finds limited evidence that property rights are being improved. He contends that more developed bands stand to benefit more from the FNLMA and may be better positioned to take advantage of the option to improve their property rights.

Doidge, Deaton, and Woods (2013) analyze the factors influencing a First Nation's decision to adopt the FNLMA. They find that First Nations that are closer to urban areas are more likely to adopt the FNLMA, which is likely due to the additional commercial opportunities available in more densely populated areas. Unfortunately, at the time of their analysis there were only 39 fully operational First Nations, many of which were very recent adoptees. This limited the scope and statistical power of their results. More recently, Pendakur and Pendakur (2018), analyzes the effect of treaties, self-government agreements, the FNLMA, and the First Nations Financial Management Act (FNFMA) on employment and household income, finding mostly positive but marginal

results. With respect to the FNLMA, they find that adoption did not impact employment or average incomes for signatory First Nations, unless paired with the FNFMA.

IV: Institutional Arrangements on First Nations Reserves

History of Indigenous Lands and Government Legislation in Canada

Up until the late 18th century, Indigenous-Crown[1] relations in Canada were focused on military and commercial activities (Miller, 2018); both the British and the French relied on Indigenous people to fill their armies, trap their furs, and harvest their food. After the loss of the American Colonies in the US War of Independence and the subsequent recognition of the United States in 1783, the British refocused their attention on land and became increasingly concerned with the cost of managing the Indian Department[2] and providing fair compensation for land (Miller, 2018). Overtime, the British Crown, later replaced by the Canadian government, took an increasingly paternalistic view towards Indigenous lands and began legislating restrictions on existing property rights. When the *British North America Act*[3] (BNA) 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* and remains in force today for most First Nations communities. The *Indian Act* defines an *Indian reserve* as a "tract of land, the legal title to which is vested in Her Majesty, that has been set apart … for the use and benefit of a band."

In all but a select few cases, the federal government remains the legal owner of all reserve lands in Canada and therefore must approve the majority of land transactions. This limits the band and its members from using land as collateral or selling it to an outside party. It also raises the cost of doing business on-reserve. This apparent lack of private property rights, as well as the associated high transaction costs, have been frequently cited as explanations for the slow progress of development on Canadian First Nations reserves (Isaac, 2005; Notzke, 1985; Flanagan and Alcantara, 2004, 2006; Alcantara, 2007; Johnsen, 2006). Still, there are a variety of different types

[1] The term Crown is used to refer to the British Crown prior to Confederation and the Canadian federal government after Confederation.
[2] The Indian Department is the historical name for the Department of the Canadian federal government tasked with managing the affairs of Canada's Indigenous People. The Indian Department has been renamed many times and is now two separate Departments: Crown-Indigenous Relations and Northern Affairs Canada and Indigenous Services Canada
[3] The *British North America Act* was later renamed and became a part of the *Constitution Act, 1867*

of land tenure that exist on Canadian reserves, some of which resemble private ownership, each with a different set of constraints and regulations.

Types of Land Tenure on Canadian First Nations Reserves

There is a great deal of heterogeneity in land tenure across First Nations reserves in Canada. While a growing number of First Nations have negotiated some level of self-governance or are signatories to the FNLMA, most bands still govern their lands under the regulations of the *Indian Act*. With few exceptions, reserve lands remain the property of the federal government and are held in trust for the benefit of band members. Therefore, all reserve land is effectively set aside as common property, with no clear delineation of ownership or even use rights. First Nations governments (i.e. band councils) have the right to allocate parcels of land for band purposes, such as housing, education and recreation, administration, and economic development. While every First Nation is different, on most reserves, band councils control a significant proportion of the lands for band purposes (Flanagan and Alcantara, 2004).

Lands allocated for band purposes become the responsibility of the band council and are managed for the benefit of the community. This is separate from the unallocated common property that constitutes the majority of the land area of some reserves. While fee-simple ownership does not exist on reserves, individualized forms of property still exist. The simplest and least formal form of 'private' ownership are based on customary rights, commonly originating from historical land practices, which existed prior to the implementation of the *Indian Act.* These tracts of land are acquired through occupation, community recognition, or inheritance (Flanagan and Alcantara, 2004). Importantly, the bands that employ customary rights do not document these rights and the *Indian Act* does not support their existence. Instead, oral tradition and community recognition is used to keep track of customary ownership. Still, customary arrangements allow 'owners' several important rights. They can lease the land, transfer/sell the land (within the community), subdivide the land, include it in a will, build a house or business on it, or farm it (Flanagan and Alcantara, 2004). Nevertheless, the lack of formal recognition of customary rights restricts their use outside the community. Importantly, courts have been reluctant in enforcing these rights because they lack legal and legislative recognition.

In practice, customary rights offer little security of tenure, can become unstable in the event of a political change, and are therefore less than ideal for commercial activities and formal transactions.

Nevertheless, customary rights are common on most reserves. Consequently, many signatories to the FNLMA have provided some level of formalization of their customary rights in their land codes. This improves the security of customary rights and helps define the limits of their use, but their legal strength off-reserve is still in question.

A third form of property that exists on reserves is the certificate of possession (CP); CPs were referred to as "location tickets" prior to the revisions of the *Indian Act* in 1951 (Flanagan and Alcantara, 2004). A CP is proof of lawful possession of reserve land, issued under the authority of the *Indian Act* and the federal government. According to Flanagan and Alcantara (2004), between 1955 and 2004, more than 140,000 CPs were created. They point out that while some reserves may have only one or two CPs, others, such as the Six Nations reserve in Ontario have used over 6,500 CPs to individualize most of their reserve land.

Once formally approved by the federal government and the band council, a CP has stronger property rights than customary ownership. 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 and Alcantara, 2004). However, most of these transactions require some combination of consent from the band council and approval from the federal government. Importantly, the Canadian courts will settle disputes and enforce the rights created by a CP. In general, CPs provide the most secure form of tenure possible on-reserve. The primary benefit of the FNLMA for CP holders is the removal of the federal government from the approval process. Under the FNLMA, CPs become subject to the band's land code and not the federal *Indian Act*. This reduces the time required to transact CP land, especially for sales to other band members and lease arrangements.

Leases, both short and long term, are a 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 any type of individually controlled reserve land (Flanagan and Alcantara, 2004). The primary constraint on leases is that the courts have found that reserve land can only be leased through a federal statute, such as *the Indian Act*. Either 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. The *Indian Act* includes regulations for three types of leasing arrangements: short-term leases, long-term leases, and leases granted on behalf of a CP holder.

Short-term leases, also referred to as permits, are governed by section *28(2)* of the *Indian Act.* Section *28(2)* gives the federal government the power to grant any person the right to reside on, use, or occupy reserve land for up to one year (Flanagan and Alcantara, 2004). For leases longer than one year, the federal government must receive consent from the band council. Bands and band members require federal approval before land can be leased, even on a short-term basis. This creates additional costs and uncertainties for interested parties. Long term leases, governed by section *38(2)* of the *Indian Act*, allow a band to 'designate' land to the federal government for the purposes of leasing the land to a third party. This process requires a community vote before the federal government can lease the land to an outside party.

Flanagan and Alcantara (2004) reference the *Musqueam*[4] decision and the fact that the Supreme Court of Canada decided that lease values for designated reserve lands should be discounted by approximately 50% from the value of freehold land, based on the restrictions on sale and use that are associated with reserve land, as well as the band council's power to levy taxes and implement zoning laws. This reduction in value significantly limits the potential revenue from leasing reserve lands and creates uncertainty for outside parties in terms of negotiating lease rates.

The final type of leasing arrangement are leases granted on behalf of a CP holder. Under the *Indian Act*, section *58*, an individual with lawful possession of reserve land (i.e. a CP) can lease their land to an outside party. Importantly, the *Indian Act* does not require that this land is designated, as in the case of a long-term lease, and the lawful 'owner' therefore does not require the permission of the band council or the community. However, they still require the permission of the federal government before the lease is finalized. Despite these issues, bands and band members with individual interests (i.e. customary rights or CPs) have effectively used permits and leases to generate revenue and transact land (Flanagan and Alcantara, 2004).

Under the FNLMA, all three forms of leases continue to be permitted. The primary change from the *Indian Act* to the FNLMA is that the federal government's approval is no longer required prior to signing a lease arrangement with an outside party. Importantly, for long-term leases (terms longer than one year), a community vote is still required. Also, under the FNLMA, CP holders must seek approval from the band council instead of the federal government (double check). The

[4] Refers to *Musqueam Indian Band v. Glass*

FNLMA does not alter the underlying character of reserve lease arrangements, but it does remove the duality of authority that exists under the *Indian Act* and therefore reduces the cost of transacting reserve land. Importantly, the specific treatment of customary rights, CPs, and leasehold arrangements are dependent on the individual land code implemented under the FNLMA.

Characterizing Housing on Canadian First Nations Reserves

On First Nations reserves, housing is one of the most pressing and visible issues. According to the most recent First Nations Regional Health Survey (Phase 3: Volume One), approximately 40% of adults living on-reserve reported having mould or mildew in their homes in the preceding 12 months (FNIGC, 2018). This compares to approximately 13% in the general Canadian population. There are a number of unique barriers to improving housing on reserves, including: the remoteness of many reserves, the unique property arrangements that govern reserve lands, and the limited availability of financing and mortgages for on-reserve property (FNMHF, 2018). Still, housing issues are not homogenous across reserves and the ways in which band members access housing are dependent on the underlying property institutions that govern reserve lands.

There are four main methods for obtaining housing on reserves. First, a band council may maintain a stock of rental housing that can be accessed by individual band members in need of housing. In this case, both the house and the land remain the band's property. Second, individual band members can lease a parcel of reserve land from the band on a long-term basis and construct their own house. In this case, the house is the property of the band member, but the land is the property of the band council. Third, a band member with a certificate of possession can construct their own house on their own land. In this case, both the house and the land are the property of the band member. This form of homeownership is the closest to fee-simple ownership that exists on reserves in Canada (Alcantara, 2005). Finally, band members who own their own homes (either on CP land or on band land) can lease their house to another band member, and where allowed by local regulations, a non-band-member.

Importantly, institutional constraints, particularly the lack of private property rights on reserves, have been repeatedly cited as explanations for the lack of progress in housing outcomes. Aragon and Kessler (2018) find that the use of more individualized forms of property rights (e.g. certificates of possession) on reserves is associated with an increase in homeownership, housing

conditions, and average incomes. Their results hold significance for our own study, as they demonstrate that the quality and availability of housing on reserves is directly influenced by the underlying structure of property rights. Furthermore, as the FNLMA is a reform of property institutions, it is plausible that adoption would positively influence housing outcomes.

The First Nations Land Management Act

In 1996, the Federal government, along with 14[5] First Nations, signed the *Framework Agreement on First Nations Land Management* (Alcantara, 2007). Three years later the government officially passed the *First Nations Land Management Act*, ratifying the previous framework agreement. The FNLMA lays out a formal process that allows signatory First Nations to opt out of the 34 land code provisions contained in the *Indian Act* and develop their own local land codes, thereby increasing their control and authority over their land.

There are several steps that are required before a First Nation is able to 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 Board[6] and a second BCR is drafted, which, if passed, commits the band to meeting the requirements of the FNLMA's community approval process. If both BCRs are successfully passed, the Lands Advisory Board makes a recommendation to the federal government to add the First Nation to the schedule of the FNLMA. This makes the First Nation an official signatory to the FNLMA but does not guarantee that they will develop their own land code. Many FNs have become signatory to the FNLMA and have yet to successfully implement their own land code. These bands are referred to as being in the developmental stage.

On average, it takes 1,068 days to draft and ratify a land code (LABRC, 2004, Page 32). First, 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 ratify the land code and the funding agreement with a community vote (Alcantara,

[5] The original 14 signatory First Nations are: WESTBANK, MUSQUEAM, LHEIDLIT'ENNEH (formerly known as "LHEITLIT'EN"), N'QUATQUA, SQUAMISH, SIKSIKA, MUSKODAY, COWESSESS, OPASKWAYAK CREE, NIPISSING, MISSISSAUGAS OF SCUGOG ISLAND, CHIPPEWAS OF MNJIKANING, CHIPPEWAS OF GEORGINA ISLAND, and SAINT MARY'S.

[6] 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 (LABRC, 2003).

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. If the community vote is successful, the verifier certifies the land code and the FN officially reclaims all land management responsibilities from the Crown. Once the land code takes effect, it obtains full legal status and become enforceable in Canadian courts (Isaac 2005, Page 1049-1050). The band can now manage its own lands without requiring federal government approval. This includes granting, as well as modifying, leases, CPs, and customary property rights.

As of 2018, 81 First Nations had fully implemented the FNLMA, including three that have moved beyond the FNLMA and implemented a full self-government agreement with the federal government. In addition, there are 59 developmental First Nations who are yet to complete the development of their land code and 13 other signatories, who have signed but not begun implementation. Importantly, the cost of implementing a land code and meeting all the requirements of the FNLMA (e.g. multiple community votes) may explain why these bands have failed to progress past the developmental stage of the FNLMA. Figure 1 provides a map of adoption across Canada and table 1 contains a list of all fully operational signatory First Nations and the date that full implementation was achieved.

V: Theoretical Framework

The primary outcomes of the FNLMA are the transfer of land management authority to the First Nation, the formalization of rules and procedures regarding all reserve lands, and the development of a formal dispute resolution process. A probable outcome of these reforms is an increase in investment and economic activity. Aragon (2015) demonstrates that improvements in reserve property rights can facilitate commercial activities, particularly those related to resource development. This improved economic activity may increase incomes for some band members, resulting in an increased ability/willingness to pay for repairs or build a new home. While this mechanism is plausible, Pendakur and Pendakur (2018) demonstrate that the FNLMA does not significantly impact income or employment levels. Instead, following Besley (1995), we consider three distinct pathways that explain why the improved property rights inherent in the FNLMA may lead to investments in housing.

Besley (1995) identifies three separate mechanisms that explain how improvements in property rights leads to increased investment: the security argument, the collateral-based view, and the

gains-from-trade perspective. All three mechanisms have been found to influence investment in a range of settings. The security argument is based on the idea that secure property rights can reduce the risk of expropriation and this increased certainty provides owners with the necessary incentives to make investments. Advocates have explicitly argued that improving the clarity and certainty of reserve land tenure is central to improving the economic efficiencies of First Nations and attracting external investment. Still, Isaac (2005) argues that while the FNLMA may provide protection from provincial expropriation, it may also reduce certainty for third parties dealing with First Nations. In other words, external investors may feel more secure engaging with the federal government than a band council.

In addition to improvements in tenure security, well-defined property rights also enable owners to use their assets as collateral. Besley (1995) argues that if land is easier to collateralize, banks and other financial institutions may charge lower interest rates. Neoclassical economics argues that investors equate the marginal return on investing to the interest rate. Therefore, as interest rates fall, investment will increase. The *Indian Act* explicitly prohibits the use of reserve property as collateral. According to Chief Clarence Louie of the Osoyoos Indian Band, this restriction prohibits one of the main drivers of small business development on reserves (cite). Importantly, the FNLMA allows signatory First Nations to take on mortgages using the bands land as collateral (Pendakur and Pendakur, 2018). While individual band members are still restricted from collateralizing their land, under the FNLMA a band council may act as the guarantor for mortgages on land held by a band-member (Lavoie and Lavoie, 2017).

The gains-from-trade mechanism demonstrates how better property rights lead to expanded opportunities for trade, which creates incentives for investment. In Besley's (1995) model, the benefits of exchange are due to an owner and potential purchaser/lessee having different marginal productivities of capital and therefore different valuations of the land. By transferring the land to a more productive party, the owner can increase the return on their investment. Yet, if property rights are not sufficiently established, transaction costs may prohibit the exploitation of these opportunities for exchange. By clarifying the ownership structure, property rights help to reduce transaction costs and facilitate exchange, thereby enhancing investment incentives. Importantly, internal rental housing markets (i.e. between members of the same First Nation) are fairly robust on many reserves. For example, it is our understanding that on Six Nations of the Grand River,

band members commonly build homes as an investment and with the intention of renting the property to other band members. By reducing the cost of transacting reserve land, the FNLMA may further facilitate these types of arrangements and may even incentivize non-band-members to pursue leasing on-reserve property.

Together, these three mechanisms help to explain the link between secure property rights and investment. Importantly, the full derivation of each mechanism can be found in Besley (1995). Using these three mechanisms, we hypothesize that the improved property rights of the FNLMA positively influence investments in housing. While improved housing conditions may come from repairs to existing homes, it is also likely that the construction of new homes is diluting the proportion of homes in disrepair. By increasing security, improving access to credit, and lowering transaction costs, the FNLMA may be facilitating both repairs and new construction. The next section describes our dataset and lays out the empirical methods that we use to evaluate the implications of the FNLMA for on-reserve housing.

VI: Data and Empirical Methods

Data Sources

We use publicly available information from the First Nations Lands Advisory Board (FNLAB) to identify which First Nations have adopted the FNLMA and when they achieved full implementation. The FNLAB website also contains important details about the adoption process and anecdotes about the benefits of the FNLMA. Our empirical analysis uses socioeconomic data from six rounds of the Canadian Census (1986, 1991, 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. First Nations reserves). While the panel is unbalanced, on average, data is available for at least five time periods.

Our dataset contains information on incomes, employment, housing conditions, household assets, education, health, and other relevant information. We also use rental rates and house values at the Census Division[7] level as measures of regional prices and economic activity. We use GIS data to

[7] Census division (CD) is the general term for provincially legislated areas (such as county, municipalité régionale de comté and regional district) or their equivalents. Census divisions are intermediate geographic areas between the province/territory level and the municipality (census subdivision).

control for distances to urban areas and other spatial indicators. Finally, we use data from Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to identify the nature of land tenure on reserves before and after adoption of the FNLMA. This is an important omitted variable from previous studies.

Our property rights data contains information on certificates of possession, leases, permits, designations, easements, and band land. All other reserve lands are considered unallocated and are either maintained as common property for the benefit of the band or are under some type of customary arrangement which we do not have information on. Importantly, band land is land that has been specifically set aside for band activities (i.e. administration, rental housing, etc.), whereas unallocated reserve land has no specified purpose and is not actively managed by the band council. Lease, permits, (CHECK EASEMENTS), and designations are all secondary instruments to either band land or a certificate of possession. They do not change the structure of property rights on reserves, instead they rely on the existence of previously established property rights that allow the land to be transacted. For these reasons, we focus on band land and certificates of possession as the main factors determining the structure of property rights on reserve. Table 2 summarizes our band level data and table 3 summarizes our reserve level data.

Factors Influencing the Adoption of the FNLMA

While the FNLMA has been heralded a success by its advocates, the fact remains that the majority of First Nations in Canada remain non-signatories. There are a wide range of factors that may influence the benefits a First Nation receives from adopting the FNLMA: proximity to an urban area, demographics and population size, property rights, among other factors. The main study to assess the decision to adopt the FNLMA, Doidge et al. (2013), found that the proximity of a First Nations' reserves to an urban area was an important factor, but their results were sensitive to the inclusion of an education variable. Chen (2015), using an expanded dataset, confirms that urban proximity is an important factor influencing adoption.

One key variable that wasn't included in either study is the nature of land tenure prior to adoption. The FNLMA is seen as a means to increasing the commercial viability of reserve land by regaining land management authority from the federal government, but the benefits of the FNLMA depend on how constrained a band's land is prior to adoption. The different types of land tenure that exist on reserve lands have different degrees of marketability and different requirements regarding

government approval of transactions. Therefore, bands with different land tenure structures are likely to have different expectations of the reduction in transaction costs that are possible via the FNLMA. Our empirical model follows closely from Doidge et al. (2013). We model the probability that a First Nation will adopt the FNLMA using the following equation:

$$P(FNLMA|X,Y) = G(a_0 + \alpha X + \beta Y) \quad (1)$$

where P(FNLMA|X,Y) represents the probability of adopting and implementing the FNLMA. G is the cumulative distribution function of the normal distribution. X is a vector of reserve characteristics, containing variables for the proportion of land held as certificates of possession, proportion of land registered as band land, distance to urban areas, the bands total reserve land area, and the population density of the Census Division. We use the natural logarithm for our distance variable because of outliers. Y is a vector of band population characteristics, containing variables for the proportion of the adult population with no high-school certificate, the bands unemployment rate, and the proportion of the population employed in the primary or natural resource sectors. Importantly, our data is available at the reserve level. We have aggregated and or used weighted averages across reserves to derive band-level data. Also, we use 2016 data to analyze the adoption decision because that is the most recent data available.

We anticipate several findings. First, we hypothesize that First Nations with a higher proportion of land held as certificates of possession will be less likely to adopt the FNLMA, as they have less to gain from the development of a land code. Second, Aragon (2015) suggests that non-aboriginal members of the community gain more from institutional change than actual band members. For these reasons, we expect that the proportion of the bands population that identifies as aboriginal will negatively impact the decision to adopt. In addition, we expect to confirm Doidge et al.'s (2013) finding that urban proximity is a significant factor in the decision to adopt the FNLMA.

Analyzing the Economic Impact of the FNLMA

The aim of our empirical analysis is to investigate the effect of the FNLMA on economic development. Past research by Pendakur and Pendakur (2018) found that the FNLMA did not increase incomes or employment, unless the band had also adopted the First Nations Financial Management Act, which allows bands to charge property taxes. Still, the economic significance of adopting both pieces of legislation was found to be small. We instead focus on the implications of

the FNLMA for the quality and availability of on-reserve housing. On many First Nations reserves, issues of mould and overcrowding are prevalent issues. The complicated nature of homeownership on reserve, including the institutional constraints on alienation and collateral created by the *Indian Act*, have been identified as significant factors in the prevalence of poor-quality housing. As demonstrated by our theoretical framework, improved property rights, such as those inherent in the FNLMA, may improve ownership security, facilitate trade, and increase access to credit. If the FNLMA is truly improving reserve property rights, we should expect to see an improvement in the quality of housing on signatory First Nations.

We use a Difference-in-Differences (D-i-D) strategy to identify the specific impact of the FNLMA on housing. The primary empirical challenge with this type of analysis is finding a suitable counterfactual (i.e. what would have happened had a particular First Nation not adopted the FNLMA). Using a simple cross-section comparison of bands would be insufficient because there is a possibility of systematic differences between the two groups (i.e. signatories and non-signatories) that affect both the decision to adopt the FNLMA and our dependent variable. Some of the differences between First Nations are observable, such as population size, geographic location, etc., while others are unobservable, such as social cohesion or institutional quality.

The last several years have seen an explosion of interest in the Difference-in-Differences regression framework. Recent works from Kahn-Lang and Lang (2018) and Goodman-Bacon (2018) highlight potential issues of estimation and interpretation that can arise when using the D-i-D framework. Our D-i-D strategy uses FNLMA adoption as a treatment and exploits the timing of adoption to compare the economic outcomes of signatory and non-signatory First Nations. It is important to account for the fact that all signatory First Nations did not achieve full implementation at the same time. A recent NBER working paper by Goodman-Bacon (2018) demonstrates that the classical D-i-D estimator has two time periods, "pre" and "post". This conflicts with the vast majority of D-i-D applications that exploit variation across groups of units that receive treatment at different times. He shows that using the general D-i-D estimator with variation in treatment timing produces a weighted average of all possible two-group/two-period estimators in the data. In addition, he shows how to interpret and decompose results when treatment timing is variable, proposes a new balance test, and explains how results can be biased when treatment effects change over time.

Kahn-Lang and Lang (2018) provide a framework of robustness checks and empirical justifications that they argue should be used whenever the D-i-D framework is employed. We **will** employ these later in the paper. In addition, they highlight a number of 'pitfalls' that past studies using D-i-D have succumbed to. Both Kahn-Lang and Lang (2018) and Goodman-Bacon (2018) provide recent critiques of the D-i-D framework. While the D-i-D estimator is very powerful, their analysis demonstrates how simple misspecifications or misinterpretations can result in severely biased results. Importantly, in cases where treatment timing is variable, forcing your model to fit a two-period framework can lead to misleading results. For these reasons we use the general D-i-D estimator, which allows for variable treatment timing. To formally implement the D-i-D framework, we estimate the following baseline equation:

$$y_{ijt} = \beta FNLMA_{jt} + \gamma X_{ijt} + \delta W_{jt} + \rho_t + \mu_j + \in_{ijt} \quad (2)$$

where the unit of observation is reserve *i*, held by band j, in year t. y_{ijt} is the outcome variable (e.g. housing quality).

Our main explanatory variable, $FNLMA_{jt}$, is a dummy variable equal to one if by year t band j has achieved full implementation of the FNLMA. Based on our theoretical model, we anticipate that adopting the FNLMA will lead to a reduction in the proportion of homes that require major repairs. All regression models include year (ρ_t) and reserve (μ_i) fixed effects. We also cluster errors at the band level to account for the fact that we have data for multiple reserves for some bands. In addition, we include controls for important reserve-level characteristics (such as property rights), X_{ijt}, band characteristics, W_{jt}, and regional measures of economic activity. This model allows us to estimate the average treatment effect (ATE) of adopting the FNLMA, unless there are heterogenous effects of the FNLMA. In that case, we are only able to estimate the average treatment on the treated effect (ATT). The next section presents the results of our empirical models. Following our results, we explore several additional model specifications and test statistics to evaluate the degree of heterogeneity in our results and confirm our causal argument.

VII: Results and Implications

Factors Influencing the Adoption of the FNLMA

The results from our adoption model are presented in tables 4 and 5. Importantly, we report both the initial regression results and the conditional marginal effects at the mean. Several results are worth mentioning. First, our results confirm both Doidge et al.'s (2013) and Chen's (2015) finding that urban proximity is an important factor in the decision to adopt the FNLMA. The estimated marginal effect of our distance variable indicates that a 1% increase in the distance to an urban area is associated with a 0.8% decrease in the probability of adopting the FNLMA. In terms of education, we find that more educated First Nations are more likely to pursue adoption, again confirming the results of previous studies. We also find similar results with respect to the unemployment rate. Together, these three results indicate that local economic conditions significantly influence the decision to adopt the FNLMA.

With respect to property rights, we find that the prevalence of band land is a significant factor influencing the decision to adopt the FNLMA. Importantly, we did not find that the prevalence of certificates of possession influenced adoption. Instead, we find that bands with more band land are more likely to adopt the FNLMA. This is an interesting result. Since the decision to adopt the FNLMA is made by the band council and not individual band members, the prevalence of band land may directly influence how much the band council has to gain from the FNLMA. Conversely, if the majority of a reserve is held as certificates of possession, the bands authority to pursue economic opportunities is constrained by the wishes of the CP holder. This confirms our earlier assertion that the underlying structure of property rights influences the decision to adopt the FNLMA. Importantly, the remaining variables in our model were not found to influence the decision to adopt.

Analyzing the Economic Impact of the FNLMA

The results of our adoption model imply that the benefits of adopting the FNLMA may be influenced by a range of factors, including local economic conditions and the structure of property rights governing reserve lands. To confirm, we use a difference-in-differences framework to empirically investigate the impact of the FNLMA on the proportion of on-reserve homes requiring major repairs. The results of this model are in table 6. Our model contains data from 383 First

Nations, 458 reserves, and covers the period of 1986-2016. Importantly, the full time period is not available for all First Nations. Instead, we restrict our analysis to those First Nations that we have data for at least three time periods. This results in a total of 2,452 observations. Importantly, we were forced to omit our distance variable because of collinearity with our fixed effects.

There are several important results worth mentioning. First, our results contest Aragon and Kessler's (2018) finding that more individualized forms of property are associated with improved housing conditions. More specifically, we find that an increase in the proportion of land held as certificates of possession is associated with an increase in the proportion of homes requiring major repairs. Interestingly, we do not find that the prevalence of band land influences housing quality. We also find that measures of housing scarcity and overcrowding are associated with a higher proportion of homes requiring major repairs. This is an intuitive result, since the number of occupants directly influences the wear-and-tear of a house.

Our main question of interest is whether the FNLMA leads to improved housing outcomes. Our results indicate that adopting the FNLMA is associated with an approximate 5% reduction in the proportion of homes requiring major repairs. This result is statistically significant at the 5% level. This confirms our hypothesis and indicates that the reduction in transaction costs brought about by the FNLMA significantly influences incentives to invest in housing. Importantly, all other variables, with the exception of our year variables, were found to be insignificant.

VIII: Conclusion

The results of our study demonstrate the importance of property rights and related institutions for housing quality on reserves. Across Canada, housing is one of the most pressing and visible issues on First Nations. While many factors have been identified as contributing to this reality, institutional constraints, particularly the lack of private property rights on reserves, have been argued to be the dominant factor. To assess the validity of this claim, we assess the First Nations Land Management Act and investigate whether adoption leads to improvements in the quality of on-reserve housing. In addition, we also investigate the factors influencing adoption and assess whether property rights play a role in the decision to adopt and/or the benefits derived from adoption.

Our adoption model demonstrates that the decision to adopt the FNLMA is not a forgone conclusion. Our results indicate that more urban, education, and skilled First Nations will be more likely to adopt the FNLMA. This is consistent with the argument that more urban and higher skilled First Nations expect to receive greater benefits from the reduction in transaction costs associated with the FNLMA. Importantly, the assessment of these net-benefits is done from the perspective of the band. Our results indicate that differences in property rights may explain why some First Nations have avoided adoption, while others have been quick to achieve full implementation.

Importantly, while Pendakur and Pendakur (2018) found that the FNLMA did not increase average income or employment levels, we do find that adopting the FNLMA positively impacts housing quality. More specifically, we find that adopting the FNLMA is associated with an approximate 5% reduction in the proportion of homes requiring major repairs. This result is supported by our theoretical framework and the idea that improvements in property rights enhance ownership security, facilitate opportunities for exchange, and increase access to credit.

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 economic outcomes. Finally, we help to address the longstanding concern in the U.S. (Anderson and Lueck, 1992), Australia (Altman, 2004), and Canada (Aragon, 2015) that the structures of property rights that are prevalent on Indigenous lands constrain economic development.

IX: References

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Figure 1: National Map of Framework Agreement Signatory Communities

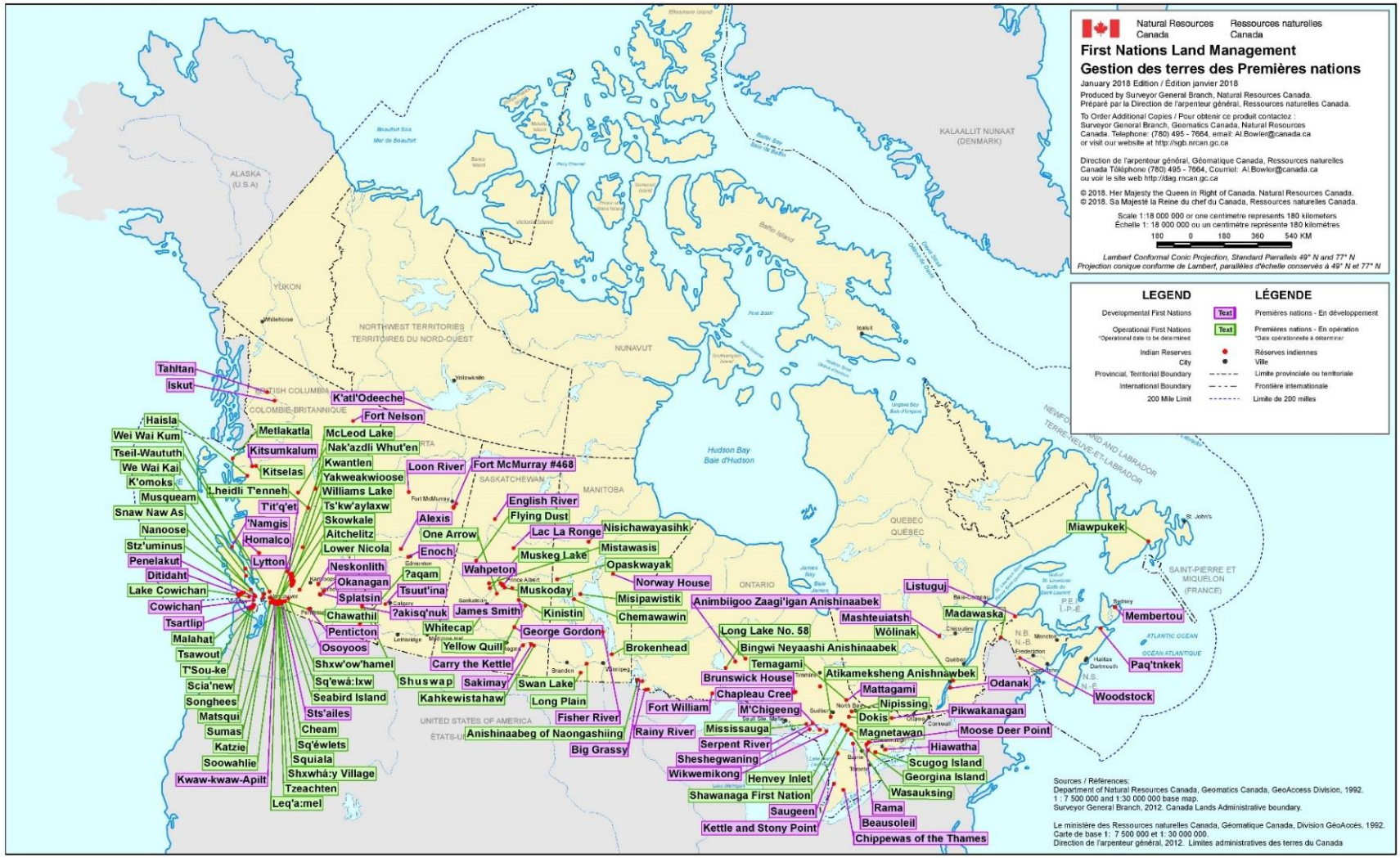

Table 1: List of Signatories to the FNLMA

Province	First Nation	Land Code Coming-into-force Date
Ontario	Big Island (also known as Anishnaabeg of Naongashiing)	August 1, 2011
	Bingwi Neyaashi Anishinaabek	April 1, 2015
	Chippewas of Georgina Island	January 1, 2000
	Chippewas of Rama (also known as Chippewas of Mnjikaning)	May 1, 2018
	Dokis	April 1, 2014
	Henvey Inlet	January 1, 2010
	Long Lake No. 58 First Nation	April 1, 2017
	Magnetawan	September 1, 2015
	Mississauga	August 1, 2009
	Nipissing Band of Ojibways (also known as Nipissing)	July 1, 2003
	Scugog (also known as Mississaugas of Scugog Island)	January 1, 2000
	Shawanaga	July 1, 2015
	Temagami First Nation	September 1, 2017
	Wasauksing First Nation	June 1, 2017
	Whitefish Lake	March 1, 2009
Quebec	Première Nation des Abénakis de Wôlinak	April 1, 2017
Nova Scotia		
New Brunswick	Madawaska Maliseet First Nation	January 1, 2018
	Brokenhead Ojibway	April 1, 2015

Manitoba	Chemawawin	September 6, 2010
	Long Plain	April 1, 2018
	Misipawistik Cree Nation	June 1, 2017
	Nisichawayasihk Cree Nation	October 23, 2017
	Swan Lake	October 1, 2010
	The Pas (also known as Opaskwayak Cree)	August 1, 2002
British Colombia	Aitchelitz	May 1, 2014
	Beecher Bay	August 1, 2003
	Burrard	June 6, 2007
	Campbell River	January 31, 2013
	Chawathil	November 25, 2016
	Cheam	September 1, 2016
	Fort George (also known as Lheit-Lit'en and Lheidli T'enneh)	November 1, 2000
	Haisla	November 6, 2015
	Katzie	December 1, 2017
	Kitselas	November 25, 2005
	K'ómoks First Nation	November 30, 2016
	Kwantlen	November 1, 2015
	Kwaw-kwaw-Apilt First Nation	June 1, 2018
	Lake Cowichan First Nation	June 9, 2017
	Leq'á:mel (also known as Legamel)	February 1, 2010

	Lower Nicola	December 1, 2016
	Malahat First Nation	March 31, 2015
	Matsqui	February 26, 2009
	McLeod Lake	May 20, 2003
	Metlakatla	December 1, 2016
	Musqueam	June 5, 2017
	Nak'azdli	December 1, 2016
	Nanoose	March 1, 2015
	Pavilion	May 1, 2004
	Scowlitz	September 1, 2016
	Seabird Island	September 1, 2009
	Shuswap	February 1, 2015
	Shxwhá:y Village (also known as Sqay Village)	January 8, 2007
	Shxw'ow'hamel	March 25, 2015
	Skawahlook	August 5, 2010
	Skowkale	May 1, 2014
	Songhees	October 1, 2011
	Soowahlie	June 1, 2016
	Squiala	July 29, 2008
	St. Mary's	July 1, 2014
	Sts'ailes	October 23, 2018

	Stz'uminus	August 30, 2014
	Sumas	November 11, 2011
	Tsawout	May 29, 2007
	T'Sou-ke (also known as Tsouke)	February 1, 2007
	Tzeachten	August 21, 2008
	We Wai Kai (also known as Cape Mudge)	December 7, 2009
	Williams Lake	July 1, 2014
	Yakweakwioose	May 1, 2014
Prince Edward Island		
Saskatchewan	Flying Dust	October 6, 2013
	John Smith (also known as Muskoday)	January 1, 2000
	Kahkewistahaw	December 22, 2011
	Kinistin	February 1, 2005
	Mistawasis	April 1, 2017
	Muskeg Lake	September 1, 2005
	One Arrow	September 1, 2014
	Whitecap No. 94	January 1, 2004
	Yellow Quill	March 22, 2017
Alberta		
Newfoundland and Labrador	Miawpukek	December 1, 2017

Table 2: Descriptive Statistics of Band Level Dataset (Year=2016)

Variable	Obs.	Mean	St. Dev.	Min	Max
FNLMA (=1 if adopted)	475	0.1115789	0.3151797	0	1
Certificates of Possession (Proportion of total land area)	475	0.0829557	0.177545	0	0.9077599
Band Land (Proportion of total land area)	475	0.1961576	0.2791872	0	1
Unallocated Reserve Land (Proportion of total land area)	475	0.7214042	0.3145562	0	1
% of Population without HS Cert.	432	0.4549747	0.1654553	0	0.8947368
Ln(1+Distance to Urban Area)	475	9.252907	2.72987	0	12.99871
Pop. Density of Census Division	475	29.41081	120.3861	0.0062361	1038.266
% of Population Indigenous	432	0.9276312	0.146806	0.1377119	1
% of Population Employed in Primary Industries	432	0.086146	0.1078093	0	1
Unemployment Rate (%)	432	23.14094	11.80662	0	58.3
Hectares (Total Area of all Reserves)	475	5376.991	10365.26	5.3	136264.6

Table 3: Descriptive Statistics of Reserve Level Dataset (1986-2016)

Variable	Obs.	Mean	St. Dev.	Min	Max
% Homes Needing Major Repairs	2764	0.3643248	0.2015517	0	1
FNLMA (=1 if adopted)	5439	0.0310719	0.173528	0	1
Certificates of Possession (Proportion of reserve land area)	5439	0.0835233	0.1838325	0	1
Band Land (Proportion of total land area)	5439	0.1774285	0.3006059	0	1
Avg House Price in Census Div.	3879	188963.8	148783.1	25566	1005920
% of Population without HS Cert.	5439	0.6576041	0.3233526	0	1
Reserve Housing (Proportion of housing)	5439	0.7650458	0.3445706	0	1
Detached Housing (Proportion of housing)	3127	0.8616558	0.1837406	0	1
Rooms per Person	3062	0.6582337	0.2083324	0.2142857	2.4
Houses per Person	3365	0.3059232	0.1606174	0	4
Pop. Density of Census Division	3879	25.09146	110.0967	0.0053007	1038.266
Average Rent in Census Division	3879	644.0709	241.1209	241	2148
Unemployment Rate (%)	3345	24.5154	15.95094	0	100
Gender (% female)	3234	0.4708548	0.093359	0.2884615	0.6818182

Table 4: Logit Results of Adoption Model

Logistic regression — Number of obs = 432; LR chi2(9) = 61.77; Prob > chi2 = 0.0000; Log likelihood = -123.9248; Pseudo R2 = 0.1995

FNLMA	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
CP	-1.453804	1.084933	-1.34	0.180	-3.580233	.672626
BL	1.512886	.6418042	2.36	0.018	.2549734	2.770799
Edu_nc_Band	-3.25122	1.434511	-2.27	0.023	-6.062809	-.4396304
DIST	-.126001	.0597551	-2.11	0.035	-.2431189	-.008883
CD_Pop_Dens	.0006572	.0010841	0.61	0.544	-.0014676	.0027821
Pop_Ab_Band	-1.340308	1.082491	-1.24	0.216	-3.461952	.7813365
Industry_Prim_Band	-2.86483	1.965981	-1.46	0.145	-6.718082	.988421
Labour_unemp_Band	-.0338107	.0169877	-1.99	0.047	-.0671059	-.0005154
hectares_Band	-.0000555	.0000352	-1.57	0.115	-.0001246	.0000136
_cons	2.454153	.9387855	2.61	0.009	.6141674	4.294139

Table 5: Logit Results of Adoption Model, Reporting Conditional Marginal Effects (Mean)

Dependent Variable: FNLMA=1 if First Nation has adopted the FNLMA

Variable	Marginal Effect	Std. Error
Certificates of Possession (Proportion of total land area)	-0.09650	0.07216
Band Land (Proportion of total land area)	0.10042**	0.04108
% of Population without Highschool Certificate	-0.21581**	0.08943
Ln(1+Distance to Urban Area)	-0.00836**	0.00407
Pop. Density of Census Division	0.00004	0.00007
% of Population Indigenous	-0.08897	0.07414
% of Population Employed in Primary Industries	-0.19016	0.13012
Hectares (Total Area of all Reserves)	-0.00001*	0.00000
Unemployment Rate (%)	-0.00224**	0.00112
Statistical significance at the 1% (***), 5% (**), and 10% (*)		

Table 6: Results of Difference-in-Differences Model

Fixed-effects (within) regression — Number of obs = 2452
Group variable: ADMIN_LAND2 — Number of groups = 458

R-sq: within = 0.0472 — Obs per group: min = 3
between = 0.2417 — avg = 5.4
overall = 0.1326 — max = 6

F(18,382) = 4.77
corr(u_i, Xb) = -0.0241 — Prob > F = 0.0000

(Std. Err. adjusted for 383 clusters in BandNumber2)

DWELL_MNT	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
1.FNLMA	-.0502075	.025336	-1.98	0.048	-.1000231	-.000392
Year						
1996	-.0089119	.0143661	-0.62	0.535	-.0371585	.0193347
2001	.0334795	.0154494	2.17	0.031	.0031031	.0638559
2006	.0631652	.0222881	2.83	0.005	.0193425	.106988
2011	.0376917	.0227933	1.65	0.099	-.0071243	.0825078
2016	.056106	.0262609	2.14	0.033	.0044719	.1077401
POP_GEND	.0497099	.1838333	0.27	0.787	-.3117419	.4111616
House_value	2.52e-08	1.13e-07	0.22	0.823	-1.97e-07	2.47e-07
CP_per	.1537058	.0867102	1.77	0.077	-.0167832	.3241948
BL_per	-.0142098	.0383225	-0.37	0.711	-.0895593	.0611397
Edu_nc	.0648265	.0439832	1.47	0.141	-.0216529	.1513059
DWELL_RES	.0334486	.0315702	1.06	0.290	-.0286245	.0955216
DWELL_DETACH	-.0230623	.0298135	-0.77	0.440	-.0816815	.0355569
DWELL_RM_PR_PSN	.1686204	.0769605	2.19	0.029	.0173011	.3199397
Labour_unemp_rt	.000317	.0003865	0.82	0.413	-.0004429	.001077
Dwell_per	-.1114219	.0542118	-2.06	0.041	-.2180127	-.004831
CD_Pop_Dens	-.000412	.0002848	-1.45	0.149	-.0009719	.0001479
Gross_rent	.0000287	.0000668	0.43	0.668	-.0001026	.00016
_cons	.1879747	.1132536	1.66	0.098	-.0347037	.4106531
sigma_u	.11495478					
sigma_e	.15818096					
rho	.34560794	(fraction of variance due to u_i)				