The Effects of Modern Treaties and Opt-In Legislation on Household Incomes in Aboriginal Communities

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Abstract We use data from the Canadian Censuses (1991–2006) and National Household Survey (2011) to examine how household incomes vary across Aboriginal communities with and without modern agreements. These agreements include self-government, comprehensive land claims and opt-in legislation regarding financial and land management authority. Using a difference-in-difference regression methodology, we find that standalone comprehensive land claims agreements, both with and without associated self government agreements, are associated with income gains for Aboriginal households, primarily through increased labour income. Joint opt-in arrangements combining fiscal and land management authority are associated with smaller income gains. But, other agreement types are not associated with increased household incomes. We also find evidence of continued income growth for CLCAs in the medium term. Finally, we find that income gains—where they are found—are much larger for non-Aboriginal households than for Aboriginal households.

Keywords Aboriginal self-governance · Household income · Aboriginal agreements

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1 Introduction

In Canada, more than 1.4 million people (about 4.3% of the population) identify themselves as Aboriginal, that is, First Nations, Inuit or Metis (Statistics Canada 2015: 3).[1] More than 300,000 live in Aboriginal communities (Statistics Canada 2013), which include reserves and other non-urban communities with mainly Aboriginal populations. Aboriginal people are the focus of substantial policy attention: the federal government directly spends nearly $9 billion on Aboriginal programs and affairs (AANDC 2015: 13). In spite of this, the economic outcomes of Aboriginal people have generally been poor. Aboriginal people have low education attainment (AANDC[2] 2009; Dharia 2013; Feir 2015), low labour force participation rates and incomes (Gingrich 2009; Pendakur and Pendakur 2011; Hossain and Lamb 2012; Lamb 2015), and low life expectancy (Statistics Canada 2010; Dharia 2013). Aboriginal policy consequently finds itself in the spotlight of public attention in Canada (see, e.g., Richards 2006).

A key feature of Aboriginal life and policy in Canada is the reserve system. Since its inception a century ago, the Indian Act of 1869 and its subsequent revisions (Milloy 2008) have regulated the way in which land use and social services are managed within Aboriginal communities. For example, because land is defined as communal property under the Indian Act, it is not possible to sell, lease, or mortgage land on reserve without special exemption. Social services such as health, education and welfare are also defined and controlled by the Department of Indian Affairs and Northern Development (now known as Indigenous and Northern Affairs Canada). Working within the Indian Act can thus severely limit financial and social opportunities for people living in Aboriginal communities.

There are a small number of legal paths that allow Aboriginal communities to work outside the Indian Act. This paper investigates which of these paths offer the greatest income benefits for Aboriginal people living in Aboriginal communities in Canada.

The legal paths outside the Indian Act include: self-government agreements (SGAs), comprehensive land claims agreements (CLCAs), and opt-in arrangements including the First Nations Land Management Act (FNLMA), the First Nations Financial Management Act (FNFMA).[3] There is substantial scholarship in law regarding the legal arrangements governing the relationships between bands/reserves and the national government (e.g., Hurley and Wherrett 1999; Abele and Prince 2006; Nelles and Alcantara 2011; Samson 2016), but not much targeted specifically at how such arrangements affect household incomes. Similarly, there is substantial scholarship on Aboriginal incomes (see, e.g., Pendakur and Pendakur 2011, Feir 2011, 2013; Lamb 2013), but little focus on how incomes relate to the institutional arrangements prevailing in Aboriginal communities.

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[1] We will use the word "Aboriginal" throughout this paper as an adjective describing people who report Aboriginal identity on Census and National Household Survey questionnaires. This includes Metis, First Nations and Inuit respondents.

[2] The federal government department responsible for registered Indians has changed its name several times over the past 2 decades. We will use AANDC, referring to Aboriginal Affairs and Northern Development Canada, throughout this document. The current name of the department, useful for web searches is Indigenous and Northern Affairs Canada, but its legal name, used e.g. for contracting, is Department of Indian Affairs and Northern Development.

[3] One other legal path exists: in 2005, Parliament passed the First Nations Commercial and Industrial Development Act. However, no communities used this Act prior to 2011, so we cannot assess it in this paper. We will henceforth treat the legal paths listed in the main text as the full set of options available to First Nations wishing to change their legal relationship with the Government of Canada.

Aragón ([2015](#)) is the only paper that investigates how Aboriginal household incomes relate to the legal arrangements between Aboriginal bands and the Government of Canada. Using census data from 1991 to 2006, Aragon established that CLCAs in BC, Yukon and NWT raised incomes in communities that attained CLCAs. But, the effects of other agreement types, the effects of agreements elsewhere in Canada, and the effects of agreements implemented after 2005 remain unstudied. These dimensions represent the value added of the present paper.

We use data from the Canadian Censuses (1991–2006) and National Household Survey (2011) to examine how household incomes vary across Aboriginal communities with and without agreements that work outside the Indian Act. In contrast with Aragon who investigates only CLCAs, we consider 7 distinct types of agreements. We consider agreements that came into force after 2005 and agreements outside the North and West of Canada, thus extending the time frame and spatial extent of analysis relative to Aragón ([2015](#)).

We find that not all agreements are correlated with higher household incomes. In particular, standalone CLCAs and CLCAs in combination with SGAs deliver income gains for Aboriginal households, primarily through labour income. Further, joint opt-in arrangements combining FNLMAs and FNFMAs deliver smaller income gains. But, other agreement types are not associated with increased household incomes. Interestingly, we find that income gains—where they are found—are much larger for non-Aboriginal households than for Aboriginal households. Since the target of policy is Aboriginal peoples, this distinction is quite important.

2 Modern Agreements

There is a substantial economic literature on American institutions governing the relationships between Native Americans and the Federal Government of the United States (see, e.g., Cornell and Kalt [1992](#); Anderson and Parker [2008](#), [2009](#)). In Canada, the literature is smaller. Morse ([1984](#)) is a very early study of self-governing arrangements in Canada and Australia, preceding the implementation of most self-government agreements in Canada. This paper argued that the Australian experience, which was generally positive, could inform Canadian self-government initiatives. Frideres ([1996](#)) describes how the perceptions and expectations of self-government varied across different actors. A common thread is the desire to achieve greater autonomy and control over one's life. He argues that the focus of self-government agreements "should be how these strategies are to be employed, how these structures fit into Canadian law and how the process and structure will meet the needs of those it was set up to serve" (Frideres, p. 262).

Self-governance agreements set out arrangements for Aboriginal groups to govern their internal affairs and assume greater responsibility and control over decision-making that affects their communities. According to the Federal government, self-government agreements '…remain the most comprehensive way of addressing Aboriginal rights and title' (AANDC [2012](#)).

Comprehensive land claims agreements, the first of which were signed in 1975, deal with the unfinished business of treaty making in Canada. Such claims arise where Aboriginal land rights have not been dealt with by past treaties or other legal means (AANDC [2016](#)). These 'modern' treaties are implemented through legislation and the rights they embody are protected under the constitution.

The lead-time to negotiate SGAs or CLCAs is substantial, measured in decades. SGAs and CLCAs are negotiated in large part because communities have demanded the right to self-determination, either in whole or in part.

For communities not interested or able to pursue these avenues, opt-in arrangements can provide First Nations with the means to opt-out of certain provisions of the *Indian Act* and opt-into alternative arrangements. The First Nations Land Management Act and the First Nations Fiscal Management Act allow communities to control land or fiscal management, resulting in the ability to lease, mortgage or issue bonds on communal property.[4] Communities governed by the Indian Act may have no opt-in arrangements, one of them, or both of them.[5]

2.1 Self-Government Agreements and Comprehensive Land Claims Agreements

Self-government agreements set out arrangements for Aboriginal groups to govern their internal affairs and assume greater responsibility and control over the decision-making that affects their communities. In general, self-government agreements address the structure and accountability of Aboriginal governments, their law-making powers, and financial arrangements as well as their responsibilities for providing programs and services to their members. There are three main types of SGAs: standalone SGAs; sectoral SGAs that cover only a particular sector (of which there is only one, covering only education); and SGAs associated with CLCAs.

In all, 17 SGAs were in place by the end of 2010.[6] Of these, we had no observations of census respondents for 2 SGAs (Tr'ondëk Hwëch'in and Little Salmon/Carmacks), and 1 SGA covered the city of Whitehorse and so is excluded because it is not an Aboriginal community. This leaves 14 SGAs that were implemented during our data frame covering 1991–2011 and for whom we observe some households before and after transition.

Most SGAs were negotiated in combination with CLCAs. In our data, we observe 12 transitions to SGAs with CLCAs. The first of these date to the mid-1990s, the last to 2009. The majority of these are connected to the Yukon First Nations Umbrella Agreement; other signatories are located in British Columbia, Newfoundland and Labrador, and the Northwest Territories (see Table 1).

Stand-alone SGAs provide for the exercise of self-government outside a CLCA over a wide range of subject matters. Two stand-alone SGAs had been negotiated by 2010, both in British Columbia. The Sechelt First Nation was the first to reach such an agreement, in 1986; Westbank First Nation followed in 2004.[7] Thus only for the Westbank stand-alone SGA do we observe the transition to the agreement in our data time frame.

There has only been one sectoral SGA. The Mi'kmaq Education Acts (federal and provincial) served to replace *Indian Act* provisions with respect to education for 10 First Nations in Nova Scotia when passed in 1999.

CLCAs can either be standalone or in combination with a self-government agreement (as described above). CLCAs without self-government agreements provide for administrative or participatory roles in resource management regimes for Aboriginal signatories.

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[4] Brinkhurst and Kessler (2013) investigate how the FNLMA affects land use but not household incomes.

[5] First Nations Commercial and Industrial Development Act (2006) allows the federal government to produce regulations for complex commercial and industrial development projects on reserves https://www.aadnc-aandc.gc.ca/eng/1100100033561/1100100033562. However this type of arrangement is too recent for us to assess.

[6] In 2011, the Maa-nulth Final Agreement was reached in British Columbia (B.C.). Two other B.C. First Nations, Yale and Tla'amin (Sliammon), will see their agreements come into effect in 2016.

[7] The Sioux Valley Dakota Nation (Manitoba) Self-Government Agreement came into effect in 2014.

Table 1 Type of agreement or arrangement, year and number of census subdivisions, as of 2010. *Source*: AANDC, EPMRB

Type	Name	Year	Number CSDs (2011)	Transition observed in time frame
Self-government agreements (SGAs) (n = 15 signatories/signatory groups)				
Comprehensive land claims agreements with SGAs	Teslin Tlingit	1995	3	Yes
	Champagne and Aishihik		4	Yes
	Nacho Nyak Dun		1	Yes
	Vuntun Gwitch'in		1	Yes
	Selkirk	1998	1	Yes
	Nisga'a	2000	1	Yes
	Ta'an Kwach'an	2002	1	Yes
	Kluane	2004	1	Yes
	Carcross Tagish	2005	3	Yes
	Tlicho		4	Yes
	Labrador Inuit		5	Yes
	Tsawwassen	2009	1	Yes
Stand-alone SGAs	Sechelt	1986	2	
	Little Salmon/Carmacks	1998	1	
	Tr'ondëk Hwëch'in		1	
	Westbank	2004	2	Yes
	Kwanlin Dun	2005	1	
Sectoral SGA	Mi'kmaw Kina'Matsui	1999	19	Yes
Total SGA census-subdivisions			49	17
Comprehensive Land Claims Agreements (n = 6 signatories/signatory groups)				
	James Bay Northern Quebec Agreement (JBNQA)	1975	32	
	NE Quebec	1978	1	
	Inuvialuit	1984	6	
	Gwich'in	1992	4	Yes
	Nunavut	1993	31	Yes
	Sahtu Dene and Métis	1994	5	Yes
	Nunavik (same CSDs as Nunavut)	2008	31	
Total CLCA census-subdivisions			79	40
Opt-in Legislation				
First Nations Land Management Act (n = 35 First Nations)		1996	2	Yes
		1999	2	Yes
		2000	2	Yes
		2002	6	Yes
		2003	7	Yes
		2004	4	Yes
		2005	15	Yes
		2007	4	Yes
		2008	3	Yes

Table 1 continued

Type	Name	Year	Number CSDs (2011)	Transition observedin time frame
		2009	7	Yes
		2010	9	
First Nations Fiscal Management Act (n = 59 First Nations)		2007	57	Yes
		2008	32	Yes
		2009	3	Yes
		2010	11	
Total opt-in census-subdivisions			164	144

To date, CLCAs have incorporated (among other things) 600 thousand square kilometers of land, capital transfers of $3.2 billion, access to resource development opportunities and participation in resource management decision-making.[8]

Seven CLCAs without self-government agreements were signed between 1976 and 2010 in Quebec, the Northwest Territories and Nunavut.[9,10] However, three were implemented before 1991, leaving three agreements whose implementation occurred in our window, and the Nunavik CLCA covered the same geographic area as the Nunavut CLCA, so we don't consider it to be a change in status. Thus, we have 3 transitions to CLCA observed in our data time frame.

2.2 Opt-In Legislation: First Nations Land Management Act and First Nations Fiscal Management Act

2.2.1 First Nations Land Management Act

The First Nations Land Management Act (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. Under the terms of the related First Nations Framework Agreement, which the Act ratified, First Nations must develop land codes and they must include rules for environmental assessment and protection and matrimonial real property laws on reserves.

According to AANDC (2013a, b), these powers and actions are expected to lay the groundwork for expanded economic development on reserves and business partnerships with the private sector.[11] By 2010, 35 First Nations had signed on. The majority of these communities are located in British Columbia; other participating communities are located in Saskatchewan, Manitoba and Ontario.

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[8] https://www.aadnc-aandc.gc.ca/eng/1100100030577/1100100030578.

[9] The 2008 Nunavik agreement covers the same CSDs as the earlier 1993 Nunavut agreement, so we don't consider it as a separate standalone CLCA.

[10] 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.

[11] http://www.aadnc-aandc.gc.ca/eng/1323350306544/1323350388999, date modified: 2013-07-05, accessed 2015-01-2015.

2.2.2 First Nations Fiscal Management Act

The First Nations Fiscal Management Act (FNFMA), enacted in 2005, was sponsored by, and jointly developed with, a number of First Nations. It addresses enhancements to First Nation property taxation practices, creates a First Nation bond-financing regime and supports First Nations capacity in financial management. The goal is to provide First Nations with a range of practical tools available to other governments for modern fiscal management. Fifty-nine First Nations opted into the FNFMA between 2007 and 2010.[12] As with the FNLMA, the majority of communities opting are in from B.C., with others are located in Alberta, Saskatchewan, Manitoba, Ontario and the Atlantic Region.

Notably, by 2010 many first nations had opted in under both FNLMA and FNFMA. Thus, in our empirical work below, we consider 3 arrangements: opting in under the FNLMA or the FNFMA, or opting in under both.

2.3 Timing and Locations of Agreements

Census subdivisions (CSDs) are Statistics Canada's geographical classification for communities across Canada. We use CSD indicators to indicate the community of residence of people in our datasets, and to determine which people live under which kind of agreements. We use the word "community" and CSD interchangeably throughout this paper.

Table 1, below, provides the timing and number of CSDs affected by agreements or opt-in legislation. One can see from Table 1 that different arrangements came into force at different times throughout our study period of 1991–2011. Because our income data are for the previous year, and because implementation dates can be at the end of a year, we are able to get before-and-after variation only for agreements that were implemented between 1989 and 2009 inclusive. For example, most CLCAs came into force in the 1990s or earlier, but most opt-ins came into force in the 2000s. We use this variation in agreement type across time and space to assess how agreements affect the household incomes of residents of Aboriginal communities.

3 Methodology

Our objective is to investigate how the economic outcomes of households in Aboriginal communities differ across communities with different types of agreements with the Federal Government of Canada. We use variation in household incomes between communities with agreements and those without, and the over-time difference in household incomes as communities attain agreements.

AANDC identified 1082 Aboriginal CSDs in 2006.[13] This list was matched to a table identifying the type of agreement, or legislation that a CSD had at each point in time (Table 1 provides this list of agreements). 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 based on 2011 CSD names and numbers.[14] We then used these to define the

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[12] AANDC, https://www.aadnc-aandc.gc.ca/eng/1393512745390/1393512934976, Accessed 2015-02-09.

[13] The list of CSDs was drawn from a table showing the Community Well Being Index for each municipality in Canada (https://www.aadnc-aandc.gc.ca/eng/1100100016649/1100100016651). This table identifies Census Subdivisions as being either First Nations, Inuit, or Other.

[14] Geocode concordance tables are available at: http://www.statcan.gc.ca/concepts/concordances-classifications-eng.htm.

geographic areas that were affected by agreements. We note that we use the 2006 definitions of Aboriginal CSDs and keep them fixed over time. Consequently, the number of CSDs associated with a given agreement is fixed over time (because we use the 2006 definitions in all time periods).

We consider outcomes of people living in Aboriginal communities with 7 types agreements (plus those with no agreement outside the Indian Act):

1. sectoral self-government agreement,
2. standalone self-government agreement,
3. self-government agreement with comprehensive land claims agreement,
4. standalone comprehensive land claims agreement,
5. first nations financial management agreement,
6. first nations land management agreement, and
7. both FNFMA and FNLMA.

Our dependent variables of interest are household-level measures of total income, labour income, transfer income and other income. Our basic identification strategy is to correlate these outcomes with the type of agreement in the community of residence. A stumbling block to the interpretation of such correlations is that the different agreements might be driven by unmeasured factors that affect both outcomes and the probability of attaining agreements. For example, the level of economic development in a community might affect both of these, and might thus induce a correlation between them. But, that correlation would not indicate the effect of the attainment of an agreement on household incomes.

We get around this problem via a standard "difference in difference" approach. That is, we focus our attention on how *differences* in agreements in force over time in a given community correlate with *differences* in the income of households in these communities over time. This approach allows us to control for differences across communities that are fixed over time, but which may determine what agreement they are under. Essentially, we can look at the change in household income in communities that transition into these agreements, and compare that to the change in household income in communities that do not over the same period.

To use a medical analogy, the idea of the difference-in-difference estimate is to consider implementation of an agreement as a *treatment* and to use the pre-implementation state as the *control*. We can then distinguish the treatment effect from a time effect by comparing the over-time change in the outcome variable in a treated community to the over-time change in the outcome variable in an untreated community. Additionally, we control for other observed household-level covariates that affect household incomes.

Our formal model is as follows. Let $s = 1, ..., S$ index all of the CSD numbers of Aboriginal communities as defined by AANDC. Let $t = 1990, 1995, 2000, 2005, 2010$ be the income year for each census or NHS. We note that income data in the census long-form and NHS are for the previous year. We also note that, unlike in non-Aboriginal communities where these data sources are sample surveys, both the Census and NHS questionnaires were administered to every household in Aboriginal communities.

Let $i = 1, ..., N$ index all the households in the repeated cross-sections formed by the census long-form and NHS databases. Although there are some individuals who fill out census long-forms in multiple years, we do not attempt to link them to make a true panel because household membership changes over time.

Let $T_{st} = \{T_{jst}\}_{j=1}^{7}$ be a vector of dummy variables for the agreement types indexed $j = 1, ..., 0.7$. These are indicator variables that a community has attained an agreement of

type {Sectoral SGA, SGA, SGA + CLCA, CLCA, FNFMA, FNLMA or FNFMA & FNLMA}. Agreements vary at the level of the community and year. We code each dummy variable as a *1* if the community had an agreement or legislation of that type whose effective date was in the previous year or earlier. Thus, a community with an agreement of type j whose effective date was 1995 would have $T_{js,1995} = 0$ and $T_{js,2000} = 1$. We note that T_{st} is a vector of zeroes for households in communities that do not have any type of modern agreement or opt-in provision. Thus, all 7 dummy variables are included in the regression. Additionally, we run regressions with an indicator of whether or not a community has an agreement of any of the 7 types.

Let X_{ist} be a vector of household-level covariates. These are: Aboriginal identity equal to 1 if any member of the household reports Aboriginal identity, denoted A_{ist}; age of the oldest household member (in 9 categories); highest education level of the most educated household member (in 12 categories, matched to 2006 codings which do not distinguish education levels among high-school non-completers); household size (as a scalar); household type (a combination of marital status, and presence of children or elders, in 9 categories); and official language knowledge (4 categories, indicating whether any member speaks English or French, whether some member speaks both, or whether no member speaks either). Because we have community-dummies (that is, CSD dummies), we do not include time-invariant characteristics of communities, such as distance from a metropolitan centre.

We run regressions of the form

$$Y_{ikst} = X_{ist}\beta_k + T_{st}\gamma_k^{NA}(1 - A_{ist}) + T_{st}\gamma_k^A A_{ist} + \alpha_{ks} + \delta_{kt} + \varepsilon_{ikst}$$

for household-level outcome variables Y_{ikst}, where $k = 1, …, 4$, for total household income and for each of its sources: labour income (deriving from wages and salaries and self-employment); transfer income; and other income.

We estimate regressions both on the level of each dependent variable, and on the natural logarithm of each dependent variable. Coefficients from level regressions may be read as giving the dollar response of the dependent household income variable to a change in the regressor. Coefficients from logged dependent variable regressions may be read as approximately giving the percentage response of the dependent household income variable to a change in the regressor. Since all of our treatment regressors are binary (that is, indicator variables), the coefficients from level and logged regressions give the approximate dollar and proportionate response, respectively, of the dependent variable to "switching on" one of the treatment variables. Although many researchers prefer log income regressions (usually in deference to the Mincer model), for this application, we tend to prefer unlogged income regressions because they exactly decompose into income sources (as described below).

It is important to note that these two regression specifications may not give coefficients with the same sign. If incomes are distributed conditionally log normally, the coefficients from the log and level regressions may be interpreted more structurally. In that case, we may take the coefficient from the logged regression to indicate the proportionate effect on the *median* income, and the coefficient on the level regression to indicate the effect on *mean* income. Because the mean and the median of the lognormal are related by mean = median * exp(variance/2), the coefficient from the level regression gives a mix of the median effect and the inequality effect (aka: the variance effect). For example, with conditionally lognormal incomes, if treatment decreases income inequality without changing average income, this means that the variance goes down and the median goes up enough to keep the mean fixed. Thus, the level regression will show a zero (no effect on the conditional mean of income) but the log regression will show a positive indicating an

increase in median income. We will keep the lognormal interpretation in mind when we find log and level regressions pointing in different directions.

We are interested in the estimates of the vector γ, which give the effect of each type of agreement on household total incomes and incomes by source. We allow for the possibility that treatment effects are heterogeneous across Aboriginal and non-Aboriginal households, by interacting the treatment indicators with the Aboriginal household status indicator. Thus, for each dependent variable, we allow treatment effects to be different for households with and without a member who reports Aboriginal identity. The estimated values of γ_k^{NA} give the estimated effects of various types of agreements on outcome k for non-Aboriginal households, and γ_k^A give the estimated effects for Aboriginal households.

All our regressions control for the household-level covariates listed above. Additionally, they control for census year via year fixed effects δ_{kt} (coefficients on indicator variables for census income years $t = 1990, \ldots, 2010$) and they control for location via CSD fixed effects α_{ks} (coefficients on about 1200 indicators, one for each CSD in the sample). We exclude the first indicator of each list to avoid multicollinearity.

All regression samples are restricted to households with at least 1 nonelderly member, residing in an Aboriginal community, with household size less than 13 (the 99th percentile of household size), in which at least 1 member lived in the same CSD 5 years ago, and which reports positive total household income.

All regression estimates are provided with estimated heteroskedasticity-robust standard errors. Because Census long form response rates exceed 90% in most Aboriginal communities (and the NHS response rate exceeded 80% in these communities), many individuals are found in successive data years. Thus, there must be correlations across time periods due to the presence of the same people in households in successive waves of data. However, clustering at the level of the CSD is in our view overly cautious, as it also allows for correlations across different people in successive waves. So, we report hetero-robust standard errors in the text, which are likely not cautious enough, and alert the reader to cases where we feel that the results should be taken with a grain of salt.[15]

4 Results

Table 2 gives descriptive statistics for our household-level Census and NHS microdata. We present the sample means for all our dependent variables and selected control variables by dichotomous treatment status (that is, having attained any type of agreement). The left-hand column of the upper panel gives the fraction of all observations in each year. These fractions

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[15] In addition to the results reported in this paper we report results from additional regressions in an online appendix available at these two websites: http://web5.uottawa.ca/www5/pendakur/ and www.sfu.ca/∼pendakur.

Appendix Table 1 reports standard errors clustered at the Census Subdivision level. Our major results are all evident in these appendix tables that cluster at the CSD level. They are: (a) that SGA-CLCA's and standalone CLCAs are correlated with higher total income; (b) that non-Aboriginal income gains are larger than Aboriginal income gains; and (c) that labour income is the primary source of income driving income gains. Additionally, as part of our research we investigated individual-level analyses clustered by birthdate and CSD (which accommodates data with the same individuals in successive waves). These standard errors were not more than 10% larger than hetero-robust standard errors, which suggests that the hetero-robust standard errors reported here are not too misleading.

Appendix Table 1 also contains selected coefficients from regressions which include province-year dummies. These allow for the possibility that provincial time-trends are endogenous to treatment. Our major results are evident in this specification as well.

Table 2 Descriptive statistics

	Full sample		Treated sample	
	Mean	SD	Mean	SD
Total sample	453,680		80,260	
Dependant variables				
Total household income	51,143	47,881	57,271	55,437
Labour income	39,240	45,038	43,483	52,370
Other income	4414	17,189	4481	18,320
Transfer income	7488	9267	9308	10,234
Year				
1991	0.17		0.02	
1996	0.18		0.04	
2001	0.18		0.05	
2006	0.24		0.45	
2011	0.23		0.43	
Groups				
Not Aboriginal hhld	0.54		0.26	
Aboriginal hhld	0.46		0.74	
Demographic characteristics				
Age of oldest household member	46.0	13.6	47.2	13.7
Household size	3.3	1.9	3.3	1.9
Official language of hhld				
English only	0.848		0.927	
French only	0.017		0.000	
Both English and French	0.134		0.070	
Household characteristics				
Not married no elders	0.204		0.226	
Not married w elder	0.022		0.024	
Single parent with kids	0.135		0.156	
Single elder w kid	0.010		0.014	
Married no kids or elders	0.181		0.151	
Married with kids	0.389		0.366	
Married w kids and elders	0.019		0.024	
Married w elders	0.039		0.039	
Schooling				
Less than high school	0.246		0.246	
Highschool certificate	0.187		0.200	
Trades	0.169		0.163	
College <1 year	0.033		0.057	
College 1–2 years	0.113		0.110	
College 2+ years	0.057		0.068	
University <BA	0.040		0.047	
BA	0.104		0.072	
BA+	0.017		0.015	
Medecine	0.003		0.001	

Table 2 continued

	Full sample		Treated sample	
	Mean	SD	Mean	SD
MA	0.027		0.018	
PHD	0.005		0.003	

Sample: households with at least 1 nonelderly member, residing in an Aboriginal community, with household size less than 13, in which at least 1 member lived the same CSD 5 years ago, and which reports positive total household income

are larger in later years, due to the increase in the Aboriginal population in Canada. The right-hand column gives the fraction of treated observations in each year. The frequency of treatment increases over the years indicating that these agreements are a one-way street. No First Nation has negotiated out of an agreement and back into the Indian Act.

The next block of Table 2 gives sample means for our dependent variables. We see that, in a cross-sectional sense, these agreements are correlated with higher household incomes. Average household income for the entire sample is $51,143 but for the observations treated with agreements, the average household income is $57,271. However, other variables that influence income are also correlated with treatment: the treated sample has a higher fraction of Aboriginal households; the treated subsample is 1 year older than the full sample, and the treated subsample is more likely to speak English than the full sample. A major objective of our regression analysis is to see if this correlation between agreements and income holds up when we control for household-level repressors, and time-invariant location effects.

4.1 Baseline Model: Total Household Income

Table 3 presents selected estimated regression coefficients from 4 regressions. We focus on household income, rather than individual income in part because we are interested also in the source of income, and transfer income in particular is most sensibly thought of as a household-level object.[16]

In the top panel, we have a single treatment status indicator equal to 1 if the household lives in a CSD with any of the 7 agreement types in force in that income year. The left hand columns give the estimated effect on the natural logarithm of household income, and the right hand columns give the estimated effect on the level of household income (measured in nominal dollars).[17] The estimated effect is interacted with the Aboriginal household indicator, so we report estimated effects for non-Aboriginal and Aboriginal households separately. We additionally report the coefficient on the Aboriginal household status indicator. We additionally include daggers beside the estimated coefficients for Aboriginal households that indicate statistical significance of the test that effects for Aboriginal and non-Aboriginal households are different from each other. In the bottom panel, we report coefficients for the analogous multi-level agreement status variables equal to 1 for households in CSDs with each of the 7 agreement types described.

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[16] We also provide individual-level regressions analogous to Table 3 in the online Appendix Table 3.

[17] Recall that we include year dummies which would soak up national-level consumer price changes to purchasing power of nominal income in logarithmic regressions.

Table 3 Results from 4 regressions assessing the relationship between agreement type on the log and level of household income, 1990–2010

	Log				Level			
	Coef.	SE	Sig.	diff.	Coef.	SE	Sig.	diff.
Any agreement								
Observations	453,680				453,680			
Prob > F	0.00				0.00			
adjR^2	0.34				0.31			
Aboriginal hhld	−0.32	0.01	***		−11,586	447	***	
Any agreement								
Not an Aboriginal hhld	0.15	0.02	***		9434	1217	***	
Aboriginal hhld	0.07	0.01	***	†††	586	442		†††
By type								
Observations	453,680				453,680			
Prob > F	0.00				0.00			
adjR^2	0.34				0.31			
Aboriginal hhld	−0.31	0.01	***		−11,186	451	***	
Not an Aboriginal hhld								
Sectoral SGA	−1.31	0.75	*		−30,914	12,589	**	
SGA only	−0.10	0.08			−8608	3151	***	
CLCA + SGA	0.26	0.07	***		19,852	7625	***	
CLCA only	0.45	0.03	***		28,240	1221	***	
FNFMA	0.17	0.07	**		10,253	3918	***	
FNLMA	0.12	0.05	**		5156	3090	*	
FNFMA + FNLMA	−0.02	0.10			−460	4014		
Aboriginal hhlds								
Sectoral SGA	−0.26	0.02	***		−8195	516	***	†
SGA only	−0.01	0.11			3799	3489		†
CLCA + SGA	0.23	0.03	***		8744	1376	***	
CLCA only	0.33	0.02	***	†††	14,725	571	***	†††
FNFMA	−0.02	0.02		††	−3961	707	***	†††
FNLMA	0.02	0.03			−4797	1323	***	††
FNFMA + FNLMA	0.09	0.05	*		−890	1791		

Other variables included in the model are: age, education, marital status of oldest member, official languages in the household (English, French or both), household size, Census subdivision and census year

Significance * 0.1; ** 0.05; *** 0.01

Significantly different between non-Aboriginal and Aboriginal hhlds:: † 0.1; †† 0.05; ††† 0.01

Consider the upper panel of Table 3. The estimated effects on the log of total household income are statistically significant and equal to 0.07 and 0.15, respectively, for Aboriginal and non-Aboriginal households. The estimated effects on the level of income are $586 (not significant) and $9434 (significant), respectively. For both the log and level regressions, the estimated effects for Aboriginal households are statistically different from those for non-Aboriginal households (indicated by daggers in the table).

Here we see that the log regression shows a positive effect for Aboriginal households, but the level regression shows essentially no effect. With log-normal incomes, this would imply increased median household income and decreased income inequality with the attainment of an agreement. One scenario that is consistent with these results is if incomes for poor households went up and those of rich households went down in communities that attained agreements. This is a striking finding and we see evidence of similar patterns throughout the paper.

There are 3 features here that we will see throughout this work. First, incomes might rise with agreements, but the increase may be small. Second, the increases for non-Aboriginal households are bigger than those for Aboriginal households. Third, the effects on the mean of log incomes are different from the effects on the mean of the level of income.

Now turn to the lower panel of Table 3. Here, we allow for the possibility that the different types of agreements have different effects on household incomes. Consider first how attainment of agreements correlates with the incomes of Aboriginal households.

We see big positive effects on both the log and level of total household income for Aboriginal households for both types of comprehensive land claims agreements (SGA + CLCA and CLCA). The estimated effects of attainment of an SGA + CLCA or CLCA on the log of household income are 0.23 and 0.33%, respectively. The estimated effects on the level of household income are $8744 and $14,725, respectively.

The estimated coefficients for these 2 types of agreements are based on lots of CSDs over lots of time periods. That is, as shown in Table 1, there is both cross-sectional and time-series variation to support identification. These estimated effects are large. For example, they exceed the roughly 10% convergence in on-reserve registered Indian income over the 1995 to 2005 period reported by Pendakur and Pendakur (2011).

The other agreement types are not strongly correlated with increased household incomes. For example, the Mi'kmaq sectoral self-government agreement (Sectoral SGA), which covers many CSDs and many households, is correlated with decreased incomes for Aboriginal households. In particular, the estimated effect on log household income is −0.26% and on level of total household income is -$8195. We are not confident that this is a robust finding for this agreement type because all Mi'kmaq CSDs came under the agreement in the same year (1999). However, it is strikingly negative.

There are 2 nations that undertook standalone self-government agreements (SGA), Sechelt in 1986 and Westbank in 2004. Here, we see no statistically significant effect on the log or level of household income for Aboriginal households. But, again, we are not overly confident of this finding because only Westbank undertook a SGA in our study period.

Now, we turn to the opt-in agreements. Here, we see that the estimated effects for the log and level regressions do not point in the same directions. For FNLMA and FNFMA, we do not see statistically significant effects on the log of Aboriginal household income, but we see statistically significantly negative estimated effects on the level of Aboriginal household income. For FNLMA + FNFMA, the estimate effect on the log of Aboriginal household income is marginally statistically significant and equal to 0.09, but the estimated effect on the level of household income is insignificantly different from zero. That attainment of FNLMA + FNFMA is correlated with an increase in the mean log income but no change in the mean level of income is striking. If the income distribution is conditionally lognormal, this suggests that the median income increases, and income inequality falls, with attainment of this agreement type. That is, the middle of the distribution may have gained from the change in agreement status but the upper end of the

distribution may have lost. Taken together, these results suggest that opt-in agreements are most powerful when done in concert.

Turning to the estimated effects for non-Aboriginal households, the most striking thing we see is that these households have markedly higher estimated effects on the level of income for most agreement types, and also on the log of income for several agreement types. In particular, the estimated effects of attaining a CLCA on non-Aboriginal household income are 0.45 and \$28,240 for the log and level of income, respectively. These effects are statistically significantly larger than the estimated analogous effects for Aboriginal household incomes.

The estimated effects for CLCAs in combination with SGAs point in the direction, but are not statistically significant. Here, we see an estimated effect of 0.26 on the log income and 19,852 on the level of income for non-Aboriginal households. These point estimates are higher than the corresponding ones for Aboriginal households, and are statistically significantly different from zero. However, because they are estimated with high variance due to the low numbers of non-Aboriginal households in these predominantly Northern communities, the estimated effects for non-Aboriginal households are not statistically distinguishable from those for Aboriginal households (that is, they don't get daggers in Table 3).

For FNLMAs and FNFMAs, we see statistically significant increases in the log of non-Aboriginal household incomes, which contrasts with the 'zero effect' we observed on log incomes for Aboriginal households. For FNFMAs, this difference between the estimated effect on log income for non-Aboriginal and Aboriginal households is statistically significant. Similarly, these two agreement types are correlated with increased levels of non-Aboriginal household incomes even as we saw decreased levels of Aboriginal household incomes (these differences are statistically significant). However, when the opt-in agreements are done in concert, with FNLMA + FNFMA, the incomes of non-Aboriginal households are not affected, but as we saw above, those of Aboriginal households may increase.

Since estimation sample includes only households that had a member in the same CSD 5 years previously, households entirely comprised of new residents are not in our sample. So, our results are not likely to be driven mainly by in-migration.[18]

Table 3 then points to 3 substantive conclusions. First, agreements are in general correlated with higher incomes for both Aboriginal and non-Aboriginal households. Second, there is very substantial heterogeneity across the 7 types of agreements that we study. In particular, the biggest incomes gains are associated with comprehensive land claims agreements, either standalone or in combination with a self-government agreement. Further, there is some evidence that First Nations financial and land management opt-in agreements are effective in raising incomes of Aboriginal households if they are done in concert. Third, income gains differ between Aboriginal and non-Aboriginal households. In particular, income gains for non-Aboriginal households are much larger than those for Aboriginal households for standalone CLCAs. For CLCAs with SGAs, the income gains are similar for Aboriginal and non-Aboriginal households. For the opt-in agreements, the differences are less clear. But for the combined opt-ins, we see income gains for Aboriginal but not for non-Aboriginal households.

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[18] In online Appendix Table 2, we provide estimates using a stricter subsample of households comprised entirely of members who were in the same CSD 5 years previously. Appendix Table 2 also contains selected coefficients from 3 other sets of regressions: (a) a subsample excluding 1991 Census data; (b) a subsample excluding the 2011 NHS data; and (c) a subsample including only observations in the Territories. Our major results are seen in all these subsamples.

4.2 Variation Across Sources of Household Income

Table 4 shows regressions analogous to the level regressions in Table 3, but using 3 sources of income as the left-hand side variables: labour income (including both wages and salaries and self-employment income), transfer income (from all levels of government) and other income (including capital income). For level regressions, these source-of-income regressions can be interpreted as an exact decomposition of the total income effects reported in Table 3, that is, the effects in Table 4 add up to the exactly the effect reported in Table 3.[19]

The top panel of Table 4 gives estimated effects for 3 sources of household income, where the treatment is the attainment of any of the 7 types of agreements. In Table 3, the effect of "any agreement" on the level income of Aboriginal households is seen to be small (and statistically insignificant). Consider the level regressions. In Table 4, we see that the "zero effect" observed in Table 3 is not due to offsetting effects from different income sources, but rather due to the adding up of quite small effects for all 3 income sources. In contrast, in Table 3, the effect of "any agreement" on the total income of non-Aboriginal households is substantial at nearly $10,000. In Table 4, we see that about half of this is due to increased labour income and the other half due to increased other income, but transfer income is not an important driver of increased household income for non-Aboriginal households.

The bottom panel of Table 4 considers our 7 types of agreements as a set of mutually exclusive possible treatments. As in Table 3, we see a lot of heterogeneity across these 7 types of agreements. For CLCAs with associated SGAs, we see that the income gains reported in Table 3 for Aboriginal households are driven mostly by increased labour income. Here, we see that the effect of SGA + CLCA on the level of labour income is 7155, which is roughly 80% of the overall income effect reported in Table 3. This increase is seen in the log labour income regression as well, with an estimated increase 0.51. The remaining income gains are driven by a small but significant increase of 1454 of transfer income.

For non-Aboriginal households, we saw in Table 3 a total income gain more than twice that of Aboriginal households. This is driven by a similar gain of 9840 in labour income (insignificant) and a much larger gain of 10,603 in other income (marginally significant).

Considering now the standalone CLCAs, we see again that the income gains for Aboriginal households are driven in large measure by gains in labour income. Of the total income increase of 14,725, we observe that 11,362 (again roughly 80%) comes from the labour income channel. The remainder is again driven by an increase in transfer income. As with SGA + CLCAs, the total income gains for non-Aboriginal households are much larger than those for Aboriginal households. However, unlike with SGA + CLCAs, this larger magnitude is driven almost entirely by a much larger increase in labour income for non-Aboriginal households. For these households, we see a treatment effect on labour income of 24,429, which accounts for nearly 90% of the total income effect for these households.

Turning now to the opt-in agreements, we saw in Table 3 that FNFMAs seemed to be correlated with lower income for Aboriginal households but higher incomes for non-Aboriginal households. Here, we see that these overall impacts are most likely driven by decreased labour income for Aboriginal households and increased labour income (insignificant) and other income (significant) for non-Aboriginal households. For FNLMAs,

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[19] Log regressions do not decompose in the same way, so we do not report them in the main text, deferring those results to online Appendix Table 4.

Table 4 Results from 12 regressions assessing the relationship between agreement type on the level of labour, transfer and other income

	Labour				Other				transfers			
	Coef.	SE	Sig.	Diff.	Coef.	SE	Sig.	diff.	Coef.	SE	Sig.	Diff.
Any agreement												
Observations	453,680				453,680				453,680			
Prob > F	0.00				0.00				0.00			
adjR²	0.30				0.08				0.50			
Aboriginal hhlds	−9088	425	***		−3100	209	***		602	78	***	
Any agreement												
Not an Aboriginal hhld	5532	1148	***		4180	643	***		−278	164	*	
Aboriginal hhld	224	428		†††	62	189		†††	300	82	***	††
By type												
Observations	453,680				453,680				453,680			
Prob > F	0.00				0.00				0.00			
adjR²	0.30				0.08				0.51			
Aboriginal hhlds	−8548	427	***		−3256	211	***		618	78	***	
Not an Aboriginal hhld												
Sectoral SGA	−31,957	6738	***		5533	7309			−4490	976	***	
SGA only	−10,822	3250	***		2755	1278	**		−540	636		
CLCA + SGA	9840	6221			10,603	4346	**		−592	457		
CLCA only	24,429	1159	***		1232	598	**		2579	169	***	
FNFMA	4718	3663			6953	2145	***		−1418	414	***	
FNLMA	−2521	2824			7315	1839	***		362	455		
FNFMA + FNLMA	−5427	4031			5948	1934	***		−981	566	*	
Aboriginal hhld												
Sectoral SGA	−4223	514	***	†††	−1485	190	***		−2488	153	***	†
SGA only	838	3702		†	4308	1188	***		−1347	1115		

Table 4 continued

	Labour				Other				transfers			
	Coef.	SE	Sig.	Diff.	Coef.	SE	Sig.	diff.	Coef.	SE	Sig.	Diff.
CLCA + SGA	7155	1291	***		136	455		†	1454	231	***	†††
CLCA only	11,362	568	***	†††	262	207			3101	114	***	†
FNFMA	−3324	698	***	†	−20	252		††	−617	159	***	
FNLMA	−2078	1257	*		−2835	602	***	†††	117	181		
FNFMA + FNLMA	−135	1942			−344	680		††	−411	370		

Other variables included in the model are: age, education, marital status of oldest member, official languages in the household (English, French or both), household size, Census subdivision and census year significantly different between non-Aboriginal and Aboriginal hhlds:: † 0.1; †† 0.05; ††† 0.01

the pattern is similar, except that the income decreases for Aboriginal households are driven by both decreases in labour income (marginally significant) and other income (significant). Finally, turning to those communities that attained both types of opt-in agreements, we do not see any statistically significant or large magnitude effect for any of the 3 income sources for Aboriginal households. For non-Aboriginal households, it seems that the zero-effect on total income observed in Table 3 may be due to large but offsetting effects in labour and other income.

The bottom line here is that the household income gains for Aboriginal households are driven by labour income gains.

4.3 The Timing of Income Gains

Although the FNFMA opt-in agreements all came into force after 2004, for our other agreement types, we observe households in multiple time periods after agreements came into force for at least some agreements. This means that we can identify delayed effects on household incomes. In this section, we consider whether or not there are additional effects on household incomes 5 years after the agreements come into force (that is, in the next census or NHS wave). Here, we estimate regressions analogous to those underlying Table 3, but with additional regressors indicating that treatment was at least 5 years previous. The interpretation of the coefficients on these new regressors is that they give the *additional* effect of an agreement on household incomes, 5 years on. For this table only, we suppress the rows for FNFMA and FMFMA + FNLMA, because they are too recent. The entries for those rows would be the same as in Table 3 for all years after the agreement, and would empty for all years after 5 years after the agreement.

The top panel of Table 5 gives the estimated effects of attaining any agreement on the log and level of total household income for Aboriginal and non-Aboriginal households for all years after the agreement, and the additional effect after 5 years after the agreement comes into force. For Aboriginal households, we see that the bulk of the effect on the level of income comes after some time has passed. The estimated effect of attaining an agreement is −1015 in the Census/NHS income year following attainment, and is 4637 (equals −1015 + 5652) in subsequent Census/NHS income years (and this total is statistically significant). This is a somewhat different picture from that given in Table 3, where we saw no increase in the level of income for Aboriginal households. The message here is that these timing effects may be important: changes in household income driven by changes in agreement status might continue to occur over a long period of time.

In the bottom panel, we examine 5 type agreements (our 7 types less FNFMA and FNFMA + FNLMA). For Aboriginal households, the extra regressors are only statistically significant for CLCAs, either standalone or combined with SGAs. For CLCAs combined with SGAs, we see that the attainment of an agreement is associated with an increase in log income of 0.21 in the census/NHS income following the agreement, and a statistically significant total increase of 0.35 (equals 0.21 plus 0.14) after 5 years have passed. However, this time pattern is not evident in the level of income. Again, leaning on the conditionally lognormal model, this suggests that median incomes rise over time, and inequality declines over time, with attainment of a CLCA with self-government.

Turning to standalone CLCAs, the big impact we observed on both the log and level of income is in fact spread over time. For both the log and level regressions, we see much larger coefficients on the "5 years later" regressors than on the contemporaneous regressors. For example, the initial effect of attaining a CLCA is to increase the level of

Table 5 Results from 4 regressions assessing the relationship between agreement type at time of agreement and 5 years later on the log and level of household income, 1990–2010

Model	Control	Log		Level	
		Coef.	SE	Coef.	SE
Any agreement	Observations	453,680		453,680	
	Prob > F	0.00		0.00	
	adjR^2	0.34		0.31	
	Aboriginal hhlds	−0.32	0.01	−11,476	449
	Not an Aboriginal hhld				
	After agreement	0.16	0.04	6855	1846
	5 years after agreement	0.04	0.04	7678	2396
	Aboriginal hhld				
	After agreement	0.02	0.01	−1015	450
	5 years after agreement	0.12	0.01	5652	541
By type	Observations	453,680		453,680	
	Prob > F	0.00		0.00	
	adjR2	0.34		0.32	
	hhabor	−0.31	0.01	−11,037	452
	Not an Aboriginal hhld				
	After agreement				
	Sectoral SGA	−0.79	0.74	−18,377	6078
	SGA only	−0.13	0.14	−35,808	10,867
	CLCA + SGA	0.20	0.08	17,332	9794
	CLCA only	0.40	0.06	14,341	1844
	FNLMA	0.11	0.05	620	3360
	5 years after agreement				
	Sectoral SGA	−0.62	1.15	−14,135	16,055
	SGA only	−0.29	0.25	3543	8907
	CLCA + SGA	0.20	0.11	−5081	9277
	CLCA only	0.08	0.05	16,675	2086
	FNLMA	0.04	0.10	26,784	10,047
	Aboriginal hhlds				
	After agreement				
	Sectoral SGA	−0.24	0.03	−6296	659
	SGA only	0.03	0.14	6461	4452
	CLCA + SGA	0.21	0.03	8066	1364
	CLCA only	0.08	0.02	2331	616
	FNLMA	0.04	0.03	−622	1321
	5 years after agreement				
	Sectoral SGA	−0.01	0.03	−1720	663
	SGA only	−0.30	0.15	−21,794	4641
	CLCA + SGA	0.14	0.05	2692	1866
	CLCA only	0.29	0.01	14,840	587
	FNLMA	−0.05	0.04	−6645	1652

Other variables included in the model are: age, education, marital status of oldest member, official languages in the household (English, French or both), household size, Census subdivision and census year

household income by 2331. But, 5 years later, household incomes are an additional 14,840 higher. So, for both types of CLCAs, we see that benefits may accrue over time.

4.4 Time Trends and the Control Group

A general issue with difference-in-difference methodologies is the *common trends* assumption underlying identification. Specifically, the difference-in-difference takes its estimated treatment effect to be the difference in outcomes after having differenced out the time trend. However, if the time trends are not the same between treatment and control units, then differencing does not remove the time trends—it only removes the difference in time trends between treatment and control.

In our context, control CSDs are those that never undergo a transition to a modern agreement. Treatment CSDs are those that do undergo a transition at some point during our study period. Like Aragón (2015), the regressions described in the Tables above assume the common trends assumption for treatment and control CSDs. But, whereas Aragon only uses CSDs in BC and the North, in our work, we use all CSDs that are Aboriginal communities across Canada. Thus, our control group is larger. If the common trend assumption is violated, that is, if treatment and control groups are on different time trends, then the difference in time trends will be ascribed to the treatment. In our context, that means, e.g., if CSDs that attained agreements had steeper time trends than those that did not, then that income growth would be attributed to the attainment of the agreement.

There are many reasons to doubt the validity of the common trends assumption. For example, if bands with better economic opportunities sought out new agreements with the Government of Canada, they would have better time trends. In this case, the difference-in-difference estimator would attribute that fast income growth to the attainment of an agreement. Or, if bands that were at the end of their development cycle sought out agreements with Canada, they would have flatter time trends because their income growth had occurred much earlier. In this case, the estimator would attribute that slow income growth to the attainment of an agreement.

In our data context, we see agreements happening on different dates. In Table 1, we show that the opt-in agreements occur throughout the 2000s, that standalone CLCAs occurred in the early 1990s, and that CLCAs combined with SGAs were signed throughout the period. Thus, we can identify the difference-in-difference model using *only* CSDs that attained agreements at some point in our study period. Such a model would simply drop all the data from CSDs that never attained agreements.

Identification of the treatment effect in this case requires a weaker common trends assumption. In particular, we do not require that treated and untreated communities shared the same time trends. Instead, all we need in this case is that the time trends for treated communities do not depend on the exact date of attainment of an agreement. This identification is stronger in the sense that it rests on a weaker common trends assumption. But, it uses less data (because it excludes all communities that never attained agreements, which is most Aboriginal communities in Canada), and consequently is less precise.

We consider these issues directly in Table 6, where we show selected coefficients from six regressions whose left-hand side variable is total household income. The leftmost columns in each block repeat results from Table 3. The middle and rightmost columns in each block show results from 4 new regressions. In the middle columns, we present estimates for any agreement and for 7 types of agreements using only the subsample of observations that attain an agreement during our study period (this corresponds to the sample in the right hand columns of our descriptive statistics in Table 2). In the rightmost

Table 6 Results from 12 regressions assessing the impact of agreement type on the log and level of household income, as compared to not having an agreement

	Log						Level					
	All CSDs		Treated CSDs		All CSDs with time trend		All CSDs		Treated CSDs		All CSDs with time trend	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Any agreement												
Observations	453,680		80,260		453,680		453,680		80,260		453,680	
Prob > F	0.00		0.00		0.00		0.0		0.0		0.0	
adjR^2	0.34		0.35		0.34		0.31		0.40		0.32	
Aboriginal hhlds	−0.32	0.01	−0.36	0.03	−0.32	0.01	−11,586	447	−14,200	961	−11,500	447
Any agreement												
Not an Aboriginal hhld	0.07	0.01	−0.12	0.02	−0.12	0.02	586	442	−10,397	670	−10,479	698
Aboriginal hhld	0.15	0.02	−0.05	0.04	−0.04	0.03	9434	1217	−2962	1617	−1536	1282
1991					0.00						0	
1996					0.11	0.03					4805	1026
2001					0.11	0.02					3534	802
2006					0.20	0.02					9949	756
2011					0.37	0.01					20,609	739
By type of agreement												
Observations	453,680		80,260		453,680		453,680		80,260		453,680	
Prob > F	0.00		0.00		0.00		0.00		0.00		0.00	
adjR^2	0.34		0.36		0.34		0.31		0.41		0.32	
Aboriginal hhlds	−0.31	0.01	−0.34	0.03	−0.31	0.01	−11,186	451	−11,395	985	−10,963	450
Not an Aboriginal hhld												
Sectoral SGA	−1.31	0.75	−1.49	0.74	−1.47	0.74	−30,914	12,589	−41,286	13,757	−39,152	12,880
SGA only	−0.10	0.08	−0.39	0.09	−0.39	0.08	−8608	3151	−26,919	3459	−25,860	3214
CLCA + SGA	0.26	0.07	0.02	0.07	0.05	0.07	19,852	7625	4712	7513	7516	7546
CLCA only	0.45	0.03	0.40	0.05	0.33	0.04	28,240	1221	30,357	2009	23,618	1323

Table 6 continued

| | Log | | | | | | Level | | | | | |
| | All CSDs | | Treated CSDs | | All CSDs with time trend | | All CSDs | | Treated CSDs | | All CSDs with time trend | |
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
FNFMA	0.17	0.07	−0.07	0.08	−0.05	0.07	10,253	3918	−5133	3961	−3800	3987
FNLMA	0.12	0.05	0.00	0.05	0.01	0.05	5156	3090	−2293	3076	−730	3101
FNFMA + FNLMA	−0.02	0.10	−0.27	0.10	−0.25	0.10	−460	4014	−16,459	4068	−14,777	4085
Aboriginal hhld												
Sectoral SGA	−0.26	0.02	−0.41	0.03	−0.41	0.03	−8195	516	−16,132	715	−15,799	686
SGA only	−0.01	0.11	−0.28	0.14	−0.30	0.11	3799	3489	−14,986	4216	−13,678	3544
CLCA + SGA	0.23	0.03	0.03	0.03	0.02	0.03	8744	1376	−3449	1403	−3525	1433
CLCA only	0.33	0.02	0.19	0.03	0.20	0.03	14,725	571	9399	801	9827	785
FNFMA	−0.02	0.02	−0.25	0.03	−0.25	0.03	−3961	707	−18,305	965	−18,097	976
FNLMA	0.02	0.03	−0.12	0.03	−0.13	0.03	−4797	1323	−12,881	1350	−13,456	1413
FNFMA + FNLMA	0.09	0.05	−0.15	0.05	−0.15	0.05	−890	1791	−16,213	1949	−16,384	1957
1991					0.00						0.0	
1996					0.00	0.03					−2373	971
2001					0.01	0.02					−3390	810
2006					0.10	0.02					3048	784
2011					0.32	0.01					16,789	750

Other variables included in the model are: age, education, marital status of oldest member, official languages in the household (English, French or both), household size, census subdivision and census year

columns, we present estimates using all observations, but including an interaction between the year dummies and an indicator that the observation is treated with any of the 7 agreement types. The idea here is to allow for the possibility that treated and untreated CSDs follow different time trends.

The bottom panel of Table 6 gives the estimated coefficients on year dummies (and their interactions). In the leftmost columns of each block (reproduced from Table 3), year effects are constrained to be the same for both untreated and treated observations (as in a standard difference-in-difference estimator). In the middle columns, only treated observations are used, so the estimated coefficients on year effects are for treated observations. In the rightmost columns, there are estimates for both untreated and treated observations.

Essentially, CSDs that were treated at some point during our time period rode much better time trends than CSDs that were never treated. The magnitude of this difference is large: for example, the estimated year effect for 2011 is 20,609 higher for ever-treated versus never-treated CSDs. One interpretation of this is that there are unobserved characteristics correlated with attainment of an agreement that are also correlated with the growth rate of income: that is, in Table 3, treatment is endogenous. In this case, we would look to the middle or rightmost columns of Table 6 for our estimated treatment effects (because they would not be subject to such endogeneity).

The estimates in this case can be summarized very simply: using the subsample of only treated CSDs suggests that only standalone CLCAs are correlated with higher incomes for Aboriginal households in the years following attainment of agreement. The estimated treatment effect given in the middle columns is 9399 for Aboriginal households and 30,357 for non-Aboriginal households. Comparing across columns, we see similar numbers (9827 and 23,618) in the rightmost columns that give estimates for the full sample but with differing time trends between treated and untreated observations. That these numbers are similar suggests that differential time trends are doing the work here.

Tables 3 and 6 use different control groups and give different magnitudes. Further, the results given in Table 6 rest on weaker identifying assumptions than those in Table 3. It would be reasonable therefore to disregard the estimates presented in Table 3 as endogenous (falsely ascribing time trends to the attainment of agreements). In that case, the conclusion is that only standalone CLCAs raise household incomes.

However, we are reluctant to subscribe to the view that the model of Table 3 is invalid. Our interpretation is as follows. As noted above, all of these agreements require substantial lead-time for negotiation and implementation, and require substantial buildup of community-level capacities. Such capacity building includes the development of legal, accounting, bureaucratic and administrative training, and may have important spillovers into community economic development. This suggests that not only does it take decades to negotiate and implement a modern agreement with the Government of Canada, but so too, the fruits of those efforts may be smoothed over time, and may not simply accrue in the few years following the attainment of an agreement. Thus, although the estimated treatment effects presented in Table 3 absorb both over-time variation across treatment status within CSDs and across-CSD variation in the time-path of income, we view these as our preferred estimates.

5 Discussion

We have six major findings. First, agreements are in general correlated with higher incomes for both Aboriginal and non-Aboriginal households. Overall, we find that agreements are associated with an increase of about 0.07 log points in household income

for Aboriginal households and about 0.15 log points in household income for non-Aboriginal households. This corresponds to an increase of roughly 7 and 15%, respectively, in the incomes of Aboriginal and non-Aboriginal households.

Second, there is very substantial heterogeneity across the 7 types of agreements that we study. In particular, the biggest income gains are associated with comprehensive land claims agreements, either standalone or in combination with a self-government agreement. Further, there is some evidence that First Nations financial and land management opt-in agreements are effective in raising incomes of Aboriginal households if they are done in concert. These findings add important new dimensions to Aragón (2015) result that CLCAs raise household incomes. We observe that this result holds for both standalone CLCAs and for CLCAs in combination with SGAs. Our findings for opt-in agreements also complement these results.

Third, in contrast to Aragón (2015), we find that income gains differ between Aboriginal and non-Aboriginal households for some agreement types. In particular, income gains for non-Aboriginal households are much larger than those for Aboriginal households in communities that attain standalone CLCAs. For communities that attain CLCAs in combination with SGAs, the difference is seen in the point estimates but is not statistically significant. For the opt-in arrangements, findings are mixed. In the case of FNLMAs, the estimated effects on the level of income are higher for non-Aboriginal than for Aboriginal households. And, for the combined opt-ins, we see income gains for Aboriginal but not for non-Aboriginal households. Since these policies are primarily aimed at improving economic and social outcomes for Aboriginal people, research designs that allow for differential outcomes by Aboriginal status are important.

Fourth, like Aragón (2015), we find that income gains for Aboriginal households are driven for the most part by gains in labour income. Given the importance of transfer income in the total income of Aboriginal households, it is interesting to note that the labour income channel dominates the gains from the attainment of new agreements with the Government of Canada. There is a sense in which gains in transfer income "cost" government but gains in labour income do not. Thus, some types of modern agreements may be a win–win for the local community and the Federal government.

Fifth, income gains for Aboriginal households are spread over time. The evidence for this is strongest for standalone CLCAs. The strength of this result may be driven by the fact that CLCAs occur for the most part early in our study period, so that there are many post-agreement data-years available. The 2016 Census micro data will allow the study of how opt-in agreements affected incomes over the medium-term.

Sixth, we see some evidence that the attainment of agreements may affect the inequality of Aboriginal incomes within communities. Our evidence on this is indirect: when we see a positive effect of attainment of an agreement on the log of income but not on the level of income, we take this to indicate that the median of income is rising but the variance of income is falling. Most research on Aboriginal inequality has focused on inequality between Aboriginal and non-Aboriginal people. This research suggests that we need to understand more about inequality *within* Aboriginal communities.

Why such heterogeneity in outcomes across the agreement types? The seven agreement types we study have different packages of legal arrangements in terms of transfers of land, cash, authority and responsibility.

Self-government agreements typically involve cash transfers and transfers of responsibility for social and/or economic well-being from the Federal government to the Aboriginal community. They also may transfer authority over financial and land-use decisions. For example, the Westbank self-government agreement transfers responsibility for internal

financial management (including taxation), land, resource and agriculture management, education, health services and law enforcement from the Federal government to the Westbank First Nation (AANDC 2003). These responsibilities are for all residents of that community, be they Aboriginal or not. The Westbank were also transferred financial resources from the Province of British Columbia and the Federal Government to undertake provision of these services (AANDC 2003, section 261). Thus, self-government agreements come with both responsibilities and resources. They may or may not balance.

Opt-in agreements are quite different. They involve transfers of responsibility, but only in two areas: land and fiscal management. They do not involve transfers of cash or land from the Federal government to the Aboriginal community or First Nation. For example, Aboriginal communities that use the First Nations Land Management Act can gain responsibility over land use decisions, including the ability to lease land to individuals, and to take on mortgages using land as collateral. Neither of these actions is possible under the Indian Act. Both types of actions might strengthen property rights on-reserve in ways that increase the scope of economic activity. We note that self-government agreements also typically transfer authority over these areas. So, opt-in agreements give First Nations rights that may improve economic well-being, but do not assign responsibilities for the provision of expensive social services as do self-government agreements.

Comprehensive land claims agreements are focused on transfers of land jurisdiction from governments to First Nations. These agreements do not necessarily involve transfers of responsibility, or even transfers of decision-making authority as in opt-in agreements. Many comprehensive land claims agreements also feature transfers of cash from the Federal government to First Nations.

While this research points to differences in outcomes across agreements, we are not able to explain the mechanics of why these differences exist. We need further research on the ground to assess and understand best practices surrounding the attainment and implementation of new agreements.

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