

The Impact of Self government, Comprehensive Land Claims and Opt-in Arrangements on Income Inequality in Indigenous Communities in Canada

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ABSTRACT:

In Canada, self government agreements, comprehensive land claims agreements, and opt-in arrangements allow Indigenous groups to govern their internal affairs and assume greater responsibility and control over the decision-making that affects their communities. We use difference-in-difference models to measure the impact at the community level of the attainment of such agreements on average income and income inequality in Indigenous communities. In comparison with earlier work, we additionally use data from the 2016 Census, and we treat as our focus the effects of attainment on income inequality.

We find that communities that attain a self government agreement or an opt-in arrangement related to land management see a decrease in the Gini coefficient for income inequality of roughly 2.0 to 3.5 percentage points. Attainment of some agreement types also affects inter-group inequality. Our results suggest that: the attainment of self government agreements and Comprehensive land claims agreements increase average log incomes and decrease income inequality; and, opt-in arrangements related to land management don't affect average log-income but do decrease income inequality.

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1. Introduction

The inherent right of self government is based on the view that Indigenous people have the right to govern themselves in relation to matters that are internal to their communities, integral to their unique cultures, identities, traditions, languages and institutions, and with respect to their special relationship to their land and resources. Self government agreements and opt-in arrangements set out provisions for Indigenous groups to govern their internal affairs and assume greater responsibility and control over the decision-making that affects their communities.

A key objective of self government is to strengthen Indigenous communities by supporting stable and sustainable Indigenous governance and greater self-reliance. Many tools have been used cooperatively by Indigenous communities and the federal government of Canada to achieve greater self-control and decentralized decision-making. These tools include both self government agreements (with or without comprehensive land claims agreements) and opt-in arrangements that allow Indigenous communities to opt out of specific elements of the Indian Act and opt in to other types of arrangements with increased local control. In this work, we consider both types of tools with a goal of estimating the impact of such arrangements on community-level income and income inequality.

Income inequality is a commonly used indicator of social well-being and social cohesion, and has increasingly been seen to cause many types of social ills, including, for example, suicide, political polarization and reduced productivity (see, e.g., Wilkinson and Pickett 2010 and OECD 2015). Consideration of income inequality as an outcome variable is common in the literature on inequality across countries, where empirical work using cross-country panels has shown that inequality can be affected by a host of institutional factors including tax rates, labour standards and public goods provision (see, e.g., the survey OECD 2011). In this paper, we consider income inequality as an outcome variable, but analyze variation at the community, rather than the country level. To the extent that equality in the income distribution is a desirable goal², we provide evidence in this paper as

² Feir and Hancock (2016) caution that assuming particular values or objectives for Indigenous communities may be dangerous, so we do not assume that more equality is desirable. Instead, we suggest that if it is, more local control may be a useful tool to deliver it.

to whether or not attainment of self government agreements, comprehensive land claims agreements or opt-in arrangements furthers that goal.

While we do not study the exact mechanisms by which increased local control might increase or decrease income inequality, there are good reasons to think that it might do so. First, increased local control might increase community-member participation in decision-making, which could result in a greater number of local residents sharing in any economic gains that arise. This would result in decreased income inequality. Second, increased local control might increase the scope for rent extraction by local actors, which would result in some community members absorbing the lion's share of economic gains. This would result in increased income inequality. Third, all the agreements we study require at least some financial reporting and/or accountability. This could shine a light on the use of local resources, which, in the presence of local participation, can decrease income inequality. Empirically, the bottom line of our findings is that attainment of an agreement is associated with a decrease in income inequality.

Throughout this paper, we use the term *modern agreements* to cover self government, comprehensive land claims and opt-in arrangements. Communities with historic treaties are covered by the Indian Act and can, typically, only obtain opt-in arrangements. However, self government and comprehensive land claims agreements are additionally available to any First Nation or Inuit community that does not have an existing treaty (is unceded).

These tools are not available to Indigenous people who are not registered under the Indian Act. Métis people are not covered by the Indian Act. Consequently, Métis communities are not able to obtain modern agreements. Thus, in this paper we focus on outcomes for First Nations and Inuit communities and use the word 'Indigenous' to refer to these groups.

While there has been a great deal of energy expended on negotiating such agreements, there has been less work that assesses the impact of such agreements on economic outcomes (see Aragón 2015, Pendakur and Pendakur 2018). The focus of this study is on agreements signed between 1975 and 2015, of which there were 179 distinct agreements. Like Aragón (2015) and Pendakur and Pendakur (2018), we focus on the association between attainment of these agreements and the economic outcomes of

Indigenous and non-Indigenous people living in Indigenous communities. But, unlike those papers, we consider community-level outcomes and, in particular, community-level income inequality.

This paper brings newer data to the table, especially relevant to assessment of opt-in arrangements, all of which have been signed since 2000. In particular, we add 2016 Census microdata to the 1991-2006 and 1991-2011 Census/National Household Survey cross-sections used by Aragon (2015) and Pendakur and Pendakur (2018), respectively.

Relative to the previous literature, we reiterate previous findings regarding the effect of modern agreements on average incomes and log-incomes of Indigenous people in Indigenous communities. We find that Comprehensive Land Claims Agreements (CLCAs), which transfer land and money to Indigenous communities, raise average incomes a lot for Indigenous households. This is the case whether or not they are combined with Self Government Agreements (SGAs). In contrast, standalone SGAs and opt-in arrangements, which allow Indigenous communities to take local control of land or fiscal issues, are associated with small losses (or no gains) in average income for Indigenous households.

Our findings regarding the effect of modern agreements on income inequality in Indigenous communities are new to the literature. We find that communities that attain a Self government Agreement (with or without an associated CLCA) or an opt-in arrangement related to land management see a decrease in the Gini coefficient for income inequality of roughly 2.0 to 3.5 percentage points. Communities that attain a standalone CLCA see a smaller decrease of about 1.0 percentage point in the Gini coefficient. These are large effects: for example, the difference in the Gini coefficient for net income inequality between the United States and Canada is roughly 10.0 percentage points. These effects are as much as one-third of that magnitude.

Attainment of modern agreements also affects inter-group inequality. In particular, standalone comprehensive land claims agreements and opt-in arrangements related to financial management are associated with larger income gaps between Indigenous and non-Indigenous households.

Consequently, if one cared only about average income, comprehensive land claims agreements would look like the only road forward. Unfortunately, negotiation of comprehensive land claims and/or self government agreements is expensive and slow:

First Nations may spend “decades at the negotiating table” (Forrest, 2018), and a 2013 federal audit found an average legal expenditure on negotiation of roughly \$10 million (Forrest, 2018). Further, comprehensive land claims and self government agreements are only available to First Nations not covered by an existing treaty.

Opt-in arrangements under the Indian Act are less complex in legal terms than self government agreements, and are available to any First Nations community. Indeed, the legislation enabling opt-in agreements is designed to be boilerplate in nature: for example, the Land Advisory Board advises First Nations as to how to use the First Nations Land Management Act opt-in provisions (Canada, 2012).

If reductions in income inequality are a desirable outcome for Indigenous communities, then we provide evidence that self government agreements and opt-in arrangements in the area of land management may deliver the goods. However, we do not find a similar reduction in inequality related to opt-in arrangements covering financial management.

Altogether, these results suggest that the attainment of comprehensive land claims agreements (with or without self government agreements) improve both average incomes and income inequality, and that standalone self government agreements and opt-in arrangements related to land management don’t reduce average income and do improve income inequality.

The paper proceeds as follows. We first outline past research in the area and describe modern agreements between the Federal Government of Canada and Indigenous communities, paying special attention to opt-in arrangements. Then, we describe our empirical methodology and data, followed by a discussion of the estimates and a short conclusion.

2. Past research:

In this paper we study the following types of agreements: Self Government Agreements (SGAs); Comprehensive Land Claims Agreements (CLCAs); and, opt-in arrangements under the First Nations Fiscal Management Act (FNFMA) and the First Nations Land Management Act (FNLMA). There has been substantial research done on the negotiation of, and possible benefits deriving from, these kinds of agreements by scholars

in political science and sociology (for example: Hog and Turpel 1995; White 2002; Abele and Prince 2006; Alcantara 2007, 2008; Whitfield 2010; Alcantara and Davidson 2015; Schmidt 2018). This body of research has explored the mechanics of decentralizing power through self governance or other arrangements, but has not necessarily looked at the economic impact of such arrangements. For example, Boutilier (2016) examines opt-ins under the FNLMA and argues that bands that opted into the Act were able to speed up decision-making related to land management such as mortgages, zoning and leases.

In terms of economic outcomes, there is a body of work exploring earnings differentials faced by indigenous groups in Canada (see for example Feir 2013; Hossein and Lamb 2015; Lamb 2013; Maxim et al 2001; Pendakur and Pendakur 2011). This research has generally concluded that Indigenous people in Canada face high labour market disparities, with registered Indians facing the highest level of earnings disparity. But, much less of this research has connected with the governance arrangements in Indigenous communities.

A much smaller group of papers correlates the governance arrangements and income at the individual level (see for example: Boutillier 2016; Aragon 2015; Aragon and Kessler 2018; Pendakur and Pendakur 2018). Aragon (2015) examines the implementation of CLCAs in British Columbia and in the Yukon in order to study the impact on individual incomes in bands with such agreements. He shows that the attainment of CLCAs resulted in a large increase in incomes of band members. Pendakur and Pendakur (2018) extend Aragon's analysis both over time and across different types of agreements in order to look at how different types of agreements affected household incomes. They find that the attainment of an SGA or a CLCA resulted in higher household incomes, and also found positive effects for some opt-in arrangements.

Relative to the previous literature, our contribution is to consider a new economic outcome that might be affected by the attainment of a modern agreement: income inequality. In undertaking this exercise, we also bring new data to the table in the form of the 2016 Census of Canada microdata. Further, because we extend the analysis well into the 2000s, we are able to more fruitfully analyse the outcomes from opt-in arrangements, all of which were signed since 2000.

3. Modern Agreements

In this work, we consider Comprehensive Land Claims Agreements (CLCAs), Self Government Agreements (SGAs) and opt-in arrangements, which we refer to collectively as *modern agreements*. In the absence of these types of agreements and arrangements, First Nations and Inuit communities are governed under the Indian Act. The Indian Act specifies that the Federal government has authority over many aspects of social and economic life in communities governed by the Act. These aspects include: decisions over land use, taxation and fiscal authority, policing and schooling, access to health care and other important tasks usually undertaken by local (municipal or provincial) governments.

These modern agreements offer different paths for increased local control in Indigenous communities (see, e.g., Abele and Prince 2006). CLCAs and SGAs are available only to First Nations that do not have an existing treaty (that is, are unceded). Opt-in arrangements are available to all First Nations, including those that have ceded title, e.g., through a Historic Treaty.³

Briefly, SGAs set out arrangements for Indigenous groups to govern their internal affairs and assume greater responsibility and control over the decision-making that affects their communities. SGAs pull communities out of the Indian Act. In general, SGAs address the structure and accountability of Indigenous governments, their law-making powers, and financial arrangements as well as their responsibilities for providing programs and services to their members. We observe three main types of SGAs: 14 SGAs associated with CLCAs, 4 stand-alone SGAs and 1 sectoral SGA. Because there is only 1 Sectoral SGA, we include them in the model, but do not report the corresponding estimates. Pendakur and Pendakur (2018) provides much more institutional detail on SGAs.

CLCAs focus on Indigenous rights and/or title to lands and resources. Sometimes they are combined with SGAs (as noted above). CLCAs without SGAs provide for administrative or participatory roles in resource management regimes for Indigenous

³ https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-AI/STAGING/texte-text/mprm_treaties_th-ht_canada_1371839430039_eng.pdf is a map of “Pre-1975 Treaties”, showing where Historic Treaties apply. https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-AI/STAGING/texte-text/mprm_pdf_modrn-treaty_1383144351646_eng.pdf is a map of “Modern Treaties and Self government Agreements”, showing the location of modern agreements.

signatories. We observe 6 CLCAs without SGAs were signed between 1976 and 2010 in Quebec, the Northwest Territories and Nunavut.⁴ Aragon (2015) provides much more institutional detail on CLCAs.

Much less research has been undertaken regarding opt-in arrangements, in part because they are a relatively recent development, with the oldest signed in 2000. Opt-in legislation arrangements provide First Nations with the means to opt-out of certain provisions of the Indian Act and opt-in to alternative arrangements. We consider arrangements made under three opt-in Acts in effect during the study's time frame: the 1999 First Nations Land Management Act (FNLMA), the 2005 First Nations Financial Management Act (FNFMA) and the 2012 First Nations Commercial and Industrial Development Act (FNCIDA). However, because only 2 First Nations have signed agreements under FNCIDA (and have done so very recently), we include these in the model but do not report the corresponding estimates.⁵ In contrast, more than a hundred First Nations have signed agreements under FNFMA or FNLMA.

The FNLMA, enacted in 1999, allows participating First Nations to opt out of 34 land-related sections of the Indian Act and manage their land, resources and environment under their own land codes.⁶ Under the terms of the related First Nations Framework Agreement, which the Act ratified, First Nations must develop such land codes and they must include rules for environmental assessment and protection and matrimonial real property laws on reserves. According to the Department of Indian Affairs and Northern

⁴ The trans-boundary Eeyou Marine Region Land Claims Agreement was signed in 2012. It covers the marine region of Nunavut along the shores of the Hudson Bay. Also, we roll-up the 2008 Nunavik agreement with the earlier 1993 Nunavut agreement (The Indigenous CSDs are the same for both agreements).

⁵ The First Nations Commercial and Industrial Development Act (FNCIDA) came into effect April 1, 2006. It was intended to "close the regulatory gap on reserves and allow complex commercial and industrial projects to proceed." Essentially, FNCIDA allows Indigenous communities, which operate under federal guidelines to build legislation that generally falls under provincial jurisdiction. It thus allows the federal government to make "project-specific" regulations for commercial and industrial development projects on reserves – allowing for on-reserve regulations to align with off-reserve regulations – "at the request of participating First Nations." Examples of such large projects include "oil sands, hydro-electrical projects or large real estate developments." By 2015, 2 opt-in arrangements were signed with first nations groups under FNCIDA. See <https://www.aadnc-DIAND.gc.ca/eng/1100100033561/1498848820817> , <https://www.aadnc-DIAND.gc.ca/eng/1100100033564/1100100033565> and <https://www.aadnc-DIAND.gc.ca/eng/1100100033561/1498848820817> .

⁶ <https://www.aadnc-DIAND.gc.ca/eng/1317228777116/1317228814521>

Development Canada (DIAND)⁷, these powers and actions are expected to lay the groundwork for expanded economic development on reserves and business partnerships with the private sector.⁸ The FNLMA provides opting-in First Nations with powers to manage their reserve land and resources under their own land codes that can generate revenue for Indigenous communities over time as projects are developed.

Once a First Nation opts-in to the FNLMA, it is able to receive funding for three phases: a) developmental funding for developing a land code, negotiating an individual agreement and holding a ratification vote; b) funding to facilitate the transition from the developmental phase to the operational phase; c) ongoing operational funding for managing land, environment and natural resources as determined through negotiations between Canada and the First Nation. By 2015, 50 opt-in arrangements were signed under FNLMA. The majority of these communities are located in B.C.; other participating communities are located in Saskatchewan, Manitoba and Ontario.

The First Nations Fiscal Management Act (FNFMA), enacted in 2005, addresses enhancements to First Nation property taxation practices, creates a First Nation bond financing regime and supports First Nation capacity in financial management with the goal of providing First Nations with a range of practical tools available to other governments for modern fiscal management (Canada 2005). According to First Nations Financial Management Board, the legislation is expected to support First Nation economic development and well-being and enable First Nations that choose to use the services of the participating institutions to participate more actively in the Canadian economy.⁹ The FNFMA provides participating First Nations with fiscal powers similar to those exercised by other governments in Canada. The Act enables First Nations to strengthen First Nation property tax systems and financial management. It also provides First Nations with

⁷ The federal department primarily responsible for indigenous issues has gone through a lot of name changes in the last few decades. While the legal name remains the Department of Indian and Northern Development (DIAND) Canada, the department has gone through: Aboriginal Affairs and Northern Development, Indian and Northern Affairs Canada, Indigenous and Northern Affairs Canada. In 2019, there are 2 departments comprised of Indigenous Services Canada and Crown – Indigenous Relations and Northern Affairs Canada. Given the myriad of departmental names we will use DIAND when referring to the department.

⁸ <http://www.aadnc-DIAND.gc.ca/eng/1323350306544/1323350388999>, date modified: 2013-07-05, accessed 2015-01-2015.

⁹ First Nations Fiscal Management Board. 2020. <https://fnfmb.com/en/about-fmb/about-first-nations-fiscal-management-act-fma> Accessed 2020-02-06

increased revenue-raising tools, standards for accountability, and access to capital markets available to other governments. The First Nations Financial Management Board is one of three First Nations institutions created under the FNFMA, along with the First Nations Tax Commission and the First Nations Finance Authority.

Between 2007 and 2015, 138 First Nations opted into the FNFMA.¹⁰ As with the FNLMA, the majority of communities opting in come from B.C. Others are located in Alberta, Saskatchewan, Manitoba, Ontario and the Atlantic Region.

There are various features of opt-ins under the FNFMA that can generate economic effects, including: financial management certification under the First Nations Financial Management Board; local revenue generation, for example, taxing business and properties and charging fees for services; and eligibility for loans from the First Nations Financial Authority. Such loans are used to finance investments that support economic development as projects are planned, developed, constructed and made operational.

These investments also generate own source revenues once projects become operational in addition to creating employment opportunities. For our analysis, income levels would not necessarily capture own-source revenues that are not distributed to community members. These revenues can be retained by the community for various purposes such as future investments, operational costs and community projects. Other potential benefits from these opt-in arrangements include capacity building, improved governance and strengthened community land and fiscal management.

Overall, opt-in arrangements allow First Nations to take control over land or fiscal issues in Indigenous communities without asking permission from the Federal government. As such, Alcantara (2007) argues that they can help reduce transaction costs.

All these types of modern agreements may be attained singly or in combination. In our empirical work, we include 8 distinct types/combinations:

1. Sectoral self governance over education¹¹ - Indigenous self government exercised over education (just one agreement: the Mi'kmaq Education Agreement).

¹⁰ DIAND, <https://www.aadnc-DIAND.gc.ca/eng/1393512745390/1393512934976>, Accessed 2015-02-09.

¹¹ Chignecto and Pictou Mi'kmaq signed a Peace and Friendship treaty in 1761. The treaty guaranteed hunting, fishing and land-use rights but did not include monetary or land transfer provisions (Wallace, 2018).

2. Stand-alone Self Government Agreements (SGAs) - provide for the exercise of self government over a wide range of subject matters.
3. Standalone Comprehensive Land Claims Agreements (CLCA) without self government
4. Self government with Comprehensive land claim (SGA with CLCA) self government negotiated in conjunction with comprehensive land claims agreements.
5. Opt-in¹²—First Nations Land Management Act (FNLMA)
6. Opt-in—First Nations Fiscal Management Act (FNFMA)
7. Opt-in—both FNLMA and FNFMA
8. Opt-in—First Nations Commercial and Industrial Development Act (FNCIDA)

We note that in our main text tables we do not present estimates for the single Sectoral agreement (Mi'Kmaq Kina'Masutsi Education Sectoral agreement in Nova Scotia) or for the 2 agreements under FNCIDA. However, these agreement types are included as regressors in the model, so as not to bias the control (no-agreement) jurisdictions. For interested readers, we present estimates for these agreement types in Appendix Table 1.

4. Data and Methodology

Pendakur and Pendakur (2011) showed that overall Indigenous income and earnings disparity had increased from the 1970s to the 1990s, but then had decreased by 2005. Figure 1 shows their estimates, plus new calculations that extend their work to 2015. In this graph, each point gives the earnings gap (expressed as a percentage) between Canadian-born Indigenous and European (non-Aboriginal and non-Visible Minority) origin workers, conditional on residential location, age, education and other characteristics¹³. There are two lines in the graph, one that compares Indigenous women's earnings to Canadian-born European origin women's earnings, and one which compares Indigenous men's earnings to Canadian-born European-origin men's earnings. Looking at either men's or women's earnings, we see a very substantial convergence between the earnings of

¹² There was one agreement under the First Nations Oil and Gas Management Act undertaken in 2014. However, we exclude it—and its associated CSDs—from this analysis because we feel it is too recent.

¹³ Other characteristics include: marital status, official language knowledge and household size (see Pendakur and Pendakur 2011 for details).

Indigenous people and that of their non-Indigenous counterparts over the period 1995 to 2015. The magnitude of this convergence is large: for men, the earnings gap shrunk by roughly 20 percentage points; for both men and women the earnings gap fell by roughly half.

Roughly one-quarter of Indigenous people in Canada live in Indigenous communities. These communities have an evolving relationship with the Government of Canada, especially in the light of the modern agreements described above. Aragon (2015) and Pendakur and Pendakur (2018) suggest that some of the earnings convergence shown in Figure 1 was due to the attainment of modern agreements which increased the incomes of Indigenous people in Indigenous communities. Here, we find new evidence that this was the case.

4.1 Data

In this paper, we use confidential individual-level long-form micro data from the 1991, 1996, 2001, 2006 and 2016 Censuses plus the 2011 National Household Survey¹⁴, merged with public-use DIAND data identifying Indigenous communities in Canada and public-use data on the federal modern agreements.¹⁵ In its publicly available table showing Community Well-being scores, DIAND identifies First Nation and Inuit census sub-divisions (CSDs).¹⁶ This list of First Nation and Inuit CSDs includes both reserves and non-reserve communities that are primarily Indigenous. Throughout this paper, we use the terms *communities* and *CSDs* interchangeably. We use this list of communities from the 2011 table and then concord it backwards and forwards to create a matched dataset of First Nations and Inuit communities over the period 1991 to 2016.

¹⁴ We note that non-response rates on the 2011 NHS make it difficult for us to say how good the analysis will be for that period. However, researchers from Indigenous Services Canada have suggested that the overall response rate in Indigenous communities is higher than it is for the rest of Canada because sampling in Indigenous communities was 100% as compared to 30% for the rest of the population.

An additional issue with using Census data to study Indigenous people is that there was substantial and persistent non-response in particular communities, in all periods. For example, in the 1996 Census, it is estimated that 44,000 Indigenous people living in Indigenous communities were not counted because their communities did not take part in the Census (Saku, 1999, p 376). However, the communities with severe non-response issues did not attain modern agreements over our study period. To the extent that these communities are similar to other control communities, their nonresponse should not bias our estimates.

¹⁵ The list of agreements, with implementation dates, was scoured from a variety of online sources. The list, with sources, is available online at www.sfu.ca/~pendakur.

¹⁶ The table can be found at: <https://open.canada.ca/data/en/dataset/56578f58-a775-44ea-9cc5-9bf7c78410e6>

We consider how modern federal agreements affect the level of income and income inequality in Indigenous communities. Unlike for the total population of Canada, the sampling rate in Indigenous communities is 100% and data are collected in face-to-face interviews. Our work is based exclusively on data from Indigenous communities.

Unlike the household-level analyses of Aragon (2015) and Pendakur and Pendakur (2018), this study is at the community level, so we ask how community-level average income and community-level income inequality are associated with the attainment of modern agreements. Since all modern agreements reflect changes at the community level or higher, the choice to model at the community level is not restrictive. Since income inequality is a community-level outcome, we feel that this is the right level of analysis.

In 2016 there were 1037 Indigenous Census Subdivisions (CSDs) with more than 1 household. Of these CSDs, 384 were covered by some kind of modern agreement with the Government of Canada. Table 1 provides a summary of the types of agreements and the number of census subdivisions. Note that some CSDs are covered by more than one type of agreement; in particular, there are many CSDs that are covered by opt-in arrangements both under FNLMA and under FNFMA. Consequently, the total number of CSDs reported in Table 1 exceeds the total of 384 CSDs that have at least one modern agreement.

Table 1: List of Agreements by Type Signed Prior to 2015

Type of agreement	Number of agreements	Number of Census Subdivisions (CSDs)	Date Range	Mean date (over
Sectoral SGA	1	19	1999	1999
Standalone SGA	4	14	[1986 , 2011]	2006
SGA with CLCA	14	28	[1995 , 2001]	2009
CLCA	6	68	[1975 , 1994]	1986
OPT-IN LEGISLATION				
(FNLMA)	50	77	[2000 , 2013]	2007
(FNFMA)	138	230	[, 2012]	2009
(FNCIDA)	2	2	2014	2014

* The James Bay and Northern Quebec Agreement and the James Bay Northern Quebec Agreement Cree Portion are considered agreements in this listing.

** This listing excludes Kwanlin Dun (2005) because it was not possible to differentiate impacts upon Indigenous versus non-Indigenous due to the nature of the Census sub-division.

From Table 1, we can see that different arrangements came into force at different times throughout our study period of 1990 to 2015. We use this variation in agreement type across time and space to assess how agreements affect the community-level economic outcomes of Indigenous communities. Modern agreements with effective dates before 1990 do not influence our difference-in-difference estimator.

4.2 Populations of Interest

Our population of interest is a subsample of households living in Indigenous communities. That subsample is defined by households where: at least one member is aged 20 or more; at least one member is aged 64 or less; all members aged 25 or more lived in the same CSD 5 years previously; all sources of household income are reported (that is, non-missing); and there are fewer than 13 people.

Each household has an “Indigenous status” defined by its members’ responses to the Census/NHS Aboriginal identity question. If a household has any member who claims First Nations or Inuit identity, then we call it an Indigenous household. If it does not, then we call it a non-Indigenous household.¹⁷

Our analysis is at the community level, and uses only communities with at least 2 households. We construct community-level averages of household-level data, and use these community-level averages as both regressors and dependent variables. We consider two samples of communities. First, for most of the analysis, we use an unbalanced panel of 5029 CSD-years. In this panel, the Indigenous household variable is equal to the mean of the Indigenous household indicator in that CSD, and so gives the fraction of households in

¹⁷ The Census of Canada asks an Aboriginal identity question, which we use to classify households by Indigenous status. Question 18 of the 2016 Census asks the following for each member of the household: Is this person an Aboriginal person, that is, First Nations (North American Indian), Métis or Inuk (Inuit)? Note: First Nations (North American Indian) includes Status and Non-Status Indians.

If “Yes”, mark the circle(s) that best describe(s) this person now.

- 1: No, not an Aboriginal person. Continue with the next question.
- 2: Yes, First Nations (North American Indian). Go to question 20.
- 3: Yes, Métis. Go to question 20.
- 4: Yes, Inuk (Inuit). Go to question 20.

If any member of the household answered ‘Yes’ to options 2, 3 or 4, we classify the household as an Indigenous household.

that CSD that are Indigenous. Second, for one set of regressions, we break each CSD into two communities, one comprised of its Indigenous households and one comprised of its non-Indigenous households. Because some of these are missing (due to zero populations in our subsample of interest), we end up with an unbalanced panel of 6280 CSD-Indigenous status-year observations. In this panel, the Indigenous household variable is an indicator variable: it is equal to zero for the sample of non-Indigenous households in a CSD and equal to one for the sample of Indigenous households in CSD.

4.3 Methodology

Our objective is to investigate how average income and income inequality in Indigenous communities respond to the attainment of various types of modern agreements. Agreements are defined by geographies over which they are enforced. These geographies are defined at the level of the census subdivision (CSD). In order to use data over a long time period, we used Statistics Canada's CSD concordances to create a dataset with consistent CSD definitions. We then used these to define the geographic areas that were affected by agreements. Then, we matched these CSDs with their residents in the long-form census and NHS databases.

The last step is to aggregate people into communities at the CSD (or CSD times Indigenous status) times year level. We use a subsample of all households in each community, defined as follows. We exclude households comprised entirely of people under 20 years old and households comprised entirely of people over 65 years old, because we want to focus on households that might have a worker. We exclude households with more than 12 members, to exclude institutional dwellings. To limit the effect of in- and out-migration (which might be induced by the attainment of agreements), we include only residents that lived in the same CSD 5 years previously. We exclude individuals who have missing data for total, labour or transfer income (though we retain observations with zeroes for these variables). Finally, because we evaluate income inequality, we require at least 2 households in each CSD (dropping CSDs with just 1 household satisfying the above restrictions). In the Appendix, we consider a subsample requiring at least 10 households in each CSD.

Given this subsample of all households, we take averages of household characteristics within CSDs to form regressors X and take average household income, average log household income and the Gini coefficient of income to form regressands Y .

Let $s=1,\dots,S$ index CSDs for all of the Indigenous CSDs. For some regressions, the index s is defined at the CSD times Indigenous status level.

Let $t=1990,1995,2000,2005,2010,2015$ be the income year for each census/NHS. We note that income data in the census long-form and NHS are for the previous year.

In our main specifications, we consider 3 community-level outcome variables Y_{st} : the community-level average of household total income; the community-level average of the log of household total income; and the community-level Gini coefficient for household total income. We compute the Gini coefficient for each CSD using `fastgini` in Stata.

Let $A_{st} = \{A_{jst}\}_{j=1}^J$ be a vector of dummy variables for the agreement types indexed $j=1,\dots,J$. We code each dummy variable as a 1 if the community had that agreement type in the previous year or earlier. Thus, a community with an agreement of type j in 1995 would have $A_{js,1995}=0$ and $A_{js,2000}=1$. Our J agreement types are those listed Table 1, plus an additional mutually exclusive dummy for attainment of both FNLMA and FNFMA (as in Pendakur and Pendakur 2018). We also consider a longer vector of agreement dummies, supplemented with a 5-year lag for each type of agreement. These variables are equal to 1 if the community had that agreement type 6 or more years earlier. This allows us to evaluate short- versus medium-term effects of agreements on our outcome variables.

We control for a vector of community-level characteristics X_{st} . These are just the community-level averages (over households) of some observed household-level demographic variables: the maximum age of household members (in 10 categories); the maximum education of household members (in 14 categories, matched to 2006 codings which do not include distinguish education levels among high-school non-completers); household size (a dummy for single-member households plus a scalar equal to household size less one); household marital status (5 categories); and household-level official language knowledge (4 categories).

Because we have CSD-dummies in all regressions, we do not include time-invariant characteristics of communities, such as distance from a metropolitan center; such variation is absorbed by the CSD fixed-effects.

Our basic identification strategy is to correlate, at the community level, these economic outcomes Y with the attainment of a modern agreement, conditional on characteristics X . A stumbling block to the interpretation of such correlations is that the different arrangements might be driven by, e.g., the income of community residents rather than the other way around. We get around this problem via a standard “difference in difference” approach. That is, we focus our attention on how *differences* in arrangements for a given community correlate with *differences* in the level of income or income inequality over time for that community. This approach allows us to control for differences across communities that are fixed over time, but which may determine what arrangement they are under. Essentially, we can look at the change in outcome variables for communities that transition into these arrangements, and compare that to the change in outcomes for communities that do not transition into these arrangements over the same period. Further, under the standard identifying assumptions of difference-in-difference analysis (namely, that time trends are similar in communities that attain agreements and communities that do not), we can interpret estimated coefficients as estimates of the causal effect of attainment of a modern agreement on economic outcomes.

To reassure the reader that the time trends really are similar between our control communities, which never attain an agreement, and our treated communities, which do attain some form of modern agreement over our study period, we show pre-trend analysis in Figures 2 and 3. Figure 2 gives the average of the Gini coefficient in CSDs that do not attain a modern agreement before 2016 (“never-treated”), and in CSDs that do attain a modern agreement before 2016 (“ever-treated”). For the latter group, we only include those CSD-years before attaining an agreement (so, it is an unbalanced panel). We present 95% confidence intervals with vertical bars.

In Figure 2, we see that: a) the parallel trends assumption is satisfied at a gross level, in that both lines trend upwards through the period; b) if there is a violation of parallel trends, it is in the early period, before 2001; and c) if there is a violation of parallel trends, it is such that the ever-treated group of CSDs has a steeper time trend for the evolution of income inequality. This last point implies that if there is a bias term polluting our estimates, it is probably a negative bias term, meaning that we could interpret our estimated treatment effects as upper bounds on the true treatment effect.

In Figure 3, we show pre-trends (suppressing confidence intervals) for a few specific agreement types, where we have more than 20 CSDs in at least two census years. Because all the standalone CLCAs were completed by 1996, we cannot estimate a pre-trend for this type. We exclude standalone and sectoral SGAs, and FNCIDA, because there are too few CSDs. Here, we see that CSDs that attained CLCAs in combination with SGAs have a seemingly different pre-trend from the control CSDs. We say “seemingly”, because the 95% confidence interval for this type is 7 percentage points wide in 2006 (the year that deviates from the control trend), so that this is not a statistically significant deviation.

Figure 3 also shows pre-trends for the two opt-in agreements. Here, we see that opt-ins under the FNFMA closely track the control time trend, and that those under the FNLMA track it only 2001 and after. However, given that all the opt-in agreements were implemented after 2001, the more recent years are more relevant for the pre-trend analysis of these agreement types. Thus, we take the parallel trends assumption as roughly corroborated for both opt-ins under the FNFMA and under the FNLMA.

Another strategy used to develop confidence in difference-in-difference estimators is to use an event-study approach, wherein effects are expected to follow, but not precede, treatment. We provide an event-study estimate in Appendix Table A3, discussed briefly in the Discussion section below. The bottom line there is that the event-study is very imprecise in our case, so that strong conclusions cannot be drawn. Nonetheless, we conclude that the estimates for opt-in arrangements are valid, because there is no evidence of effects before treatment. However, the estimates for SGAs and CLCAs should be taken with a grain of salt, because for these agreement types we find some evidence of effects preceding attainment of agreements.

Let α_s be a vector of community fixed effects. These are either a vector of CSD dummies or a vector of CSD*Indigenous dummies. Let δ_t be a vector of year fixed effects (aka: year dummies). Finally, let ε_{st} be a community-level error term. We estimate the linear model defined by

$$Y_{st} = X_{st}\beta + A_{st}\gamma + \alpha_s + \delta_t + \varepsilon_{st},$$

for community-level outcome variables Y_{st} . We weight the least squares estimator by the number of households averaged in each community-year.

We interpret estimated coefficients γ as giving the causal effect of attaining a modern agreement on economic outcomes, subject to the cautions outlined above. We note that because all estimation is at the community level, there can be arbitrary correlation across households within CSD-years. We report standard errors, clustered at the CSD level, which allow for arbitrary correlations over time within communities.¹⁸

5 Results

Table 2 provides descriptive statistics for our dependent variables Y and selected regressors X and for an indicator variable for attainment of any agreement (“treated”). These are weighted averages, where the weights equal the number of households in the CSD. We have 5029 CSD-years spread over 1037 CSDs and 6 years. This is an unbalanced panel because some CSDs have no households in some years. The average household income is \$47,346 and the average Gini coefficient is 0.390. About one-third of CSDs attained a modern agreement at some point during our sample period.

5.1 Community-Level Income and Inequality: Baseline Results

Table 3 shows selected coefficients from 3 regressions assessing the impact of the attainment of a modern agreement on the average level of total income, the average log of total income and the Gini coefficient of total income at the CSD-year level.

In addition to coefficients giving the effects of modern agreements, we report the estimated coefficient on the Indigenous household status variable. In these regressions, this variable is equal to the fraction of households in the CSD which report Indigenous identity. The coefficient on this variable can be interpreted as the association between the fraction of Indigenous households in a CSD and the average (or Gini coefficient) of income for households in that community.

¹⁸ These standard errors may be overly cautious. For example, they allow for correlations within CSDs between observations in 1990 and 2015, even without over-time correlations in between. We have also computed hetero-robust standard errors and Newey-West AR1 standard errors. These are in general smaller than the CSD-clustered standard errors reported in the main text. All headline results are present using these alternative standard errors. The key difference we observe when we use the less cautious standard errors is that the negative impacts on the level of income for the opt-in agreements are strongly (rather than marginally) statistically significant.

The upper left coefficient shown in Table 3 shows the conditional association between average household income in a community and the fraction of households in that community that report Indigenous identity. Here, we see that CSDs with higher fractions of Indigenous households have lower incomes: the estimated coefficient of roughly -3,100 indicates that we would expect a community with a fraction of Indigenous residents 10 percentage points higher than another would have average household income roughly \$310 lower. This is consistent with other research on Indigenous income gaps (see, e.g., Pendakur and Pendakur 2011).

Turning to the estimates of the effect of agreements on average household income, results are broadly consistent with the previous literature. Living in a CSD that attained a Comprehensive land claims agreement is associated with an \$11,000 or \$15,000 increase in household income (depending on whether it is combined with a Self government agreement or not).

In contrast, attainment of opt-in agreements is not associated with increased average incomes at the CSD level. CSDs that attained a Fiscal Management Agreement (FNFMA) or Land Management Agreement (FNLMA) see small, and at best only marginally statistically significant, income losses on the order of \$2,500 to \$3,000.

These results on how modern agreements affect community-level average income are very similar to what Pendakur and Pendakur (2018) found in their household-level analysis of how modern agreements affect incomes. However, our results are based on more Census years and more agreements (especially opt-in arrangements).

The middle columns give the estimated coefficients for the effects of the attainment of an agreement on the conditional mean of log income. Pendakur and Pendakur (2018) note that if income distributions are conditionally log-normal, then the effect on log-income is related to the effect on the median income. They use this to make inferences on how the attainment of agreements affects inequality. In this paper, we instead measure income inequality directly, via the Gini coefficient.

Considering log-incomes, we see a slightly different pattern in how attainment of modern agreements affects incomes. As with average income, both standalone CLCAs and CLCAs in combination with an SGA show substantial income gains of 26% and 30%, respectively. However, for the opt-in arrangements, we see positive but statistically

insignificant point estimates in the neighbourhood of 2% to 3%. That the mean log income is rising (or stable) even though the mean total income is declining (or stable) suggests that inequality decreases with the attainment of an opt-in agreement. We now turn to this issue directly, by asking how the Gini coefficient responds to the attainment of an agreement.

To get a sense of the scale of the Gini coefficient, we note that in Canada, the 2017 Gini coefficients for the pre- and post-tax distribution of income are separated by roughly 14 percentage points.¹⁹ Many of our estimates suggest reductions in the Gini coefficient of roughly 2 to 3 percentage points. Thus, the attainment of modern agreements may have a moderate-sized impact on income inequality in Indigenous communities.

The rightmost column of Table 3 gives estimates of the effect of attainment of a modern agreement on the Gini coefficient for income inequality within a CSD. We observe negative point estimates for all these agreement types, indicating that modern agreements are associated with decreased income inequality in Indigenous communities.²⁰ Most prominently, attainment of either a standalone SGA or an SGA in combination with a CLCA is associated with a roughly 3.5 percentage point decrease in income inequality. However, for a standalone CLCA we see a much smaller impact of roughly 1 percentage point.

Some opt-in arrangements are also associated with decreased income inequality: attainment of an FNLMA, whether standalone or in combination with an FNFMA, results in lower inequality: the estimated impacts for these two types of opt-in arrangements are statistically significant with magnitudes of roughly 2 percentage points.

The bottom line from Table 3 is twofold. First, as seen in the Aragon (2015) and Pendakur and Pendakur (2018), attainment of CLCAs, with or without an associated SGA, may be causally linked with higher average income. And, as seen in Pendakur and Pendakur (2018), opt-in agreements under FNLMA and FNFMA are associated with slightly decreased average incomes and unchanged average log-incomes.

¹⁹ Statistics Canada. [Table 11-10-0134-01 Gini coefficients of adjusted market, total and after-tax income](#)

²⁰ In Appendix Table 1, we show the estimates for the additional included agreement types. Here, we see that attainment of the uncommon agreement types is associated with *increased* inequality. In particular, attainment of a Sectoral SGA or an FNCIDA increases inequality by 3 percentage points. For these types of agreements, we have only a few agreements in the dataset: 1 Sectoral SGA covering 19 CSDs and 2 FNCIDAs, each covering 1 CSD. Thus, these findings are suggestive only. Nonetheless, finding increased inequality for these agreement types is striking.

The second conclusion from Table 3 concerns the effects of the agreements on income inequality. We see strong evidence that attainment of modern agreements reduces income inequality. In particular, CSDs that attain SGAs (with or without associated CLCAs) and that attain opt-in arrangements under FNLMA see a decrease in the Gini coefficient for income inequality of roughly 2 to 3.5 percentage points. A smaller decrease, of roughly 1 percentage point, is seen for communities that attain a standalone CLCA.

5.3 Other Inequality Measures

The Gini Coefficient is a specific measure of inequality, with some nice properties. For example, it is widely used, standard estimators of it (such as ours) are asymptotically normal, and it does not respond to scaling of the income distribution. However, it also has some undesirable properties, for example, its maximum sensitivity is at the median of the distribution. In Table 4, we use several different outcome variables to try to answer the question of how exactly the income distribution responds to the attainment of modern agreements. Here, we consider 4 response variables: a) the log bottom quartile cutoff of total household income in a CSD; b) the log median; c) the log top quartile cutoff; and, d) the log interquartile ratio. Here, we hope to determine if the decreased Gini Coefficients observed in Table 3 are due to increases at the bottom, decreases at the top, or both.²¹

Recall from Table 3 that the Gini coefficient decreased for CSDs that attained a modern agreement. The rightmost column of Table 4 shows that the point-estimate of the response of the log-interquartile range, which may be directly interpreted as a measure of income inequality, is also negative. Thus, we are reassured that the specific choice of the Gini Coefficient as the inequality measure for our baseline estimates is not crucial.

In Table 3 we saw that average income rose, and inequality fell, for CSDs that attained CLCAs, with or without SGAs. In Table 4, we see that this corresponds to all quartiles rising, but the bottom quartile rising faster than the median and top quartile. Specifically, the median and top quartiles rise by about 15% in response to attainment of a

²¹ The asymptotic properties of quantile estimators depend on the density of the income distribution near the quantile of interest. In our CSDs, many of which are small, this density may be low, and these estimators may be ill-behaved. In contrast, weighted means are well-behaved even with small samples. So, in Appendix Table 3, we present estimates for models where the response variables are the arithmetic, geometric and harmonic means of incomes by CSD. These estimates give the same flavour of results as those in Table 4.

CLCA (with or without an SGA). If the bottom quartile rose by the same amount, there could be no change in inequality. But, we find that the bottom quartile rises by 20% and 30% in response to the attainment of a standalone CLCA or a CLCA in combination with an SGA, respectively. Consequently, even though all boats rise with the attainment of these agreements, the bottom rises more than the top, so that inequality declines.

The pattern we observe for opt-in agreements is different, in two ways. First, the point-estimates suggest that the bottom quartile rises at the expense of the top quartile in CSDs that attain opt-in arrangements. That is the source of the decline in inequality we observe in Table 3. Second, the precision of these estimates is very low, so that few of the point-estimates are statistically significant. Indeed, the only statistically significant point-estimates here are for the estimated effects of attaining opt-in arrangements under both the FNLMA and FNFMA. These show that the decline in top incomes and the decline in inequality are statistically significant for this agreement type.

The big picture finding from Table 4 is thus that the key source of decreased inequality due to the attainment of modern agreements is in the relatively large income increases attained by the bottom quartile, compared to those observed at the median or top quartile. Combining these findings with the findings on the effects on log-incomes observed in Table 3, we see that for CLCAs (with or without SGAs), average log-incomes go up, with the bottom quartile of log-income going up more than the upper quartiles. But, the upper quartile still rises. So, attainment of these agreements may benefit households throughout the income distribution. In contrast, opt-in arrangements under the FNLMA are associated with no change in average log-incomes and reduced income inequality. This corresponds to the bottom gaining while the top loses.

5.2 The Timing of Community-Level Gains

In Table 5, we present results on how the responses to the attainment of agreements are spread over time.²² We include a set of dummy variables equal to 1 in all years after 5 years after attainment of an agreement. The interpretation of the reported coefficients on these new regressors is that they give the *additional* effect of an agreement

²² We consider another assessment of the timing of effects in an event study analysis in Appendix Table A2, which we remark on in the Discussion section below.

on household incomes, 5 years on. Thus, we allow for an effect in the *medium term* (more than 5 years after the agreement) that may differ from the *short term* (in the first 5 years). The estimated effect in the short term is given by the coefficient in the upper panel of the table. The estimated effect in the medium term is given by the sum of the coefficient in the upper panel and the coefficient in the lower panel.

Looking at the effects of attaining a CLCA (standalone or with an SGA), the estimated coefficients in the lower panel are statistically significant. Considering the effects on average income and average log-incomes, we see that for standalone CLCAs there are small income gains in the short term, with the lion's share of the overall income gain accruing in the medium term. In contrast, for CLCAs combined with SGAs, the (average and average log-) income gains are attained in the short term, with just a small increase in the medium term.

Turning now to the right-hand columns of Table 5, we consider how income inequality changes over time. For standalone CLCAs, the impact on income inequality occurs in the medium term. The point estimate of the short-term impact is a small, but statistically insignificant, increase of 1 percentage point. However, the medium-term impact shown in the bottom panel is a statistically significant -2.9 percentage points, indicating that the Gini coefficient falls in the medium term. The overall medium-term effect is the sum of these two effects, amounting to a decrease in the Gini coefficient of about 2 percentage points.

Turning to the opt-in arrangements, shown in the lower panel of Table 5, we see that none of the estimated coefficients for the medium term effects are statistically significant. This means that for these agreement types, there is no evidence of a different effect on average income, average log income, or income inequality in the medium term in comparison with the short term.

Table 5 thus adds a bit nuance to our interpretation of Table 3. The results from Table 5 confirm that the most of the effects of attaining of a modern agreement are realized in the short term, and not much changed over the medium. The exception here is for standalone CLCAs, where both the gain in income and the decline in inequality occur mainly in the medium term.

5.3 Within-Group and Inter-Group Inequality

Table 3 showed how community-level overall income inequality responds to the attainment of a modern agreement. However, inequality has both a within-group and inter-group dimension that is important in the context of Indigenous inequality. In particular, we now ask two distinct questions: First, how did the attainment of modern agreements affect the average incomes of Indigenous versus non-Indigenous households at the community level? If Indigenous incomes increase more than non-Indigenous incomes, then part of the decrease in inequality is due to a reduction in inter-group inequality.

Second, we ask: how did the attainment of modern agreements affect within-group inequality for Indigenous residents versus non-Indigenous residents? We can then think of the effects on total inequality reported in Table 3 as being driven by two components: changes in inequality between Indigenous and non-Indigenous residents (inter-group inequality) and changes in inequality within these two groups.

Table 6 presents regression estimates aimed at answering these questions. Here, we break each CSD into two observations, one comprised of its Indigenous residents and one comprised of its non-Indigenous residents. Then, with this larger set of observations, we run regressions identical to those reported in Table 3. Note that, like in Table 3, this regression has CSD-level fixed effects (not CSD*Indigenous-level fixed effects).

Recall that in the regressions reported in Table 3, the Indigenous status regressor is a continuous variable indicating the fraction of households in the CSD that report Indigenous identity. In Table 6, the Indigenous status regressor is a dummy variable indicating whether or not the observation is of the Indigenous or non-Indigenous residents of the CSD. We interact all the agreement attainment variables with the Indigenous status regressor, so that there is a separate estimated effect of attainment for Indigenous and non-Indigenous households in these CSDs.

The top panel of the Table gives estimates for non-Indigenous households, and the bottom panel gives estimates for Indigenous households. The 2nd group of columns gives the difference in the estimates between the top and bottom panels for total household income. This difference is our measure of how attainment of an agreement affects inter-group inequality. A positive value indicates that non-Indigenous households in a given CSD gain more income than do their Indigenous counterparts. Given that Indigenous

households have lower average incomes than non-Indigenous households (see Table 3), a positive value of that difference indicates an increase in inter-group inequality.

Looking first at the estimates for the attainment of a standalone CLCA, we find that non-Indigenous households gain roughly \$22,000 whereas Indigenous households gain only about \$15,000. The second column of Table 6 reports this difference, about \$7000, along with its estimated standard error. In this case, the difference is not statistically significant, so we see no strong evidence of an effect on inter-group inequality. We see similar results on intergroup inequality for SGAs, either standalone or in combination with a CLCA: there is no statistically significant impact on inter-group inequality.

Turning now to the opt-in agreements, we see a somewhat different pattern. Here, we see statistically significant increases in intergroup inequality. Further, the increase in intergroup inequality is driven by positive (but statistically insignificant) effects on the incomes of non-Indigenous households combined with (statistically significantly) negative effects on the incomes of Indigenous households.

Now consider how attainment affects within-group inequality (shown in the rightmost columns of Table 6). For CLCAs in combination with SGAs, we see a statistically significant decrease of roughly 3 percentage points in the Gini coefficient for Indigenous households, but not for non-Indigenous households. For standalone SGAs and standalone CLCAs, we see a statistically significant decrease in inequality for both non-Indigenous and Indigenous households (although the latter estimates are only marginally significant).

For the opt-in agreements, there are no statistically significant effects observed for non-Indigenous households. But, we see (as in Table 3) a statistically significant decrease in inequality for Indigenous households in communities that attain an arrangement under the FNLMA.

In summary, inter-group inequality is an important component for some agreement types. In Table 3, we saw that modern agreements are associated with decreased income inequality. In Table 6, we see that these decreases in overall income inequality for SGAs and CLCAs are not accompanied by any statistically significant change in inter-group inequality. In contrast, for opt-in arrangements, the smaller observed response in overall inequality is actually driven by a combination of *increased* inter-group inequality and decreased within-group inequality.

6 Discussion

The empirical results presented above, especially those in Tables 3 and 4, give our basic story: attainment of modern agreements reduces income inequality in Indigenous communities. But, all of our regressions use the widest possible sample of communities: all Indigenous communities in all Provinces and Territories with at least 2 households, regardless of whether or not they ultimately attain an agreement. We use this large sample in the hopes of yielding the most precise possible estimates. In Appendix Table 1, we consider the robustness of these findings to a variety of sample restrictions, trading off precision for protection against several types of bias. We consider the following subsamples: a) CSDs with at least 10 households (to get a more trustworthy estimate of the Gini coefficient; b) Inuit CSDs only (where no opt-ins were taken up, because SGAs grant greater authority); c) non-Inuit CSDs only; d) CSDs under Historic Treaties only (where CLCAs were not possible, and only opt-ins were taken up); and e) only CSDs that ultimately attained an agreement in our study period (“ever-treated”). The bottom line here is that our major conclusion about the negative association between modern agreements and income inequality is robust to all of these possible subsamples.

The Indian Act is extremely limiting in terms of what can and cannot be done in land use and fiscal matters without asking permission of the Federal Government. Modern treaties offer a way for First Nations and Inuit communities to gain local control over their day to day lives. Self government and comprehensive land claims agreements are only available to bands that have not ceded their traditional territory through an existing treaty. In contrast, opt-in arrangements are attainable by all communities if certain standards are met. These relatively new legal structures (with the first opt-in arrangements signed in 1999) allow communities to opt out of certain sections of the Indian Act. For example, the First Nations Land Management Act of 1999 allows Indigenous communities to manage their own land, resources and environment under their own land codes. Thus, increased levels of decision-making autonomy are possible for all First Nations and Inuit communities if desired.

Modern treaties, however, are not entered into lightly. Self government and comprehensive land claims agreements in particular can take decades to negotiate and cost millions of dollars in legal expenses. Self government agreements also require capacity

building to meet the new fiscal and social service demands. Opt-in arrangements, while much quicker and cheaper to attain, may also require capacity building to meet the demands of new responsibilities.

Pendakur and Pendakur (2018) noted that income responses were observed prior to the attainment of agreements, especially for CLCAs, and attributed this to capacity building in advance of attainment. The best way to estimate such responses is through an event-study, wherein one includes as regressors additional lags and leads, analogous to extending the model of Table 6. In Appendix Table A2, we present event-study estimates for our model, with additional lag regressors for 10 years after attainment, and lead regressors for 10 and 5 years before attainment. The bottom line is twofold. First, the standard errors on the estimated effects on inequality are large in such a saturated model, so we don't learn much from the event-study. Second, while for SGAs and CLCAs, there is some evidence changes in the Gini coefficient in advance of attainment, for the opt-in agreements, we see no evidence changes in Gini coefficient before attainment. This is consistent with an economic environment where SGAs and CLCAs are very costly to attain, but opt-in agreements are less costly to attain.

As noted, while much effort has gone into negotiating agreements, relatively little is known about the economic impacts of such agreements. Aragon (2015) and Pendakur and Pendakur (2018) show that some types of modern agreements raise incomes and employment rates in Indigenous communities. However, the level of income is not the only economic outcome that may be of value to First Nations and Inuit communities. This paper investigates how income *inequality* at the community level responds to the attainment of a modern agreement.

We see strong evidence that the attainment of modern agreements reduces income inequality. In particular, standalone Comprehensive land claims agreements are associated with a decrease in the Gini Coefficient for income inequality of about 1 percentage point. Communities that attain Self government agreements (with or without land claims) see a decrease of roughly 2 to 3.5 percentage points. Finally, indigenous communities that attain opt-in agreements relating to land management see a decrease in the Gini coefficient for income inequality of roughly 2 percentage points. These are large effects: the difference in the Gini Coefficient of the pre-tax income distribution in Canada is roughly 8 percentage

points lower than that of the United States (OECD 2020). These results suggest that increased local control in Indigenous communities results in decreased inequality.

This finding is a reduced form conclusion. We do not illuminate the mechanism(s) by which it occurs. Several mechanisms are possible. First, increased local control might increase community-member participation in decision-making. For example, if local elections are seen to be more meaningful and impactful, due to the greater power for decision-making given to band councils, then more community members might vote and/or stand for election. Either of these channels could influence inequality, much the way that democratization is associated with greater equality (Bonica et al 2013).

Second, increased local control might increase the scope for rent extraction by local actors. For example, the ability to issue debt may be positively associated with local government corruption (Liu et al 2017). However, all the agreements we study require at least some financial reporting and/or accountability, which might mitigate this channel. For example, increased auditing has been found to reduce local government corruption in Brazil (Funk and Owen 2020). However, in this research, we leave the exact channels by which local control and inequality affect each other as avenues for future research.

7 References

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Table 2: Descriptive statistics for sample

		mean	Standard deviation	
Dependent variables	Household income	47,346	25,748	
	Log of hhld inc	10.277	0.503	
	Gini Index	0.390	0.056	
Independent vars	Indigenous hhld	0.79	0.36	
	Hhld size	3.78	0.866	
	Age of oldest hhld member	<i>20-24</i>	<i>0.180</i>	
		25-29	0.036	0.026
		30-34	0.085	0.041
		35-39	0.118	0.045
		40-44	0.130	0.042
		45-49	0.129	0.039
		50-54	0.120	0.038
		55-59	0.109	0.041
		60-64	0.094	0.040
	Highest level of schooling in the hhld	LT highschool	0.309	0.169
		<i>Highschool</i>	<i>0.214</i>	
		Trades	0.166	0.086
		College <1 year	0.040	0.036
		College 1-2 yrs	0.097	0.058
		College 3+	0.054	0.045
		University <BA	0.036	0.033
		BA	0.067	0.055
		BA+	0.001	0.012
		Medicine	0.001	0.004
		MA	0.014	0.020
	PhD	0.002	0.004	
	Marital status	<i>Unmarried no kids no elders</i>	<i>0.178</i>	
		Married no kids no elders	0.130	0.083
		Unmarried w elders	0.024	0.020
		Unmarried w kids	0.155	0.075
Unmarried w kids & elders		0.017	0.017	
Married w elders		0.031	0.026	
Married w kids		0.436	0.083	
Married w kids and elders		0.030	0.026	
Official language	<i>English</i>	<i>0.867</i>		
	French	0.030	0.151	
	Bilingual	0.100	0.061	
	no official language	0.003	0.012	
Treated CSD	0.475	0.499		

Selection: Indigenous Census Subdivisions as defined by DIAND. Left-out category for sets of dummies indicated with *italics*, std dev suppressed.

Source: Drawn from 1991 to 2016 Censuses of Canada and 2011 National Household Survey. In each Indigenous CSD, we include only households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. The covariates are: age; education; household size; marital status; and official language knowledge. Statistics are weighted by the number of included households in the CSD.

Table 3 Selected estimates from baseline regressions

	HHLd income			Log of hhld income			Gini coefficient		
	coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.
Observations	5,029			5,029			5,029		
R2	0.90			0.83			0.60		
Indigenous household	-3,098	8,684		-0.332	0.160	**	0.004	0.019	
SGA	-4,242	3,830		0.048	0.055		-0.033	0.006	***
CLCA	15,235	2,890	***	0.264	0.036	***	-0.012	0.006	**
CLCA+SGA	11,472	4,657	**	0.297	0.066	***	-0.035	0.008	***
FNFMA	-2,459	1,560		0.030	0.039		-0.005	0.005	
FNLMA	-2,820	1,698	*	0.022	0.048		-0.020	0.007	***
FNFMA + FNLMA	-2,930	3,156		0.023	0.038		-0.023	0.012	**

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. The covariates are: age; education; household size; marital status; and official language knowledge. Statistics are weighted by the number of included households in the CSD.

Table 4

Alternative inequality measures of household income

	log bottom quartile cutoff			log median cutoff			log top quartile cutoff			log interquartile ratio		
	coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.
Observations	5,021			5,021			5,021			5,021		
R2	0.79			0.87			0.90			0.50		
Indigenous household	-0.57	0.20	***	-0.44	0.14	***	-0.35	0.12	***	0.22	0.11	**
SGA	0.01	0.05		-0.02	0.04		-0.06	0.07		-0.08	0.07	
CLCA	0.20	0.04	***	0.14	0.03	***	0.16	0.02	***	-0.04	0.03	
CLCA+SGA	0.31	0.07	***	0.18	0.06	***	0.16	0.05	***	-0.15	0.04	***
FNFMA	0.06	0.05		0.02	0.02		0.02	0.02		-0.03	0.04	
FNLMA	0.05	0.07		0.03	0.05		-0.02	0.03		-0.07	0.06	
FNFMA + FNLMA	0.08	0.05		-0.03	0.03		-0.07	0.02	***	-0.15	0.05	***

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. The covariates are: age; education; household size; marital status; and official language knowledge. Statistics are weighted by the number of included households in the CSD.

Table 5 Selected coefficients from regressions with lagged effects

		HHLD income			Log of hhld income			Gini coefficient		
		coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.
observations		5029.00			5029.00			5029.00		
Adj R2		0.91			0.84			0.61		
	Indigenous household	-2,123	8,757		-0.318	0.160	**	0.002	0.019	
After the agreement	SGA	-4,593	3,705		0.053	0.077		-0.032	0.008	***
	CLCA	2,276	1,244	*	0.067	0.040	*	0.011	0.009	
	CLCA+SGA	9,124	4,651	*	0.215	0.070	***	-0.027	0.012	**
	FNFMA	-2,134	1,397		0.045	0.034		-0.006	0.005	
	FNLMA	-1,998	1,494		0.048	0.044		-0.023	0.008	***
	FNFMA + FNLMA	-3,272	2,047		0.063	0.054		-0.032	0.011	***
5 years after the agreement	SGA	2,560	5,005		0.046	0.112		-0.008	0.009	
	CLCA	16,502	3,350	***	0.251	0.030	***	-0.029	0.008	***
	CLCA+SGA	4,965	2,401	**	0.157	0.047	***	-0.017	0.014	
	FNFMA	-312	2,298		-0.067	0.083		0.001	0.009	
	FNLMA	-1,307	2,026		-0.054	0.055		0.005	0.007	
	FNFMA + FNLMA	4,258	7,554		-0.008	0.107		0.022	0.026	

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. The covariates are: age; education; household size; marital status; and official language knowledge. Statistics are weighted by the number of included households in the CSD.

The regressors denoted "after the agreement" equal 1 in all census income years following the agreement

The regressors denoted "5 years after the agreement" equal 1 in all census income years 5 or more years later.

Table 6: Selected coefficients from regressions showing effects for indigenous and non-indigenous populations by agreement type

	HHLd income			Intergroup inequality (+ indicates more cross group inequality)			Log of HHLd income			Gini Coefficient		
	coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.	coef	s.e.	sig.
Indigenous hhlds	-6,478	1,522	**				-0.262	0.034	**	0.046	0.008	**
Non	SGA	-2,208	3,871				0.072	0.061		-0.021	0.008	**
Indigenous	CLCA	22,621	5,187	**			0.366	0.067	**	-0.031	0.011	**
hhlds	CLCA+SGA	8,231	5,558				0.216	0.070	**	-0.015	0.016	
	FNFMA	7,089	4,957				0.167	0.056	**	-0.016	0.017	
	FNLMA	15,961	11,475				0.235	0.111	**	-0.016	0.022	
	FNFMA + FNLMA	6,202	8,840				0.126	0.054	**	-0.026	0.029	
Indigenous	SGA	854	3,458		-3,063	3,833	0.055	0.038		-0.014	0.008	*
hhlds	CLCA	15,251	2,841	**	7,371	5,242	0.258	0.036	**	-0.010	0.006	*
	CLCA+SGA	12,348	4,548	**	-4,117	4,391	0.302	0.068	**	-0.034	0.009	**
	FNFMA	-3,584	1,395	**	10,673	3,322	***	0.018	0.039	-0.003	0.005	
	FNLMA	-4,660	2,265	**	20,621	8,442	**	-0.008	0.055	-0.018	0.008	**
	FNFMA + FNLMA	-5,882	2,274	**	12,084	7,146	*	-0.009	0.044	-0.015	0.010	

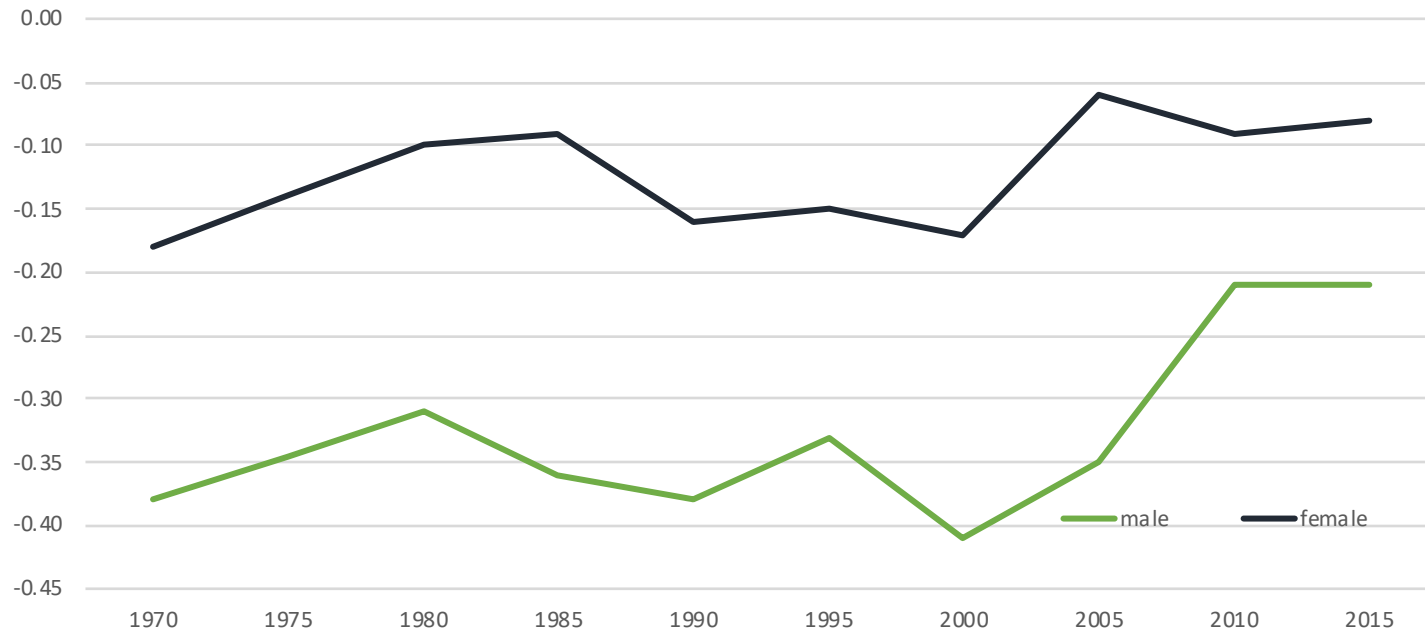
s.e.'s are clustered at the CSD*Indigenous level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. The covariates are: age; education; household size; marital status; and official language knowledge. Statistics are weighted by the number of included households in the CSD.

The regressors also include the reported agreement types in the row headings interacted with either Indigenous status indicator.

The column labeled "Intergroup Inequality" gives the difference between the Indigenous and non-Indigenous treatment effects for household income, and the standard error of that difference.

Figure 1: % earnings differentials Indigenous vs Canadian-born European origin men and women 1970 – 2015, controlling for personal characteristics



Source: 1971-2016 censuses, 2011 NHS

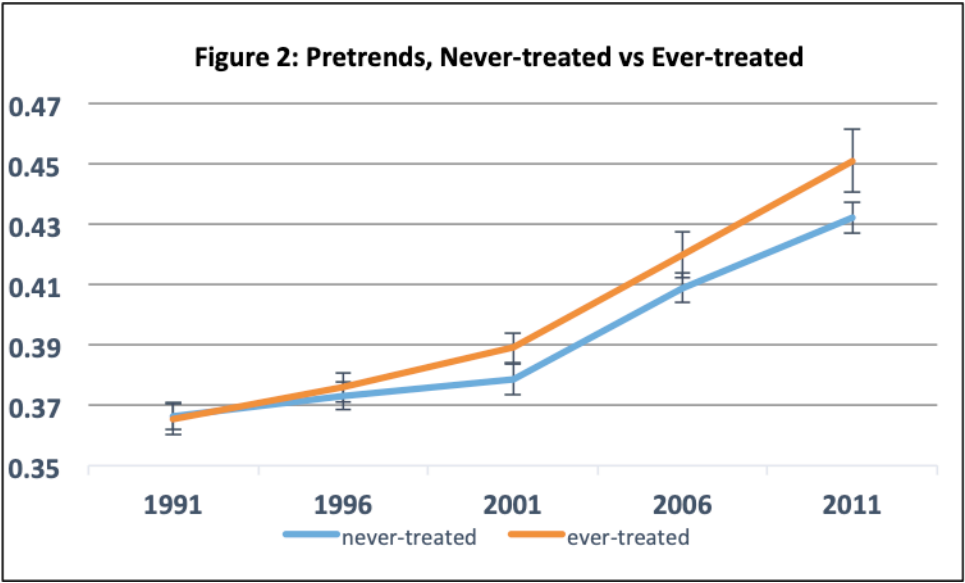
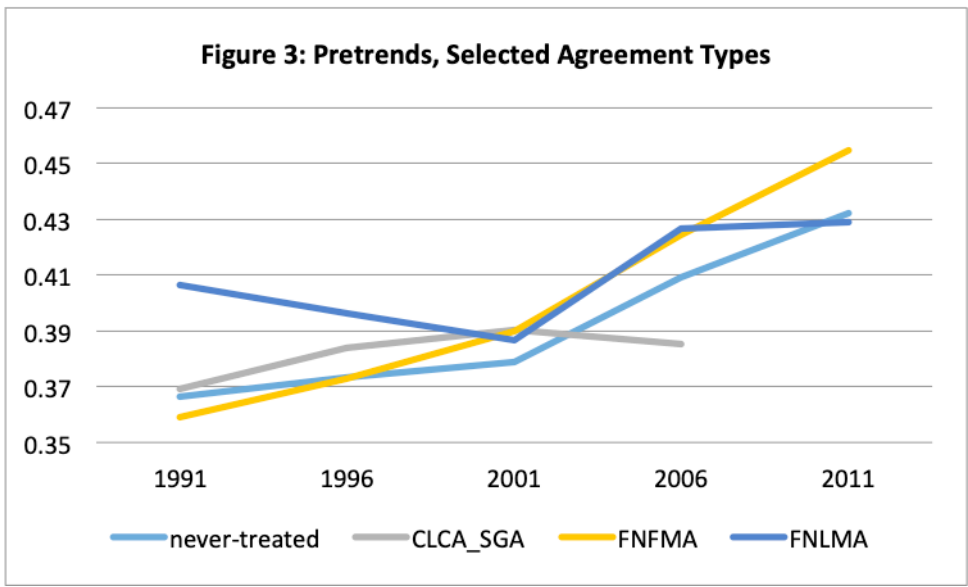


Figure 3: Pretrends, Selected Agreement Types



Appendix table 1: Results for selected samples

sample	control	Household total income		Log of hhd total income		Gini index	
		coef	s.e.	coef	s.e.	coef	s.e.
Inuit	observations	309		309		309	
	Adj R2	0.96		0.95		0.72	
	Aboriginal hhd	-11,635	8,692	-0.345	0.153	0.081	0.029
	CLCA	3,713	2,504	0.059	0.044	0.013	0.008
	CLCA+SGA	-7,648	3,701	0.046	0.061	-0.024	0.016
Not Inuit	observations	4,720		4,720		4,720	
	Adj R2	0.91		0.81		0.61	
	Aboriginal hhd	-6,907	8,890	-0.361	0.171	0.004	0.020
	Sectoral SGA	-7,079	1,810	-0.230	0.116	0.031	0.017
	SGA	157	2,519	0.089	0.047	-0.037	0.006
	CLCA	10,635	3,861	0.315	0.086	-0.050	0.013
	CLCA+SGA	15,094	6,201	0.320	0.086	-0.035	0.008
	FNFMA	346	1,344	0.059	0.038	-0.008	0.005
	FNLMA	-364	1,693	0.056	0.049	-0.023	0.008
	FNFMA+FNLMA	734	2,995	0.060	0.037	-0.026	0.011
historic treaties	observations	2,253		2,253		2,253	
	Adj R2	0.94		0.81		0.59	
	Aboriginal hhd	3,400	13,063	-0.092	0.199	-0.043	0.024
	FNFMA	1,195	1,428	0.072	0.057	-0.005	0.006
	FNLMA	1,139	1,691	0.108	0.042	-0.028	0.008
FNFMA+FNLMA	438	2,069	0.123	0.079	-0.024	0.013	
More than 10 households observed in each CSD in our sample	observations	4,206		4,206		4,206	
	Adj R2	0.90		0.84		0.62	
	Aboriginal hhd	-2,292	9,709	-0.334	0.178	0.012	0.020
	Sectoral SGA	-9,006	1,762	-0.256	0.109	0.035	0.016
	SGA	-4,024	4,005	0.05	0.06	-0.031	0.01
	CLCA	14,761	2,759	0.257	0.035	-0.011	0.006
	CLCA+SGA	11,256	4,736	0.294	0.067	-0.035	0.008
	FNFMA	-2,404	1,548	0.031	0.040	-0.005	0.005
	FNLMA	-2,798	1,710	0.024	0.048	-0.020	0.007
FNFMA+FNLMA	-2,786	3,216	0.023	0.040	-0.022	0.012	
treated only	observations	1,887		1,887		1,887	
	Adj R2	0.90		0.85		0.65	
	Aboriginal hhd	-6,972	7,467	-0.481	0.161	0.044	0.023
	Sectoral SGA	-14,816	2,233	-0.324	0.100	0.040	0.015
	SGA	-14,368	4,985	-0.059	0.057	-0.018	0.010
	CLCA	11,059	2,595	0.23	0.04	-0.007	0.01
	CLCA+SGA	3,460	4,621	0.208	0.072	-0.027	0.009
	FNFMA	-11,960	2,466	-0.076	0.045	0.004	0.006
	FNLMA	-9,437	2,336	-0.051	0.049	-0.015	0.009
	FNFMA+FNLMA	-13,615	3,954	-0.098	0.043	-0.012	0.013
Baseline with all coefficients	observations	5,029		5029.000		5029.000	
	Adj R2	0.90		0.83		0.60	
	Aboriginal hhd	-3,098	8,684	-0.332	0.160	0.004	0.019
	Sectoral SGA	-9,023	1,710	-0.255	0.109	0.034	0.016
	SGA	-4,242	3,830	0.048	0.055	-0.033	0.006
	CLCA	15,235	2,890	0.264	0.036	-0.012	0.006
	CLCA+SGA	11,472	4,657	0.297	0.066	-0.035	0.008
	FNFMA	-2,459	1,560	0.030	0.039	-0.005	0.005
	FNLMA	-2,820	1,698	0.022	0.048	-0.020	0.007
	FNFMA+FNLMA	-2,930	3,156	0.023	0.038	-0.023	0.012
FNCIDA	10,281	9,820	0.010	0.205	0.034	0.010	

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. Statistics are weighted by the number of included households in the CSD.

The covariates are: age; education; household size; marital status; and official language knowledge.

The regressors also include the reported agreement types in the row headings.

each horizontal panel of the table is for a different (self-explanatory) subsample of CSDs. *Historic Treaties* CSDs are those in AB,SK,MN,ON,PEI and NB. *Treated only* CSDs are those CSDs that attain an agreement between 1990 and 2015.

Baseline with all coefficients reports treatment effects for the Sectoral SGA and for the 2 opt-ins under FNCIDA.

Appendix table 2: event study

		Household total income		Log of hhld tot income		Gini index	
		coef	s.e.	coef	s.e.	coef	s.e.
	observations	5,029		5,029		5,029	
	Adj R2	0.91		0.84		0.61	
SGA	10 yrs prior	-3,869	5,016	-0.235	0.272	0.024	0.049
	5 years prior	-1,486	2,087	0.158	0.212	-0.028	0.037
	after agreement	-2,501	4,167	0.045	0.097	-0.029	0.013
	5 years after	8,343	6,366	0.073	0.172	0.009	0.023
	10 years after	-11,370	3,802	-0.014	0.110	-0.036	0.013
CLCA	after agreement	2,698	1,206	0.075	0.040	0.009	0.009
	5 years after	1,223	1,574	0.028	0.028	-0.013	0.007
	10 years after	20,660	3,191	0.294	0.031	-0.020	0.007
CLCA+SGA	10 yrs prior	4,995	2,244	0.039	0.044	-0.001	0.011
	5 years prior	6,446	4,029	0.184	0.075	-0.019	0.011
	after agreement	3,278	2,254	0.084	0.038	-0.013	0.011
	5 years after	6,120	2,228	0.122	0.038	-0.007	0.013
	10 years after	-482	3,578	0.156	0.074	-0.034	0.017
FNFMA	10 yrs prior	-2,122	1,035	-0.057	0.045	0.008	0.008
	5 years prior	-2,899	1,166	-0.068	0.048	0.014	0.009
	after agreement	1,127	1,410	0.122	0.050	-0.019	0.008
	5 years after	-182	2,340	-0.064	0.084	0.001	0.009
FNLMA	10 yrs prior	-177	1,265	0.002	0.038	-0.009	0.010
	5 years prior	-2,532	1,742	-0.016	0.059	0.007	0.010
	after agreement	-190	1,411	0.060	0.049	-0.025	0.010
	5 years after	183	2,329	-0.041	0.055	0.010	0.009
	10 years after	-2,405	3,950	-0.009	0.087	-0.011	0.015
FNFMA+FNLMA	10 yrs prior	806	1,937	-0.042	0.065	0.012	0.013
	5 years prior	-2,908	2,489	-0.017	0.071	-0.009	0.012
	after agreement	-1,499	2,410	0.089	0.063	-0.029	0.013
	5 years after	5,277	7,659	0.005	0.105	0.022	0.025

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. Statistics are weighted by the number of included households in the CSD.

The covariates are: age; education; household size; marital status; and official language knowledge.

The regressors also include the reported agreement types in the row headings.

The regressors denoted "10 years prior" equal 0 in all census income years before 10 years before the agreement, 1 otherwise.

The regressors denoted "5 years prior" equal 0 in all census income years before 5 years before the agreement, 1 otherwise.

The regressors denoted "after the agreement" equal 1 in all census income years following the agreement, 0 otherwise.

The regressors denoted "5 years after the agreement" equal 1 in all census income years 5 or more years later, 0 otherwise.

The regressors denoted "10 years after the agreement" equal 1 in all census income years 5 or more years later, 0 otherwise.

Appendix table 3: other measures

	Household total income		HHLd tot inc geometric mean		HHLd tot inc harmonic mean	
	coef	s.e.	coef	s.e.	coef	s.e.
observations	5,021		5,021		5,021	
Adj R2	0.90		0.88		0.61	
hhabor	-3,030	8,715	-3,217	5,261	-640	3,833
SGA	-4,238	3,828	316	2,908	-1,444	1,425
CLCA	15,239	2,888	13,728	2,694	3,211	1,799
CLCA+SGA	11,467	4,651	12,059	3,308	10,546	3,546
FNFMA	-2,494	1,561	-2,491	1,319	-2,353	885
FNLMA	-2,819	1,697	-1,474	1,770	-924	1,904
FNFMA+FNLMA	-2,929	3,155	-1,815	1,972	-2,018	1,835

s.e.'s are clustered at the CSD level. Stars indicate statistical significance: *: 0.10; **: 0.05; ***: 0.01

The column headings give the regressand; each regression includes as regressors CSD-level averages of covariates averaged over the subsample of households satisfying: at least one member is aged 20-64; resided in the same CSD 5 years previously; all income sources reported; and <13 people. Statistics are weighted by the number of included households in the CSD.

The covariates are: age; education; household size; marital status; and official language knowledge.

The regressors also include the reported agreement types in the row headings.