The Determinants and Impacts of Historical Treaty-Making in Canada*

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Abstract

For nearly three centuries, Indigenous peoples within the borders of present-day Canada engaged in treaty-making with the British Crown and other European powers. These treaties regularly formed the colonial legal basis for access to Indigenous lands for European settlement and use. However, the cession of land through treaties did not occur everywhere, including in regions subsequently settled by Europeans. As a consequence, there is substantial regional variation in the legal status of settled lands, jurisdiction over natural resources, and state commitments to Indigenous nations. We study the economic determinants of when and where treaties were signed, their content, and how they have shaped the path of economic development in Indigenous communities. We find that while the act of signing a treaty was linked to the bargaining power of Indigenous nations, there was no systemic relationship between economic factors and the content of treaties. Using restricted-access census data, we show that historical treaties are associated with substantially lower income in Indigenous communities today. This difference is not driven by standard channels, like worker characteristics or the structure of labour markets. Rather, we argue that this is the result of differences in the value of property rights relative to the treaty commitments delivered upon by the Crown, which have widened in recent decades with the formal recognition of Aboriginal title.

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During the colonization of North America, European powers engaged with Indigenous nations through both violence and negotiation. As with other European powers and the United States, the British Crown pursued both of these strategies; however, the British ultimately colonized much of the land that would become Canada through a succession of treaties with Indigenous nations. These treaties typically consisted of a set of clauses, which could promise physical goods, cash payments, the provision of public goods, rights to hunt or fish, or the maintenance of peace in exchange for land. Formally, treaties set expectations for both parties, including access to land and resources, as well as the establishment of legal and political jurisdictions. Importantly, treaties were not signed in all regions of Canada and among Indigenous nations that did sign treaties, the nature of treaties differed substantially over time and space. Today, both of the content of treaties and the presence of Aboriginal rights and title continue to have important and evolving implications for economic development.

In North America, public discourse often emphasizes the relatively lower economic outcomes of Indigenous people compared to non-Indigenous individuals; however, there is a tremendous amount of variation in economic conditions across Indigenous nations. In the economics literature, many have attributed this variation to historical policies and events that have disproportionately impacted some Indigenous communities. In the context of the United States, there has been a focus on the structure of property rights as a consequence of land allotment policies at the start of the reservation period,[1] the impact of forced co-existence of distinct political groups on reservations (Dippel, 2014), the legacy of residential schools (Gregg, 2018),[2] the loss of resources (Feir et al., 2019), federal oversight (Frye and Parker, 2021), and constitutional design (Akee et al., 2015).

Evaluation of the effect of historical treaties on contemporary Indigenous economic development has been notably absent from this literature. This is particularly striking given the central role of treaties in the colonization of North America, the ongoing relevance of treaties in contemporary courts, the nature of the modern treaty-making process, and the fact that nearly 400 treaties were signed between the United States and Indigenous nations in the years between the American Revolution and the Civil War. One reason for this lack of scholarship may be the complex nature of overlapping agreements, hidden treaties, and renegotiation over treaty rights (Carlos et al., 2021); however, given the continued connection between the Canadian government and the British Crown, the treaty landscape in Canada is conceptually more straightforward.[3] Treaty rights and Indigenous rights and title are explicitly recognized in Canada's legal structure, which suggests that variation in treaty provisions may explain a large share of contemporary variation in economic outcomes across Indigenous communities.

[1] See, for example, Akee (2019); Carlson (1978, 1981, 1983); Miller (2015); Dippel and Frye (2019); Dippel et al. (2020); Leonard et al. (2020).

[2] There is also a literature in Canada on the long run impact of residential schools (Feir, 2016b,a; Jones, 2021).

[3] It should be noted that Crown treaty obligations were also often ignored in Canada. In fact, today there is a process by which Indigenous groups can negotiate specific claims settlements with the federal government in relation to failures to honor historical treaty commitments, though compensation from these claims is capped $150 million. More information on the specific claims process can be found here: https://www.rcaanc-cirnac.gc.ca/eng/1100100030291/1539617582343.

This paper examines the historical treaty-making process through the 18th and 20th centuries in what is now Canada. We address two broad questions. First, what are the historical determinants of the treaty-making process? We view treaties as institutions–that is, the "rules, enforcement characteristics of rules, and norms of behavior that structure repeated human interaction" North (1989)–and we examine how changes in the bargaining power of each nation influence the probability a treaty will be signed. Second, has treaty-making affected long-run economic development in Indigenous nations and, if so, how and why? It is possible that institutional structures in communities that signed historical treaties have diverged relative to those in non-treaty communities. Ex ante, however, it is not clear whether historical treaties should be associated with better or worse economic outcomes over the long-run. It is feasible that treaties could have reduced uncertainty in exchange, specifically in relation to property rights and the enforcement of contracts. On the other hand, since the Crown was both the enforcer and agent in exchange, it is also possible that the "rules" were not enforced on behalf of the interests of Indigenous peoples.

We begin our analysis by establishing the correlates of the decision to sign a treaty. In particular, we construct a detailed dataset from primary sources to evaluate whether the determinants suggested by historians and economic theory are empirically related to the likelihood of signing a historical treaty, the timing of treaty-making, and the clauses included in the treaty text. These determinants include colonial and expansionist factors such as the desire to exploit natural resources like furs, settle agricultural and other lands, and secure strategic advantage over other colonial powers or Indigenous nations (Miller, 2009). We find that treaties were most likely to be signed in communities that experienced a deterioration of their bargaining power through rapid resource depletion and least likely to be signed in more rugged, defensible communities. When nations whose neighbouring communities shared a common language signed treaties, they were also more likely to sign a treaty themselves, suggesting that information sharing among nations may have been relevant. With respect to timing, we find that ruggedness and gradual resource loss similarly increase the likelihood if a treaty is signed that it is signed at a later date. Conversely, treaty signing is most likely to occur during periods of rapid resource loss. In contrast, we do not find a systematic relationship between economic determinants and the content of treaties, perhaps because the content in treaties did not reflect the true intent of treaties as negotiated between parties (Craft, 2013).

Several of the determinants that we identify as predictors of signing a treaty may also be correlated with community-level economic outcomes. As such, we view establishing the determinants of treaty-making as an important first step in addressing our second question, which is what, if any, impact did treaties have on economic development over the long-run? An obvious challenge in identifying these effects is the possible endogenous nature of the treaty process itself. We mitigate these concerns to a degree by conditioning on our set of determinants in all specifications that examine the relationship between historical treaties and economic outcomes. However, unobservable factors may still be cause for concern. For instance, if Indigenous nations that were historically worse-off signed treaties in the hopes that treaties would bring them prosperity, this would violate

the exclusion restriction in an OLS regression of economic outcomes on an indicator for signing a historical treaty. Our preferred identification strategy addresses this issue with a contiguous borders approach that leverages the fact that Indigenous nations whose ancestral territories bordered one another may have shared similar unobservable characteristics which we account for by including pairwise fixed effects.[4]

Our results suggest that historical treaties have substantially stifled economic outcomes in Indigenous communities today. In 2016, individuals in Indigenous communities that signed a historical treaty have approximately $5,000 less total annual income, on average, relative to those in Indigenous communities without treaties. This difference in total income is driven almost entirely by lower employment income in Indigenous communities that signed historical treaties. This is an empirically robust finding that holds across specifications and after conditioning on a wide range of possible explanatory factors.

Our analysis shows that standard channels common in the labour market literature do not explain the difference in incomes across treaty and non-treaty communities.[5] We therefore evaluate whether legislative changes that affirmed inherent "Aboriginal rights and title" in non-treated territory provide a plausible explanation for the income gap. First "recognized and affirmed" in the patriation of Canada's constitution in 1982, "Aboriginal rights and title" was subsequently strengthened by a series of Supreme court decisions through the 1980s and into the present (Redish, 2019).[6] We test whether the income difference between treaty and non-treaty communities has grown as Canadian courts have increasingly affirmed the existence of "Aboriginal title" in unceded areas and clarified the duty to consult and accommodate in areas where Aboriginal title may still exist.[7] Evidence using public-use census data reveals that the income gap between treaty and non-treaty communities has widened substantially in the post-1982 era as court decisions disproportionately strengthened the property rights of non-treaty Indigenous nations.[8]

These results provide important insights into the reasons behind the vast differences in economic outcomes across Indigenous communities in what is now Canada. The substantial income gap between treaty and non-treaty nations, while potentially a reflection of the provision of some goods and services through the treaty process, is primarily a marker of the economic harm associated with land cession. Rather than converging over time, as the relative value of unceded land increased with the strengthening of Indigenous title over lands, the gap has widened. These findings have implications for other nations engaged in the modern treaty-making process and potential policy

[4] We also present results that use tribe and province fixed effects, a nearest-neighbour matching procedure, and an instrumental variable strategy that uses the fact that Indigenous nations whose neighbours signed treaties in a previous period may have been more likely to sign treaties themselves.

[5] These mechanisms include differences in education, age profiles, the industrial composition of the labour force, differential settlement of non-Indigenous peoples, individual treaty clauses, the intensive or extensive margin of labour supply, or a difference in the prevalence of non-Indigenous community members.

[6] Early court cases in the 1970s set the foundation for the patriation of the constitution in 1982.

[7] Many of these cases have been interpreted as having imposed economic costs on natural resource firms; however, recent work has demonstrated that the effects on Canadian natural resource firms have been heterogeneous and not uniformly negative (Keay and Metcalf, 2021).

[8] Our results are similar using confidential census data and are pending approval from Stats Canada.

interventions aimed at closing outcome gaps between Indigenous and non-Indigenous peoples.

Our work contributes to a substantial literature that explores the role of property rights and transaction costs in economic development on Indigenous lands in North America. In the United States this has included work on trust status (Akee and Jorgensen, 2014; Leonard et al., 2020; Dippel et al., 2020), leasing (Akee, 2009; Frye, 2012), and fractionation (Russ and Stratmann, 2014, 2016; Leonard et al., 2018, 2020; Dippel et al., 2020). Our analysis focuses on the explicitly negotiated conditions for land transfer from Indigenous nations to the state rather than on the nature of land tenure arrangements that exist on remaining Indigenous lands which, in addition to being a major component of the literature in the Unites States, has also been a focus in Canada (Aragón, 2015; Pendakur and Pendakur, 2018; Aragón and Kessler, 2020; Pendakur and Pendakur, 2020).[9] It also examines factors that contributed to the evolution of the Canadian frontier, including the role of Indigenous nations in this process. In this sense, our work is related to Allen (1991, 2019) who shows how the United States incentivized settlement strategically to assert jurisdiction in the presence of Indigenous nations.

We also contribute to a body of work that studies the nature of treaties and when they are signed. Broadly speaking, this is connected to earlier work by Douglass North on the relationship between price changes, bargaining power, and the desire to renegotiate a contract (North, 1989). More specifically, our work relates to Anderson and Mc Chesney (1994) who study the incentives to sign treaties rather than engage in conflict and to Spirling (2012) who shows that negotiation with Native Americans over treaty terms depends crucially on who holds institutional power. We contribute to this literature by explicitly examining many of the mechanisms considered in their work, such as the bargaining position of Indigenous nations and measures of the value of land to settlers. We formally analyze how outside options, or a lack thereof, may influence the terms of treaties and their probability of being negotiated through their effects on bargaining power. Of particular interest is how historical economic shocks influence institutional structures, and consequently, inequality in the long-run.

2 Background and Economic Framework

2.1 A Brief History of Treaty-Making in Canada

There is a centuries-long history of treaty-making between European powers and Indigenous nations within the borders of present-day Canada. The earliest diplomacy between Indigenous nations and European colonizers developed prior to expansive European settlement in the form of alliances to secure access to the fur trade and the interior more broadly. These treaties were directly related to the economic and military competition between France and the United Kingdom in North America. France was particularly successful at establishing early treaties, which allowed for their particular model of the fur trade and supported France's relatively sparse presence in the region in military

[9] Perhaps most closely related to our work is that of Aragón (2015) who considers the importance of modern treaty-signing in Canada in clarifying property rights, lowering transactions costs, and generating growth in First Nations communities in Canada.

conflict with the British.[10]

We begin our analysis of treaty-making with the Peace and Friendship treaties[11] that were typically signed in eastern Canada and the Northeasten United States between 1725 and 1779 (see Figure 1). These treaties included few long-term provisions and generally did not include land cessions from Indigenous nations; rather they served to normalize relations between the Mi'kmaq and Maliseet, former French fur-trading allies, and British forces that occupied Nova Scotia, Newfoundland, and parts of Rupert's Land after French lands were ceded to the British through the Treaty of Utrecht in 1713.[12]

Although the Treaty of Utrecht temporarily established peace between Britain and France, tensions escalated over each countries' claims to territory in North America. By 1754, conflict resumed between the two empires. The Seven Years War ended in 1763 with the cession of French territory east of the Mississippi to Britain. As the continued success of Britain's American colonies depended on their relations with Indigenous peoples, the British issued the Royal Proclamation of 1763 which established a boundary separating Indian Territories from the East Coast, as displayed in Figure 2. Land to the west of the colonies was designated "Indian Territory", settlement west of the Atlantic watershed was forbidden, and all purchase of lands was to be done by the Crown, through representatives from the Indian Department (Slattery, 1983). The Royal Proclamation of 1763 was the first significant recognition of Indigenous property rights in North America by the British government and set the precedent for future treaty-making between Indigenous peoples and either British or Canadian governments (Slattery, 1979). Importantly, the Royal Proclamation of 1763 is still relevant with respect to property rights over unceded Indigenous lands.

The land known as "Indian Territory" was theoretically not intended for settlement by the Crown; however, the defeat of the British in the American War of Independence brought thousands of British loyalists, and some of their Indigenous allies to the remaining British territories in what is now Canada. The influx of refugees, along with fear of American annexation, led the British government to negotiate a series of treaties throughout territories within what is now Southern Ontario and Quebec, known as the Upper Canada Treaties.[13] These treaties were typically, one-time purchases of land, with no or few annuities. Early treaties typically secured small parcels of land with larger parcels acquired later. Land was transferred by Indigenous groups and in return they received cash or the equivalent value in goods. In total, over a dozen treaties were ratified in Upper Canada to help establish the colony and prevent potential American annexation. Of note, the idea of Indian reserves began to appear for the first time in these treaties and would continue through the Robinson (1850) and the Numbered treaties (1871-1921).[14]

[10] Although these treaties are interesting in their own right, we do not focus on such alliances in this work.

[11] Images of an original Peace and Friendship treaty can be found in Figure A.1 of the Online Appendix.

[12] The French continued to pursue Indigenous allies for their conflict with the British throughout the period until the end of the Seven Years' War.

[13] The Upper Canada Treaties are frequently referred to as the Upper Canada Land Surrenders, but this naming is no longer viewed as appropriate by many Indigenous nations and was not a contemporary term

[14] Figure A.2 of the Online Appendix displays an image of one such treaty known as St. Joseph's Island Treaty No. 11 that was signed on June 13th, 1798 and only included one clause which established the transfer of land from the

After the War of 1812, the support of Indigenous nations was no longer as tactically necessary for the British. By the 1840s, with substantial growth in what is now the American Midwest, economic development became more feasible around the Great Lakes and boosted demand for natural resources. In response, the Crown moved quickly to secure all lands in the southern peninsula through the treaty process to allow the settlement of what had become profitable land. Further, as government policy shifted from ally-ship to assimilation, related treaty provisions began to appear.

In the 1840s, mining companies surveyed territory along Lake Huron and Lake Superior and began to mine in the area, to the dismay of Indigenous groups in the area who had not signed any treaty or land surrender ceding land rights to the government.[15] Thus, in 1847 the Anishnawbe of the Upper Great Lakes requested compensation for the lands they had lost to mining, and, over the summer of 1849, treaty negotiations took place between former fur trader, William Benjamin Robinson and Indigenous chiefs. These treaties are particularly interesting as Robinson was granted a substantial budget and instructions to secure the maximal amount of land.[16] The negotiations led to two separate treaties between the Crown and Indigenous nations along Lake Huron and Lake Superior. In contrast to the earlier land cession treaties, the Robinson-Huron and Robinson-Superior treaties established reserves, promised annuities, and secured property rights over hunting and fishing in unoccupied Crown lands. These treaties would serve as the template for the eventual negotiation of the Numbered Treaties.

Contemporaneously with the Robinson treaties that were negotiated in Upper Canada, a similar set of treaties were negotiated with Coast Salish peoples in what is now British Columbia.[17] Between 1850 and 1854, James Douglas, the second governor of the Colony of Vancouver Island, negotiated fourteen land purchases in order to secure lands that would be vital to the future of the Hudson's Bay Company who had an exclusive license to trade with Indigenous peoples in unsettled parts of British North America. These treaties prioritized securing land in southern Vancouver Island near the heart of the new colony. The Douglas Treaties have broad similarities with the Robinson Treaties even though they were negotiated in relative isolation; Indigenous nations were given one time payment in goods, reserves were established, and property rights over hunting and fishing in the ceded territories were secured in the treaties. Eventually, the government of British Columbia abandoned the treaty-making process. Instead, as a cost-savings measure, the province opted to ignore the Royal Proclamation of 1763 and assert property rights over unceded Indigenous territory until the late 20th century.

The Douglas Treaties were the last major treaties signed between Indigenous nations and the

Chippewa to the crown in exchange for a number of goods, including blankets, kettles, tobacco, cloth, hats, rifles, etc.

[15]The Robinson Treaties are an important motivating factor in including mining controls as potential treaty determinants.

[16]Many novel treaty clauses first appear in this period with Robinson negotiating annuity payments, permanent rights to hunt and fish, and other provisions.

[17]Importantly for our identification strategy, the treaties signed in British Columbia are largely restricted to Vancouver Island. As such, a large share of non-northern regions without treaties are found in the province.

Crown prior to Confederation in 1867. With the establishment of the Dominion of Canada through the British North America Act, the Canadian government was granted legislative jurisdiction over *"Indians and lands reserved for Indians."*[18] Shortly thereafter, the federal government passed the *Indian Act* (1876), which effectively transformed First Nations into legal wards of the state, with the federal government having a fiduciary duty to them (Hurley, 2000).[19] The Act was inherently assimilationist with the goal of pushing Indigenous peoples to give up their "Indian" status and become full citizens.

As colonization moved westward, a series of treaties, known as the *Numbered Treaties*, were negotiated with Indigenous nations to secure land for settlement and pre-empt potential annexation of Western territories by the United States. In particular, Westward expansion by the United States and the construction of the transcontinental railroad applied substantial pressure on the Canadian government. While the Dominion purchased Rupert's Land from the Hudson's Bay Company, it retained the obligation to secure lands individually from Indigenous nations. The Numbered Treaties were the government's approach to this requirement.

The Robinson Treaties that were signed in the 1850s served as a blueprint for the Numbered Treaties; however, the circumstances, desires, and needs of the different Indigenous nations that were involved in signing treaties led to the negotiation of treaties with unique clauses. For example in Treaty No. 1–the first post-confederation treaty–land was ceded by Indigenous nations in exchange for initial cash payments to all band members, the promise of ongoing annuities, a commitment to provide education, the establishment of reserves, and an agreement of peace.[20] The Numbered Treaties differed from the Robinson Treaties in the size of reserve lands, the annuities that were paid from the treaties, and in clauses regarding education, and in later treaties, health, and famine relief. In many respects, the goal of the Numbered Treaties was to further the agenda of the government as put forth in the Indian Act.

Although the treaty process was not always peaceful, with notable resistance by Big Bear and other leaders, there were generally not Canadian equivalents to the Indian Wars in the United States. Perhaps the most compelling argument for why was the lack of capacity to wage war on the part of the Canadian government. At a time when the United States government was spending 20 million annually on the Indian Wars in the West, the entire annual budget of the federal government in Canada was 19 million (Miller, 2009, p.156). Another possibility suggested by Washburn (1995) and St. Germain (2001) is that the British crown's primary interest in the fur trade meant that, at least initially, there was less pressure to secure additional lands for settlement without treaty and less violence as a result. The emergence of the Métis population through historical intermarriage between French fur traders and Indigenous peoples, as well as intermarriage and trade between Indigenous peoples and the English has also be cited as a reason for non-violence (St. Germain, 2001, p. 6).[21]

[18] Canadian Constitution Act of 1867, 91(24).

[19] Out of the three Indigenous groups in Canada, only First Nations are defined as "Indians" under the Indian Act.

[20] The text from Treaty No. 1 is included in Figure A.3 of the Online Appendix.

[21] It is important to recognize, however, that the threat of war or violence, in the absence of a treaty, could be

The federal government continued to negotiate Numbered Treaties until 1921 and additional adhesions were made to individual treaties until 1929. The Williams Treaties (1923) were the final historical treaties and were signed between the Crown and members of the Chippewa and Mississauga nations in Ontario with the intent to rectify errors that had been made in some of the earlier colonial treaties. Historical treaty-making formally ended after the last Numbered Treaty adhesion was signed in 1929. Miller (2009) outlines a combination of factors that led to the end of the historical treaty-making era. First, it was becoming increasingly evident that there was building government opposition to a system that treated Indigenous peoples differently from the rest of Canadians.[22] Second, non-Indigenous economic interests were occupied by the development of lands ceded between 1871 and 1921. Finally, the Great Depression tested the government's fiscal capacity. Treaty-making between Indigenous groups and the federal government did not resume until the 1970s when the government began to engage in the negotiation of modern treaties. Figure 3 summarizes the eras of treaty-making in Canada by classifying treaties into peace and friendship, land surrenders, comprehensive treaties, and modern treaties.

2.2 The Determinants of Signing a Treaty

Whether or not a treaty was negotiated depended on the costs and benefits of doing so to both parties. In the context of treaties between Indigenous nations and European powers, the potential use of force, uncertainty of who would be able to use force successfully, and the beliefs about whether the contract provisions would be enforceable were central to the decision-making process for both parties. The relative importance of these factors were also likely to change substantially over time as the political, military and economic power of settler/colonial governments increased relative to Indigenous nations and competition between European powers decreased.

Miller (2009) has documented many of the factors that were viewed as influential to the treaty-making process. Fur prices played an important role both in access to trading routes and territory and the shifting economic well-being of nations as fur prices and fur availability evolved. Similarly, others have posited that the depletion of food sources, such as the bison, pushed nations into signing agreements in order to avoid starvation (Daschuk, 2013). The presence of natural resources may have also played a similar, albeit less focal role.

Economic theory suggests that, at a given point in time, an Indigenous nation would sign a treaty with the Crown (or other European power) that exchanges land for other goods or on-going obligations if their outside options declined. North (1989) discusses this concept in the context of a price change, wherein one (or both) parties has an incentive to "alter the agreement". The resulting

explicit or implicit. Settlers would frequently threaten or employ force as they moved into Indigenous territory. As settlers, or rumors of settlers, moved into unceded First Nations territory, so did the subtle, and less subtle, threats of violence from First Nations in the absence of treaty arrangements (Miller, 2009, p.153). To the extent that these threats were more or less credible, First Nations with more credible threats may have received more favorable treaty terms and may have been more likely to be offered a treaty relative to groups that may not have been able to make similarly credible threats (Anderson and Mc Chesney, 1994).

[22] This is perhaps most evident in the words of Duncan Campbell Scott in relation to the residential school system, *"Our objective is to continue until there is not a single Indian in Canada that has not been absorbed into the body politic, and there is no Indian question, and no Indian Department."*

change in bargaining power leads parties to renegotiate their contract. North's description is in relation to the renegotiation of an existing contract, but a similar logic can be applied when thinking about the decision to sign a contract in the first place. Negative economic shocks would, therefore, have increased the likelihood of signing a treaty, acting both directly through the economic need of the Indigenous nation and indirectly through the capacity to resist or act militarily. The land holdings of a particular nation should also influence bargaining power, as more land-rich nations may have been more willing to cede land. In general, we should expect factors that resulted in an increased perception of the value of land for Europeans to be positively related to treaty-making. This could include fertile soil, proximity to waterways and existing settlement, and the presence of natural resources. Technological shocks that made interior lands more accessible to European settlers should, as a result, make treaty-making in the interior more likely.

Frictions in the bargaining process could also have played a role. This is most likely to have occurred through asymmetries in the information available to both parties at the time of signing. North (1991) argues that cooperation between parties occurs when play is repeated and when there is complete information about the other player's past performance. Extending this intuition to the historical treaty-making process suggests that Indigenous nations were more likely to cooperate (i.e., sign a treaty) when they had more information about the outcomes of the Crown's prior treaties. Based on Miller (2009)'s recount of the importance of information-sharing across nations, we hypothesize that nations were more likely to sign treaties after their neighbours signed treaties and that this would have been most acute if their neighbours spoke a dialect of the same language group. Granted, if the perception was that agreements were not fair or were unlikely to be honoured this would make signing less likely.

The broader literature on colonization can also inform our understanding of the treaty-making process. Environments more prone to disease that Europeans have historically not had resistance to may have been less likely to attract attempted treaty-making by Europeans (Acemoglu et al., 2001) while the spread of disease in Indigenous communities would likely have weakened their bargaining power. Geographic features such as ruggedness that increase the military capacity of existing populations (Nunn and Puga, 2012) should have increased the bargaining power of Indigenous nations.

Since many factors will influence both the willingness of European parties to engage in treaty-making, as well as the willingness of Indigenous peoples to engage in treaty-making, often in opposite directions to one another, the implication of any specific factor on the probability that a treaty would ultimately be signed is often ambiguous. To help clarify the opposing incentives at play, Table 1 summarizes how we expect a variety of factors to have influenced the value of a treaty to Europeans and Indigenous parties, the ability of each party to exert force, the probability of signing a treaty, and the treaty terms for Indigenous powers.

2.3 The Relationship Between Treaty-Making and Economic Development

A priori, it is not obvious that historical treaties between Indigenous nations and European powers should affect the path of development. In particular, since the *Indian Act* of 1876 has dictated the way the government interacts with First Nations peoples, regardless of treaty status, a similar set of national institutions have been applied broadly to First Nations communities. Even if we think that treaties may play a role in economic development, the effect on long-run development and well-being for Indigenous communities is ambiguous. If treaties were negotiated under poor terms for Indigenous nations, like including limited economic rights or provisions of public goods, the agreements themselves might result in relative underdevelopment over time if other nations could retain more rights by abstaining from signing a treaty. The series of court cases and legislative changes that began in the 1960s and increasingly strengthened Indigenous property rights over unceded lands may lend credence to this assertion.

In 1967, Frank Calder, and other elders from the Nisga'a Nation sued the BC government over the claim that their title to their lands had never been lawfully extinguished.[23] The case escalated to the Supreme Court of Canada and in 1973 the Supreme Court ruled that the Nisga'a Nation did hold title to their lands and that this title preceded colonial assertions of dominion (Redish, 2019). The Nisga'a case was instrumental in the recognition of Aboriginal rights and title and was followed by several other significant legislative changes. Notably, in the 1982 patriation of the constitution, Section 35 (1) stated that "the existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed." Landmark legal decisions continued to follow: *Guerin v. R* (1984) found that "the fiduciary relationship is rooted in the concept of Aboriginal title...the Aboriginal interest in the land may be alienated only via surrender to the Crown,"[24] reaffirming the principles underlying the 1763 Royal Proclamation; and in the early 2000s, a series of court decisions established the duty to consult and potentially accommodate Indigenous nations in the face of Aboriginal title, rights or Treaty rights (Brideau, 2019).[25] While these court decisions affirm both treaty rights and Aboriginal title, Aboriginal title in the land (even if not yet established in court) contain a much broader scope of potential rights to land: "ownership rights similar to those associated with fee simple, including: the right to decide how the land will be used; the right of enjoyment and occupancy of the land; the right to possess the land; the right to the economic benefits of the land; and the right to pro-actively use and manage the land."[26]

Another concern regarding the potential negative impacts of treaty-making relates to the enforceability of contracts. Since treaties themselves are ultimately enforced at the discretion of the Crown, the Crown could simply ignore the terms of the contract, disregarding these initial agreements in Crown-Indigenous relations. As argued by North (1989), among others, when enforcement lies with the party with superior coercive power then the rules will be enforced to their

[23] Calder v. Attorney-General of British Columbia [1973]

[24] [1984 2 S.C.R. 335.

[25] Specifically, Haida Nation v. British Columbia, Taku River Tlingit First Nation v. British Columbia, and Mikisew Cree First Nation v Canada.

[26] Tsilhqot'in Nation v. British Columbia [2014], supra, note 2, at para. 73.

advantage, potentially to the detriment of the other party. This logic appears to have played out in practice. The historical literature has documented that many provisions went unhonoured or manipulated such that Indigenous nations lost the land they had reserved for themselves via treaty.[27] If Indigenous signatories anticipated this, then their decisions would not be made under the expectation of contracts being upheld. Treaty clauses would therefore have no effect in theory. In a sense, we test this indirectly by looking at the impact of having signed a treaty on outcomes over the long-run.

On the other hand, if the treaty terms are upheld, then variation in the clauses contained in the treaties could matter substantially. For example, some treaties promised continuing obligations on the part of the state such as famine relief, medical care, and the provision of schools on reservations, while others offered one time payments in cash and clothing in exchange for land with no other attached provisions. Further, if having a treaty clarifies property rights relative to disputed property rights in unceded territory then this could lead to more development into the present. Given that the importance of clear property rights has been a recurring finding in the related U.S. literature, it could be the case in Canada, as well.

It is also worth considering that the effect of signing a treaty may vary substantially over time. For example, prior to favourable legal rulings regarding the status of Indigenous title over unceded lands, these non-treaty nations would have experienced similar land dispossession to treaty nations that had, in fact, received something in return. Specifically, many Indigenous nations in the West and North did not sign treaties at all and yet were dispossessed of their land and their sovereignty regardless. As such, we might expect the value of not engaging in the treaty-making process to have improved meaningfully with time.

3 Data Sources and Variable Construction

We digitize and combine a wide variety of data sources to empirically evaluate the determinants and impacts of historical treaty-making. Below, we briefly outline these sources and the process by which we integrate them into our analysis. Additional details can be found in the Online Appendix.

3.1 Observational Units and Historical Treaties

In Canada, communities are defined by Statistics Canada in terms of census subdivisions (CSDs). CSDs are municipalities or regions that are the equivalent of municipalities, including Indian reserves and Indigenous settlements. "First Nations communities" are CSDs that Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Indigenous Services Canada (ISC), and Statistics Canada classify as "on-reserve". They include all CSD types that are legally affiliated with

[27] For example, Carter (2019) provides evidence that land reserved by Indigenous nations in Saskatchewan were eroded by as much as 60% in some areas to make way for settler farmers. Likewise, Daschuk (2013) provides evidence that promised provisions never arrived or arrived much later than promised with significant welfare consequences. More recently, the Ontario court of appeals ruled that the Crown's annuity of $4 per person from the Robinson-Huron treaty of 1850 violated the spirit of the treaty to share with Indigenous nations the wealth generated from the territory (Cecco, 2021). If upheld by the Supreme Court, the ruling could lead to back pay worth billions of dollars for Indigenous signatories.

"Indian bands", commonly referred to as First Nations.[28] Inuit communities are included in similar census definitions. Since we are ultimately interested in understanding how the treaty-making process influenced economic development in Indigenous communities, we select our sample based on the set of CSDs identified as "Indigenous" in the 2011 Community Well-Being (CWB) Database constructed by Indigenous Services Canada (ISC), as of 2018.[29]

We begin by matching Indigenous communities to First Nations, using the 2011 band-to-community linkage file provided from CIRNAC.[30] With the exception of a small number of communities, most reserves can be mapped one-to-one to a First Nation. In the event that there are multiple bands on a reserve, we duplicate the observation, so that our primary unit of analysis is the reserve-band level.

We then obtain a list of bands that signed historic treaties[31] and the date each treaty was signed from CIRNAC's Map Room website and the associated treaty texts through the treaty-making section of the CIRNAC website. From the historical texts, we identify the terms of each treaty; for instance, whether the treaty contains an education clause or the right to hunt, trap, or fish on ceded territory. Specifically, the clauses we consider include a "liquor ban clause", those related to retaining hunting, fishing or trapping rights, clauses related to maintaining traditional village sites, clauses with promises to provide farmland, cash for the chiefs, a blanket extinguishment clause regarding the surrender of all rights to resources in an area, a land surrender clause, and clauses related to the provision of education.[32]

Given that our selection of clauses is based in part on the judgment of what are the most important written clauses, as well as what we judge to be "good clauses" and "bad clauses", we additionally perform an arm's length text-based analysis. In this analysis, each treaty can be viewed as a distinct document consisting of a set of words. By analyzing the word content of each treaty, they can be classified according to their "sentiment" using the Bing library to classify individual words.[33] The texts have to be processed through several initial steps, which we describe in the Online Appendix. As the primary outcome variable, we use a normalized sentiment score, where a score of one means that all words in a document are positive and a score of negative one means all words in the document are negative.

[28]Note that this language is fraught. Many First Nations people see their nation as broader than their legally defined band, but the term First Nation is commonly used interchangeably with band in practice.

[29]The CWB database has since undergone revisions, which means that a sample selected today based off the 2011 CWB may differ from a sample selected off the 2011 CWB that was downloaded more than a year ago.

[30]The linkage file is available upon request through CIRNAC.

[31]A list of bands and their treaties is found by accessing the notes corresponding to each of the regional pre-1975 treaties maps: https://www.aadnc-aandc.gc.ca/eng/1290453474688/1290453673970; the historical texts are found at https://www.aadnc-aandc.gc.ca/eng/1370373165583/1370373202340.

[32]In relation to education, some treaties contain a promise of a school being maintained for the community when they desire it, but some contain a more ambiguous clause regarding the government paying for teachers salaries alone and no guarantee of a school on reserve. This difference could have substantial implications for the provision of education (Miller, 2009), although we consider them jointly due to low variability in the type of education clauses.

[33]This approach is similar to the analysis in Spirling (2012) who investigates whether treaties with Indigenous Nations in the United States became harsher after Congress stripped the President of the ability to negotiated directly with tribes in 1871. Spirling's exact language processing method differs from ours, in that he evaluates "harshness" of land and resource cession terms, rather than sentiment.

To gain further insight into the treaty texts, we use Latent Dirichlet Allocation (LDA) to fit unsupervised topic models. Rather than classifying each treaty based on a pre-specified set of topics, or clauses, LDA treats each treaty as a distribution over topics, where topics are defined as distributions over words. Documents can overlap in their content, where content is determined algorithmically instead of through human choice. LDA estimates both the distribution of topics over documents and the distribution of words over topics simultaneously. There are multiple ways to perform this estimation and we follow the procedure outlined in Silge and Robinson (2017).[34]

3.2 Historical Determinants and Additional Controls

First Nations in Canada are associated with larger ethnographic groups, referred to as "tribes" in historical and government documentation. The term "tribe" is not currently used to refer to Indigenous societies in Canada; however, since many of the historical variables we construct are derived from sources that use this terminology, we will use the term "tribe" to be consistent with these documents. Although Indigenous groups within a tribe may not have historically lived together in a community, they often shared a common language, traditions, culture, and potentially a traditional governance structure. We match Indigenous groups to tribes as follows.

CIRNAC has provided us with a list of bands matched to their tribes that they have been compiling over several decades through discussions with individual First Nations. In this dataset, the tribe associated with each band is the cultural group with which the band identifies. We are able to match the majority of bands using this file. For communities that were not included in the CIRNAC file (mostly Inuit), we overlay the CSD boundary file with digitized maps of traditional tribal territories from the Smithsonian Handbook of the North American Indian to identify the tribal territory in which the Indigenous community is currently located.

Figure 5 displays these digitized territory maps with labels added to the territories that fall within the present-day borders of Canada. A small number of communities were not located in any traditional territory. We assume that nations located in these communities identify with the tribal territory that is closest to their reserve. In some instances, bands identified as "Cree" or "Ojibway", even though there are many different Cree and Ojibway tribes. In these circumstances, we assume they are part of the Cree or Ojibway tribe that is closest to their reserve. For instance, if a community identified as "Cree", and "Western Woods Cree" is the closest tribal territory to their reserve, then we assume this community's tribe is "Western Woods Cree".

There are several factors that we have identified as being potentially important in the treaty-making process discussed in section 2.2. These include, reliance on the bison, historical involvement in trapping, the natural resource potential of Indigenous homelands, ruggedness, the size of Nations' traditional territories, and factors affecting the transaction cost of signing a treaty, such as the information one obtains from their neighbours' experiences with treaty-making. To generate each of these variables, we overlay digital reproductions of several secondary data sources with the digital reproductions from the Smithsonian maps.[35]

[34] This method is described in more detail in the Online Appendix.

[35] The reader is referred to the Data Appendix for a more detailed discussion of the sources and Table 1 for how

Measures of historical reliance on the bison are constructed by overlaying the Smithsonian maps with a digitized version of William Hornaday's depiction of the bison's range at various points in time (Hornaday, 1889). We calculate the difference in the share of tribal territory covered by the bison's range in 1870 and 1730, the time period during which the bison's range gradually declined as a result of settler encroachment. We also compute the difference in the share of tribal territory covered by the bison's range in 1889 and 1870, the time period during which European hide-hunters slaughtered the remaining bison to near extinction.[36] These variables indicate which communities initially had access to a stable economic resource which was then lost during the rapid slaughter. Similarly, to proxy for involvement in the fur trade, we compute the share of tribal territory covered by the beaver's range from a digitization of the Canadian Geographic map of trapping ranges. Involvement in the fur trade we would expect to have different effects on the likelihood of signing a treaty at different points in time.

We consider the natural resource potential of ancestral territories in two ways. First, we construct indicators for whether any gold or silver deposits had been discovered in a tribe's ancestral territory by 1915. These measures are constructed by overlaying digitized maps of mineral deposits from the 1915 Historical Atlas of Canada with the ancestral territory maps. Second, we calculate the number of mines in a tribe's ancestral territory using the location of mines from the United States Geological Survey. This measure includes contemporary, as well as historic mines. The justification for the inclusion of both historic and contemporary mines is that the discovery of mines is arguably an endogenous process. For instance, discovery of mines by 1915 may have been facilitated by earlier treaties. The number of mines in a territory today may be less susceptible to this issue because regardless of contemporary land rights, the mining potential of land across Canada is generally well-known.

To classify the historical networks through which information may have flowed, we construct indices based on geographic boundaries and linguistic origin. The geographic classification of a neighbour is based on the geographic boundaries in the tribal maps of the Handbook of North American Indians. If the ancestral territories of two tribes shared a historical border, then we code them as neighbours in this classification. We also consider a linguistic classification based on whether a tribe's geographic neighbour shared the same linguistic grouping, defined by the Ethnographic Atlas of Murdock (1967).

As a proxy for the value of a tribe's ancestral land, we use the digitized Smithsonian maps to construct the size of ancestral territories. To generate a measure of ruggedness, we overlay the Smithsonian maps with global elevation files from the Food and Agriculture Organization of the United States and compute the terrain ruggedness index of Riley, DeGloria, and Elliot (1999).

Differences in tribal experiences with colonization are captured by computing the date the earliest rail entered a tribe's traditional territory using ESRI Canada's historic railway data, as

each of the data sources are related to the theoretical discussion.

[36] A more detailed account of the bison's decline and the effect this had for Native economies can be found in Feir, Gillezeau, and Jones (2019).

well as the distance between each community and the closest trading post, and the population at that trading post in 1823. We also construct the length of primary canoe routes in a tribe's traditional territory from digitizing the Edinburgh Geographical Institute's map of historical canoe routes. Since some tribal territories intersected the US-Canada border, we incorporate an indicator for these cases.[37] We account for population change in tribal territories by computing population over time using the HYDE Gridded Population of the World Database (Goldewijk et al., 2010).

Finally, we account for other cultural differences using a set of variables from the Ethnographic Atlas. These include whether the tribe had a history of centralized governance, the percent of calories a tribe consumes from agriculture, whether tribes lived in permanent or semi-nomadic villages, a measure of jurisdictional hierarchy, and whether tribes had land rights and wealth distinctions. We have chosen these factors in line with previous literature (Dippel, 2014; Leonard et al., 2020).

3.3 Modern Outcomes and Additional Controls

To understand how signing a historic treaty impacts economic development in the long-run, we merge our historical dataset with restricted-access data from the 2016 Census of Population in the Statistics Canada Research Data Centre. This merge is conducted at the CSD level, but our models are estimated using the individual-level microdata. We consider several long-run outcomes, but focus on the kinds of income generated in treaty versus non-treaty communities.[38]

We consider employment income, after tax income, total income, investment income, and government transfers.[39] We also examine labour market status, that is, whether an individual is not in the labour force, and whether an individual has at least a high school degree, as well as whether they have at least a post-secondary degree. The Census of Population does not include many cultural outcomes; however, we are able to analyze whether individuals in communities that signed a historic treaty are more or less likely to speak an Indigenous language at home or be band members.These results can be found in the appendix. In addition to the historical controls that we described previously, in some of our long-run specifications we also condition on the latitude and longitude of the centroid of each CSD, as well as the geodetic distance to the closest Census Metropolitan Area (CMA) to proxy for geographic isolation.

[37] For these tribes we have also constructed measures of railway penetration into tribal territories using information on the earliest date an American rail entered a tribe's traditional territory using data from (Atack, 2016). Since this way of measuring makes little difference to our empirical findings, we do not use it in our main set of controls.

[38] Our focus is on the working age population, which we define as individuals aged 25-64.

[39] Total income is defined before tax income from all sources including employment and wage income, investment income, government transfers, and one time receipts such as inheritances. Employment income can consist of amounts you receive as salary, wages, commissions (see line 10120), bonuses, tips, gratuities, and honoraria. After tax income includes all taxes and transfers and reported by the Census from administrative tax and benefit records received from the Canada Revenue Agency. Investment income includes form of interest from deposits in financial institutes, interests on savings certificates, bonds and debentures, dividends from both Canadian and foreign stocks, net rental income from real estate, mortgage and loan interest received, regular income from an estate or trust fund, interest from insurance policies and net partnership income for a limited or non-active partner. This variable does not include net capital gains or losses. Government transfers includes all cash benefits received from federal, provincial, territorial or municipal governments during the reference period. For more details, see https://www12.statcan.gc.ca/census-recensement/2016/ref/guides/004/98-500-x2016004-eng.cfm.

3.4 Descriptive Statistics

In total, our analysis includes 21 treaties, with the Upper Canada Land Surrenders and Douglas Treaties considered as one treaty each in the majority of the analysis. The modal treaty was signed shortly after Confederation, in 1874, whereas the mean treaty was signed in 1870 and the median in 1875. In Table 2 we display the breakdown of treaty clauses among communities that signed a historic treaty.

Most communities that signed a historic treaty retained the rights to hunt, trap, and fish as part of their treaty (82%), while very few treaty communities had treaty provisions that allowed them to retain their own villages (4%). The proportion of communities with treaties that contain each clause are listed in Table 2. We can see that 4% of communities are part of treaties that only discussed a land surrender, and 65% of communities signed treaties that contained a blanket extinguishment clause.

The raw sentiment score of treaties increased over time, as seen in Figure 7(a); however, since the sentiment score is computed as the number of positive words minus the number of negative words, comparisons of a long document and a short document with the same fraction of positive words would yield a higher sentiment score for the long document. Since treaties became broader in scope and arguably more paternalistic over time, it is unsurprising that this measure of sentiment would appear to increase over time. We therefore plot a normalized sentiment score in Figure 7(b), where a discernible pattern becomes less clear. With the exception of low scores in the late 1700s and just after 1850, sentiment changed very little across treaties.

Figure 8 displays probability distributions over the LDA-selected topics contained in treaties over time. We choose to estimate a model with 3 topics.[40] Here, we can see that there were distinct differences across the content of treaties over time, with very early and late treaties being more similar in scope than the treaties in the middle of the historical treaty-making era. Reassuringly, the topics seem to associate relatively well with known eras of treaty-making. For instance, the Peace and Friendship treaties signed in the 1700s have similar topic distributions, whereas the land surrenders have separate and distinct topic distributions. The Robinson and Douglas treaties that were signed in the 1850s also display similar topic distributions, whereas the post-confederation Number Treaties have their own distinct distribution.

Turning to our determinants of interest, Table 3 displays these summary statistics. Column (1) displays these statistics for Indigenous communities who are not part of a historical treaty and column (2) displays them for Indigenous communities who did sign a historical treaty. Column (3) reports difference in means tests. Treaty and non-treaty communities differ substantially along the dimensions we have identified as being potentially important determinants of signing a treaty. Notably, treaty communities are associated with larger ancestral territories that have less rugged terrain (rows 1 and 2). They tend to be more impacted by the decline of the bison (rows 3 and 4) and were likely more involved in trapping, as indicated by the greater share of their territory

[40] For the interested reader, we display the distribution of the top 20 words within topics in Figure A.4 and Figure A.5 displays the log ratio of words across two separate topics.

covered by the primary beaver's range (row 5). Treaty communities are more likely to have a neighbour who signed a treaty and especially so if that neighbour was part of the same language network as them (rows 6 and 7). Perhaps counter to our hypothesis that the natural resource value of the land was an important reason why Europeans pushed for treaties, in rows 8 and 9 we see that treaty communities were actually less likely to have had gold or silver discovered in their ancestral territory by 1915.[41] That being said, treaty communities are associated with ancestral territories that have more total mines, including both active and inactive mines (row 10).

We report additional summary statistics in Table B.1 of the Online Appendix for our other historical control variables, as well as a set of modern variables we include in some of our long-run specifications. With the exception of the estimated population density in ancestral territories in 1700 onward, many of these variables exhibit average differences across treaty and non-treaty communities.

4 Empirical Methodology

4.1 Determinants and Timing of Treaty-Making

We begin our empirical analysis by considering the determinants and timing of historical treaty-making. Our first empirical specification addresses the question of why some tribes signed treaties and what factors correlate with the inclusion of individual clauses. We estimate models that take the following form:

$$\mathrm{T}_{cg} = \beta_0 + \mathbf{X}_g\boldsymbol{\theta} + \mathbf{Z}_{cg}\boldsymbol{\Phi} + \epsilon_{cg}, \tag{1}$$

where T_{cg} is a dummy variable for whether or not community c belonging to cultural group (tribe) g signed any historic treaty. The matrix, $\mathbf{X}_g$, includes a set of determinants that vary by cultural group and are informed by the historical literature as being potentially important factors to consider. These include the change in the share of ancestral territory that was covered by the bison's range between 1730 and 1870, as well as the change between 1870 and 1889, the share of ancestral territory that was covered by the primary beaver trapping range, the natural logarithm of the average terrain ruggedness in a nation's ancestral territory, the area of the ancestral territory, whether any gold or silver had been discovered in their territory by 1915, the eventual number of mines in their territory, and indicators for whether the tribe that shares a geographic border signed a treaty in a previous time period, as well as whether a geographic neighbour who was in the same language group signed a treaty in a previous time period. In some specifications, we include an additional set of controls, $\mathbf{Z}_{cg}$, for the distance to the closest historical trading post, the population at the closest historical trading post, whether the nation spans the American border, and the EA controls. Standard errors are clustered by cultural group unless otherwise stated.

We also estimate specifications that take the same form as equation 1 but where the outcome of interest is an indicator equal to 1 if the community is comprised of band members whose ancestors signed a particular type of historic treaty. We generate indicators for whether the historic treaty is

[41] We speculate that this might be in part due to the gold rush which may have shifted the relative capacity for violence on the part of European settlers and, thus, the need to negotiate a treaty with Indigenous nations.

classified by the historiography as a Peace and Friendship treaty, a Comprehensive Treaty, or a land surrender with a one time payment. Further, we consider the specific types of clauses included in treaties and estimate specifications where the outcome is an indicator equal to 1 if the community is comprised of band members whose ancestors signed a treaty with a given clause. Finally, in some models we condition on having ever signed a treaty to look at the relative difference in the likelihood of signing a treaty with a particular clause among those that signed.

We estimate all specifications separately using OLS; however, we also provide an analysis of the timing of treaty-making using Cox Proportional Hazard models.[42] In these specifications, failure occurs when a treaty is signed. Coefficient estimates that are below 1 are associated with a lower hazard and the interpretation is therefore that they signed a treaty later, whereas estimates that are above 1 are associated with signing a treaty earlier. Since some factors may only have a time-related interpretation during specific time periods, we supplement the Cox Proportional Hazard model with a time-varying dataset that allows us to examine the probability of signing a treaty in a given year based on time-varying parameters of interest. As an example, we can examine whether nations that were impacted by the rapid decline of the bison were more or less likely to sign a treaty in the years in which the bison was disappearing.

The coefficients of interest in these exercises should be viewed as reduced form parameters that combine the underlying structural parameters that affect the choices of both European and Indigenous powers. Sometimes interests will align to predict the same direction of coefficient estimates and sometimes they will not. Thus simple interpretation of all coefficients will not always be possible. The reader is advised to consider the coefficient estimates alongside Table 1 which displays how we view each determinant as changing the respective valuations of treaties as well as the ability of either side to exert force.

4.2 The Economic Impacts of Treaties

In the second part of our empirical analysis, we seek to quantify the relationship between historical treaties and long-term outcomes for Indigenous communities. Ideally, we would estimate specifications of the following form:

$$\mathrm{y}_{icg} = \beta_0 + \beta_1 \mathrm{T}_{cg} + \mathbf{X}_g\boldsymbol{\theta} + \mathbf{Z}_{icg}\boldsymbol{\Phi} + \epsilon_{icg}, \tag{2}$$

where y_{icg} is the contemporary economic outcome of individual i in community c associated with cultural group (tribe) g. T stands for "treaty" and is coded as 1 if a band signed any type of historic treaty with the federal government. The matrix $\mathbf{X}_g\boldsymbol{\theta}$ includes our determinants of treaty-making and the matrix $\mathbf{Z}_{icg}\boldsymbol{\Phi}$ includes additional controls that vary by individual, community, or tribe. Nevertheless, estimating equation 2 as is would produced biased estimates of the coefficient of interest, $\hat{\beta}_1$, if the act of signing a treaty was correlated with unobservable factors that are

[42] We present additional results using Tobit models in the Online Appendix. In these models we define duration as the time between 1700 and the date that a treaty was signed. Since treaty-making halted after 1929, this model is censored at the right end of the distribution at 230 (1930-1700). Coefficients in these models can be interpreted as the increase in time to sign a treaty associated with a one unit increase in the independent variable of interest.

simultaneously correlated with economic development outcomes.

To alleviate this concern, we use an empirical approach that is a form of the contiguous border strategy that has been used in labour economics to estimate a variety of economic outcomes, including the impact of minimum wages across stage borders (Dube et al., 2010). We outline this approach in Figure 6. Panel (a) displays all ancestral territories that overlap with the borders of Canada. Purple territories indicate territories of groups that did not sign a historic treaty, light green territories depict those that did sign a historic treaty, and the aqua coloured territories display territories for groups where some bands that share this cultural grouping signed a treaty but other bands did not. The first sample restriction used in this approach is to remove territories belonging to groups who signed treaties who do not have a neighbour, defined as a bordering tribe, who did not sign a treaty. This restriction is shown in panel (b). Finally, we make the choice to treat territories where some bands signed treaties and others did not as part of the "control" group. This is displayed in panel (c). This leaves us with a group of treatment territories—those where all bands signed treaties—and a group of control territories—those where all bands did not sign a treaty *or* where some bands signed treaties and other bands did not. We then construct a sample of matched pairs between treatment territories and all control territories.[43] This matched strategy allows us to rewrite equation 2 using a pairwise fixed-effects model:

$$\mathrm{y}_{icgp} = \beta_0 + \beta_1 \mathrm{T}_{cg} + \mathbf{X}_g\boldsymbol{\theta} + \mathbf{Z}_{icg}\boldsymbol{\Phi} + \gamma_p + \epsilon_{icgp}, \tag{3}$$

where we have added the fixed effects γ_p to allow unobservable factors that are the same across matched pairs to be held constant. Variation in this specification therefore comes from differences in treaty-signing within pairs of geographically proximate nations. We include the set of controls that we have identified as being historically important in $\mathbf{X}_g$, as well as other factors related to settlement and culture, and contemporary factors, like the distance to the closest census metropolitan area in $\mathbf{Z}_{icg}$. In some specifications $\mathbf{Z}_{icg}$ also includes individual characteristics, like education or labour force participation. Standard errors are clustered by pair.

We verify that our results are robust to using a variety of additional empirical approaches. First, we use a specification that includes province and tribe fixed effects so that variation in signing a treaty comes from variation in historical factors within the same province and same tribe. These fixed effects may account for provincial-specific policies that affected Indigenous groups differentially across provinces, but suffer from the fact that there is very little within-province and within-tribe variation. We also use a nearest neighbour strategy that matches individuals in the census across historical and contemporary factors.[44] Next we use a doubly-robust LASSO

[43] If an ancestral territory in the treatment group borders two ancestral territories in the control group, two pairs would be created.

[44] In this specification, at the community level we use a logit model that regresses an indicator for whether a community signed a historic treaty on our full set of determinants and historical controls. From here, we generate propensity scores and only keep communities that fall within 0.1 and 0.9 of the propensity score, as suggested by Imbens (2015). Next, we merge this chosen set of communities with the individual-level restricted access data, keeping only individuals in communities that meet the propensity score criteria. We then use the nearest neighbour methodology to estimate average treatment effects using the 4 nearest neighbours.

procedure that selects the controls that best predict treatment (signing a treaty) and outcomes and then includes the overlap of these two sets as the main set of controls. Finally, we use an IV specification that leverages tribes' neighbours' past experiences with treaty-making to predict whether a tribe signs a treaty.[45] Our results are generally robust across all of these specifications.

5 Results

5.1 Historical Determinants

We begin by considering the determinants of whether an Indigenous nation signed a treaty at all in Table 4. Panel (a) displays the unconditional correlates of signing a treaty, where columns (1)-(7) report estimates from specifications that include each determinant separately. All factors are included simultaneously in column (8). Here, we see that factors that likely allowed tribes to delay signing a treaty in good economic times, but that could have increased the benefit of signing a treaty in poor economic times tend to be positively correlated with signing a treaty. Tribes that were affected by the rapid loss of the bison (column (2)) and tribes that were historically involved in trapping (column (3)) are more likely to sign a treaty than other tribes.

Tribes with more rugged ancestral territory were less likely to sign a treaty, a finding that is not surprising, given the existing literature on the relationship between ruggedness and historical institutions. Nunn and Puga (2012) shows that areas of Africa with rugged terrain were better able to fend off slave-raiders. This narrative may also be true in North America, where tribes with more rugged terrain could have been able to fend off settlers or encroaching colonial powers militarily and thus reject a treaty. Alternatively, rugged terrain may have simply increased the transaction cost of signing a treaty for Europeans. We also see that tribes with larger ancestral territories were more likely to sign a treaty – a larger ancestral territory reduces the marginal value of land to a nation of a given population size, making treaty-making more likely. An alternative explanation would be that larger ancestral territories may have increased the reward to the colonial powers from coercing the signing of a treaty.

The positive coefficient on the number of mines may appear to contradict the negative coefficients on the presence of gold or silver in one's ancestral territory. While generally minerals would have raised the value of land to Europeans (as suggested by the positive coefficients on the number of mines), during the Gold Rushes of the mid-to-late 1800s, there was a massive population expansion in British Columbia and the Yukon with settlers from the United States. This may have substantially shifted the bargaining positions of settler governments in regions with gold and silver that did not occur in areas with other minerals. This shift in bargaining power might have been large enough to allow settlers to simply expropriate resources from Indigenous nations.

[45] Specifically, the first stage uses two indicators: one for whether a tribe's geographic neighbour signed a treaty in a previous year and whether a tribe's geographic neighbour who is in the same language network signed a treaty in a previous year. This first stage is then used to predict having signed a historic treaty and the second stage uses the predicted value from this specification in place of the indicator for having signed a historic treaty. The intuition for this instrument is that that a nation may learn from their neighbors about the potential benefits and costs associated with treaty-making and, thereby influencing the probability of signing a treaty.

The raw correlations also suggest that tribes' neighbours' involvement in treaty-making was historically important. While the coefficient on a neighbour in your geographic network having signed a treaty previously is not statistically different from zero, having a neighbour whose language is in the same language group as yours and who signed a treaty in a previous period is both economically and statistically significant. One of the reasons that a neighbour's involvement in treaty-making may have been important is that tribes could share information about their neighbours' experiences in order to negotiate potentially better treaties, or feel more confident they understood their risks and benefits, and thus be more likely to accept their terms. In this sense, information sharing served the dual purpose of reducing the transaction costs of doing business by learning about the "rules, enforcement features, and norms of behavior," (North, 1989) and allowing tribes to safeguard against potential exploitation.[46] Miller (2009) notes that tribes often did share information in practice, and he uses the particular example of Treaty No. X, wherein...[47]

With a few exceptions, the majority of the correlations between the pre-specified treaty determinants and the probability of signing a treaty continue to hold when we include all factors in the model simultaneously (column (8)). They are also generally unaffected by including our full set of historical controls (Table 5), which reassures us that we have identified the primary determinants of signing a treaty based on the historical narrative. Coefficients on the historical controls are included in Table B.2 of the Online Appendix.

5.2 The Timing of Treaty-Making

Next, we evaluate the timing of treaty-making. Looking to the U.S. literature, Leonard et al. (2020) and others hypothesize that reservations with better land quality would be allotted sooner, while those with worse quality land would be allotted later.[48] As such, in our analysis, we may expect European colonizers to engage in treaty-making earlier if Nations' ancestral territory was more valuable to Europeans. Similarly, treaties should be signed later, or not at all, with nations whose ancestral territories were less valuable from the perspective of Europeans. Indigenous nations themselves may have been more likely to sign a treaty during periods of deteriorating outside options.

Table 6 reports estimates from Cox Proportional Hazard models. These results condition on the full set of historical controls. Looking at column (8) which includes all determinants in the same model, we see that treaties were signed later by tribes with more rugged terrain, those that experienced the gradual loss of the bison, those whose neighbours signed before them, and those with silver in their traditional territories. Treaties were signed earlier by tribes that experienced

[46] Learning from ones' neighbours has been shown to be important in a variety of other economic contexts. Buera et al. (2011) shows how neighbouring countries' experiences with the adoption of market-oriented policies affected the evolution of market-oriented policies regionally.

[47] Miller (2009) also describes how tribes on either side of the Canadian-U.S. border also used information on neighbouring experiences to negotiate treaties with better terms.

[48] Other authors providing evidence that those with better land were allotted more quickly include Carlson (1978, 1981, 1983) and Dippel and Frye (2019).

the rapid loss of the bison, and those whose ancestral territories had a larger number of total mines. The coefficients are not statistically significant. Overall, we view the results in Table 6 as evidence that nations with more valuable and defensible land were able to delay treaty making.

Since treaty-making happened over several centuries, however, not all factors present in our list of determinants lend themselves to a simple interpretation in terms of increasing or decreasing the value of signing a treaty to European colonizers. Instead, some factors may have been more or less important for Indigenous nations' willingness or desire to sign a treaty with Europeans. These factors may also have had a time component wherein their influence in treaty-making would have been different during specific time periods. Such factors include the decline of the bison through the nineteenth century and changes in fur prices.

We probe these specific points related to the timing aspect of treaty-making by recasting our dataset as a panel. What this means is that for each of the 1134 CSD-band units, we generate yearly observations from 1700-1930. From here, we construct a set of time-varying factors to examine the determinants of signing a treaty in a given time period. Thus, the outcome of interest is now $T_{i,g,t}$, which equals 1 if community-band i belonging to group g signed a treaty in year t. Table 7 displays the results of this panel specification, where in columns (1) through (4) we include some factors that vary by geographic tribe grouping and in columns (5) through (8) we replace these tribe-level controls with tribe fixed effects.

The first time-related event we investigate is the near-extinction of the bison. The loss of this resource towards the end of the nineteenth century meant that the resource that underpinned many societies of the Great Plains disappeared over a very short period of time. If bargaining power among Plains nations was tied to this outside option, then the elimination of the bison could be seen as a rapid reduction in their bargaining power. As this resource disappeared, the net benefit of a bison-society signing a treaty would have increased due to the deterioration of their outside options. Daschuk (2013) discusses this narrative in detail in his book, "Clearing the Plains". If this was the case, then we should see an increase in the likelihood of signing a treaty during the timing of the slaughter. This is confirmed by the the estimates in Table 7: nations that were impacted by the rapid slaughter of the bison are about 2.4 percentage points more likely to sign a treaty during the years of the slaughter compared to Nations that were not impacted by the rapid slaughter.

Table 7 also shows that nations whose ancestral territory was covered by the primary beaver trapping range were about half a percentage point less likely to sign a treaty in any of the years prior to 1850 when fur prices were relatively high. This is further evidence that Indigenous nations were more likely to sign treaties during time periods when they had fewer outside options.

These results highlight the fact that many First Nations signed treaties during periods of economic distress. To the extent that ceding land is giving up a valuable future asset—both economically and culturally—and that the terms under which the exchange are worse given a worse bargaining position, we may expect the signing of treaties to have long-run implications for inequality between treaty and non-treaty communities.

5.3 The Content of Treaties

Given the ambiguous predictions regarding the direction of treaty signing and the bargaining positions of tribes, we estimate more specific models in Table 8 that focus on the individual clauses contained in treaties. In this table, we restrict our analysis to nations that signed a treaty and evaluate the probability that a treaty contains a specific clause. We speculate that education, the rights to hunt, fish, and trap, retaining villages, and acquiring farmland are treaty clauses that are desirable on the part of Indigenous nations. Treaties that offered a cash payment to the chief or one time cash for land, as well as no liquor clauses are neutral clauses. Blanket extinguishments of rights to the land is an undesirable clause.

Farmland clauses and education clauses are particularly interesting because of their potential long-run consequences. On average, tribes with rugged terrain are less likely to obtain a treaty with farmland, which is intuitive if rugged terrain is not conducive to farming. Tribes that experienced the gradual depletion of the bison were less likely to obtain farmland, while those that experienced the rapid depletion were more likely to obtain farmland. This may have to do with the fact that tribes that experienced the rapid depletion of the bison would have needed to secure an outside option to bison hunting relatively quickly. The negotiation of the farmland clause may have been an attempt to reduce their economic uncertainty related to the loss of the bison (Miller, 2009).

Most factors are not strongly correlated with the undesirable blanket extinguishment clause (column (6)). However, conditional on having signed a treaty, having a geographic neighbour sign a treaty in a previous time period is positively correlated with signing a treaty with blanket extinguishment of rights, while having a neighbour in the same language group sign a treaty in a previous time period is negatively correlated with signing a treaty with blanket extinguishment of rights. This finding suggests that tribes' ability to communicate with one another may have affected their negotiation strategies.

Admittedly, our analysis of the determinants of treaty clauses relies on our interpretation of clauses being positive or negative for Indigenous Nations. We therefore supplement the treaty clause analysis with the natural language processing discussed above to generate a normalized sentiment score for each treaty which is not impacted by our choice to classify clauses in a particular way.[49] Table 9, contains these estimates that examine whether the determinants that we perceive as having shifted bargaining power are correlated with the sentiment of treaties signed. Again, we focus on the sample of communities that signed historic treaties. Column (1) presents the correlations without historical controls while column (2) includes those controls.

Focusing on the controlled estimates in column (2) indicates that nations with more rugged terrain, those who experienced the gradual decline of the bison and those where silver had been discovered in their traditional territories by 1915 signed treaties with lower sentiment. Nations that experienced the rapid decline of the bison, those with a larger share of their territory covered by the primary trapping range, and those with more mines in their traditional territory and where

[49] We have also examined the determinants of the topic based analysis. These results are presented in the Online Appendix, however, they do not have a straightforward interpretation.

gold had been discovered by 1915 signed treaties with better overall sentiment.[50]

Comparing the sentiment results to those of the individual treaty clauses does not reveal a clear narrative regarding bargaining power and the content of treaties. One possible explanation for this result is that the treaties reflect specifically what Europeans wanted in the contracts and are not representative of Indigenous interpretations of the treaties. This is indeed discussed in the legal and historical narrative (Craft, 2013) and reconciles the fact that many of our determinants are correlated with the probability of signing a treaty in a way that is consistent with economic theory, while the content of treaties is not systematically correlated with these same determinants. Another way of saying this is that whether a treaty exists or not is measured precisely, but the content of treaties, as understood by both parties at the time of signing, is mis-measured.

5.4 Contemporary Income in Treaty Communities

Given that treaties shifted the allocation of property rights and have contained particular clauses that imply long term commitments on the part of the state, we would expect them to be correlated with modern economic activity. However, since the enforceability of treaties relies largely on the legal system of Canada, it is unclear how much impact they may have had on development. In this section, we examine the relationship between signing a historic treaty and long-run economic outcomes in Indigenous communities. We also consider the impact of the specific content of treaties, as measured by treaty clauses. In the Online Appendix we show differences in long-run outcomes between communities that signed Comprehensive Treaties, Peace and Friendship Treaties, Land Surrenders, and those that did not sign any treaties.

Table 10 displays the impact of signing any historical treaty on several sources of income in 2016. Each specification was estimated using our preferred contiguous border strategy, but in Figures A.6, A.7, and A.8 of the Online Appendix we show the results using each of our additional empirical specifications. First, column (1) shows that communities that signed a historical treaty had approximately -$6,000 lower incomes in 2016. Given that the mean total income among all Indigenous people in the 2016 Census was $42,281, this income difference is substantial. Further, since $42,281 reflects the average income among those living both on and off Indigenous communities, while our comparison focuses within Indigenous communities, this is almost surely an even larger relative difference in total incomes.

The next columns examine which sources of income are generating the largest differences between treaty and non-treaty communities. Column (2) shows that, after taxes and transfers, the income gap is smaller, as expected; however, the magnitude is still substantial and suggests that individuals in treaty communities have approximately $3,600 lower after tax income than those in non-treaty communities. The next column suggests that the majority of the difference in total income is the result of differences in employment income (3), which is unlikely due to differences in the propensity to be in the labour force (column 6). Investment income is also lower (column (4)), in the realm of $500. Interestingly, government transfers are not statistically different be-

[50] For the factors associated with the determinants of different treaty topics as identified by the Latent Dirichlet Allocation model, see Table B.5.

tween treaty and non-treaty individuals (column (5)). This result is surprising because one would expect that if total income is lower, then by the structure of Canada's tax and transfer system, government transfers would be higher. Additional analysis using quantile regression reveals that the largest differences in income are located among those at the top of the income distribution, and are therefore among individuals least likely to qualify for additional government transfers.[51]

6 Why Do Treaty Communities Have Lower Incomes?

6.1 Labour Market Channels

One explanation for the difference in incomes across treaty and non-treaty communities is related to differences in the characteristics of workers in both types of communities. For example, communities with younger or less educated workers may mechanically have lower incomes because they are either on different parts of the age-earnings profile or on a lower age-earnings profile. Alternatively, the structure of labour markets may be different, in terms of the composition of occupations or the availability of jobs. Other reasons include the differential presence of non-Indigenous people, different rates of out-migration, or spatial isolation.

We find that the differences in total income between treaty and non-treaty communities cannot be explained by differences in age structures, education, the probability of employment, the presence of non-Indigenous people (both historic and current), occupational composition, migration, community type or spatial isolation.[52] Since these standard labour market channels do not appear to drive the observed income gap, we turn to an examination of whether the structure of property rights, both historically and in more recent years, provides a plausible explanation for the divergent incomes between treaty and non-treaty communities.

6.2 Early Indigenous Title and Settlement Patterns

If historical treaties had binding consequences for recognized Indigenous property rights at the time they were signed, then we would expect to see a difference in the settlement patterns across territories that were ceded and those that were not. After all, the common narrative in Canadian history is that treaties preceded the European settlement of a region and that if the English, French, or eventual Canadians wanted to settle in a region, they would first need to negotiate a treaty (Washburn, 1995; St. Germain, 2001; Miller, 2009). We consider this conjecture using decadal data on population in tribal territories that we compute by overlaying population density from the HYDE database with the tribal territory maps from the Smithsonian institute. We are cautious with our interpretation of these data, as recent work by Guinnane (2021) has called into question the reliability of McEvedy and Jones, one of the underlying sources used in the HYDE database. Panel (a) of Figure 9 displays population density in a tribe's traditional territory if members of the tribe signed a treaty. We see that population density breaks discontinuously around the time

[51] These results are unreported at present pending vetting by Statistics Canada.

[52] Section C of the Online Appendix provides a more detailed analysis of education, including the presence of residential schools, as a possible channel. We do not find evidence that differential educational attainment explains the long-run differences in income.

a treaty was signed, consistent with the narrative that treaties preceded settlement.

However, panel (b) of Figure 9 offers a different perspective. Panel (b) displays the average population density for *all tribal territories* over time whether or not they signed a treaty. The markers indicated by a circle display the density for tribes who signed a treaty, normalized around the earliest date the treaty was signed. The markers indicated by a triangle display the average population density for all tribes who did not sign a treaty with the data normalized around the average date treaties were signed. One can think of this exercise as creating a placebo test of whether settlement required a treaty in practice, with the triangle markers indicating a counterfactual. The data plotted for tribes who did not sign treaties shows that population density was the same or slightly higher in areas that would eventually sign a treaty and increases in a similar fashion to those that did sign a treaty over the next 100 years.[53]

To the extent the HYDE data accurately represents the settlement of Canada, this suggests that the timing of settlement in Canada was more coincidental with the signing of treaties than the result of signing treaties: settlement appears to have proceeded in areas without treaties in a fashion similar to those with treaties. The key insight we take from the data presented in Figure 9 is that while treaty timing is correlated with settlement, the act of settlement, at least in the period during which most treaties were signed, did not always occur with treaty. This is important for reflecting on the actual value to Indigenous nations of not engaging in the treaty-making process, as Indigenous land rights do not appear to have been effective in prohibiting settlement in practice. In fact, in a 1887 legal case that shaped Aboriginal law in Canada for decades, [54] it was determined that Aboriginal occupation of the land existed at the discretion of the Crown and endorsed the doctrine of discovery. Thus, treaty or no treaty, this legal case suggested that Aboriginal title did not exist as an inherent right. However, this was at odds with the Royal Proclamation and the process by which subsequent acquisition of Indigenous lands were to be brought into the Canadian state (Redish, 2019) and the nation to nation relationship expressed in treaties (Borrows, 1997).

6.3 Indigenous Rights and Title Since the 1980s

Given that property rights do not appear to have been respected historically, we now evaluate whether changes in the legal landscape since the 1970s may have provided greater scope for Indigenous nations to assert jurisdiction over their unceded lands. In the 1970s, Canadian jurisprudence began to shift with Calder et al. v. B.C. attorney general and the subsequent patriation of the Canadian constitution in 1982, Section 35 which "recognizes and affirms the existing Aboriginal and treaty rights of the Aboriginal peoples of Canada." These changes effectively shifted Canadian law back towards the values expressed in the Royal Proclamation. While several important court cases were settled by the Supreme Court during the 1990s (importantly Delgamuukw v British Columbia (1997) which expressed the duty to consult when Aboriginal rights may be adversely impacted), it wasn't until 2004 in Haida Nation v. British Columbia that it was established that

[53] We have also generated a placebo date for those nations that did not sign a treaty drawing randomly from the distribution of dates treaties were actually signed with similar results.

[54] Supreme Court of Canada, St. Catharines Milling and Lumber Co. v. R, (1887) 13 S.C.R. 577.

the Crown has a duty to consult Indigenous peoples when it intends to act in a manner that may effect established *or potential* Aboriginal rights (Brideau, 2019). This, in conjunction with the recognition of the potential existence of Aboriginal title in areas *not* covered by treaty, may have created a legal environment in which nations who did not cede their land are in a superior bargaining position today. This would be the case in bargaining with both the the federal government and individual firms.

If this property rights channel is a significant determinant of the modern income wedge between treaty and non-treaty communities then we would expect income differences to be small or non-existent prior to the affirmation of Aboriginal rights and title and the establishment of the duty to consult. We test this prediction by merging our historical dataset with restricted access data from the Censuses of 1981-2016 in Figure 10. Here, we pool all census waves and interact the indicator for signing a treaty with dummies for each census wave. The model does not include a constant, so that each coefficient estimate can be interpreted as the difference between treaty and non-treaty communities by year, after accounting for year fixed effects and historical determinants. Once accounting for all historical factors, it is evident that income differences only emerge after the full establishment of duty to consult where Aboriginal title is either known to exist or may potentially exist because it was never ceded through treaty.

To test this channel more directly, we link nations to data on mining agreements between Indigenous nations, the Crown, and mining firms made available by Natural Resource Canada.[55] The number of these agreements over time is depicted in Figure 11. After Haida Naition v. British Columbia in 2004, there is a sharp rise in the number of these agreements. These agreements often include revenue sharing and conditions for the employment of Indigenous nation members. In Figure 12, we present the estimated treaty effect over time, conditional on all historic factors that influence treaty signing (black squares), and the estimated effect that includes controls for the number of agreements a nation has signed (red circles).[56] The number of mining agreements signed notably reduces the trend in income differences over time and the treaty effect becomes statistically insignificant. These results provide further evidence that historical treaty nations have lower income today in part because of differences in the scope of modern recognized property rights.

7 Discussion

This paper examines the economic determinants of historical treaty-making between Indigenous nations and European powers and its consequences for long-run economic outcomes in Indigenous communities. Consistent with basic principles in contract theory, our analysis of historic treaty-making suggests that treaties were most likely to be signed by Indigenous nations during periods of resource depletion and when their bargaining power was relatively weak. We find little evidence

[55] These data can be found at https://atlas.gc.ca/imaema/en/index.html. Last accessed September 10, 2021.

[56] This plot is displayed using public-use data, as the one with restricted-access data is pending Statistics Canada vetting. The plots using restricted-access data depict a similar pattern, wherein controlling for the number of mining agreements in a region reduces the magnitude of the treaty penalty estimate by approximately half.

that these economic forces led to systematic differences in the types of clauses contained within the treaties. This result is consistent with the legal and historical literature that documents that treaty texts did not reflect the true intent of treaty negotiations at the time of signing (Craft, 2013).

Our examination of the determinants of treaties helps to inform our subsequent empirical analysis which evaluates the impact of historical treaties on the path of economic development in Indigenous communities. We provide robust evidence that nations that signed historical treaties have substantially lower incomes into the present compared to their non-treaty counterparts. After ruling out differences in labour market conditions as a possible explanation for the income gap, we provide evidence that changes to the legal landscape relating to Indigenous property rights and land title led to the present-day income gap. Here, we show that court decisions that began in the 1970s and gained momentum after the patriation of the Constitution in 1982 increasingly allowed non-treaty communities to benefit from economic rents on their lands. This led to a widening of the income gap between treaty and non-treaty communities.

Historical treaties have provided the legal foundation for economic and institutional development in the majority of the territory within present-day Canada. The original intent of the treaties, as understood by Indigenous signatories was to provide the framework for the shared use of lands. Instead, the treaties have resulted in a backwards structure of property rights that limited Indigenous nations from extracting rents from their lands.

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8 Figures



Figure 1: Canadian land covered by historic treaties. Dates correspond to the year each treaty was signed. Note that the date, 1779, on the East Coast marks the last date in a series of Peace and Friendship Treaties signed between the British and Mi'kmaq and Maliseet groups.

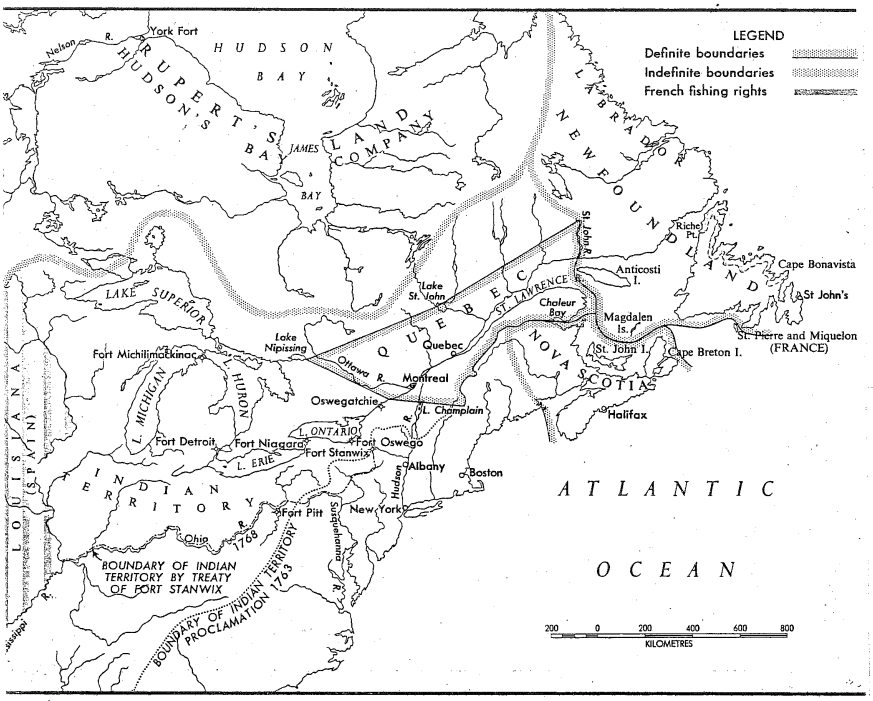


Figure 2: North America as of the Royal Proclamation of 1763, reproduction from the Historical Atlas, 3rd edition, page 31.

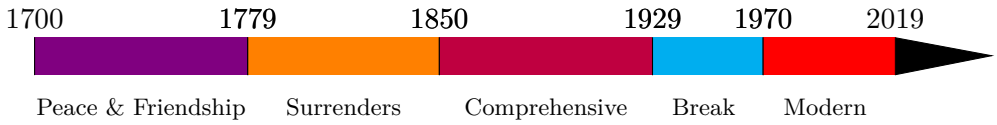


Figure 3: Timeline of treaty-making between Indigenous groups and the British crown and Canadian governments.

Figure 4: Timeline of Legislative Changes Relating to Aboriginal Rights and Title

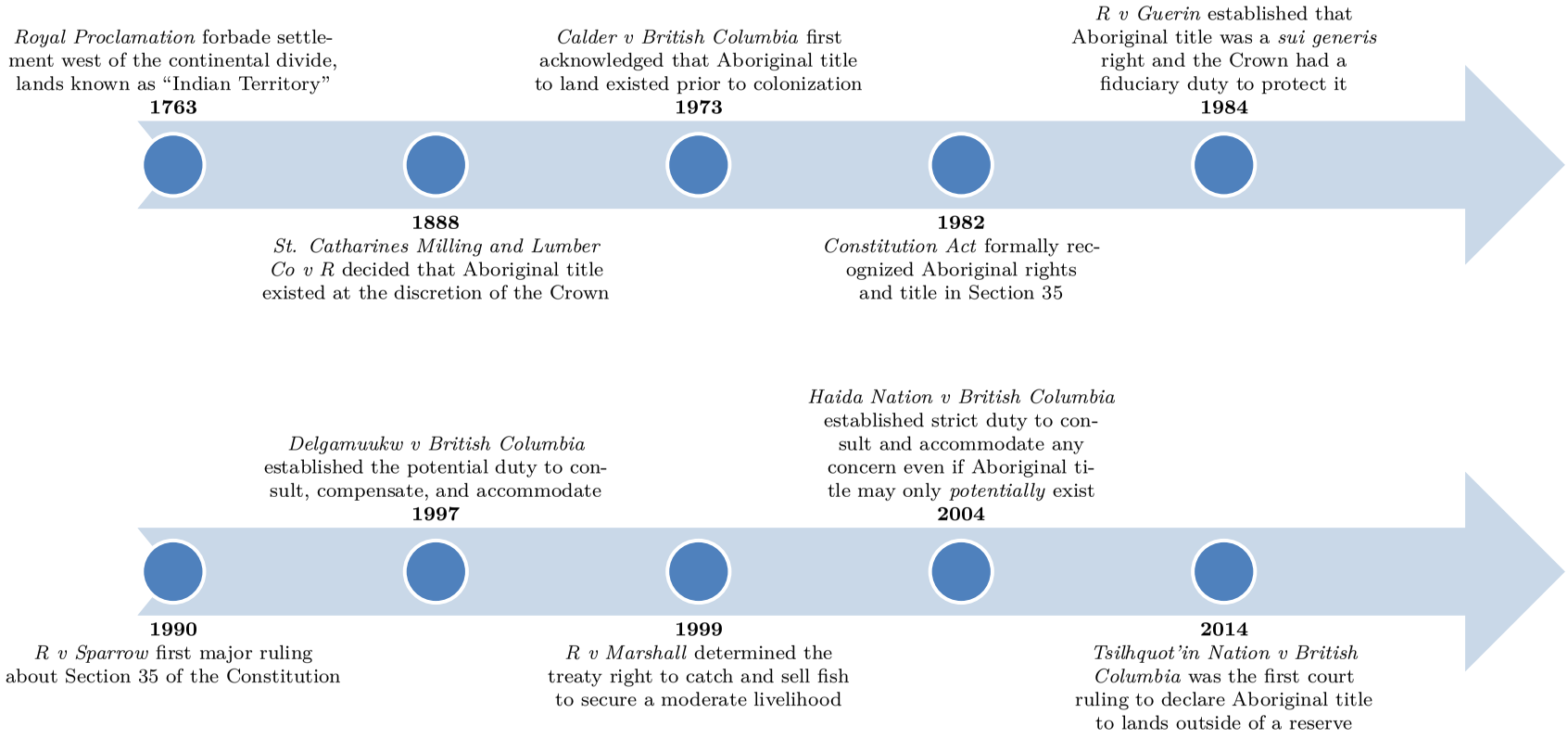
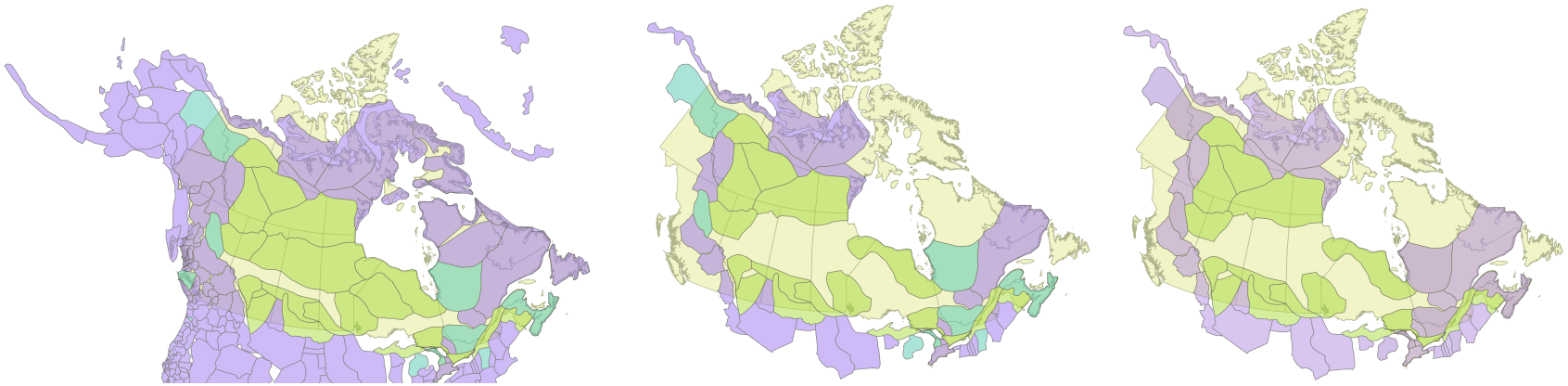


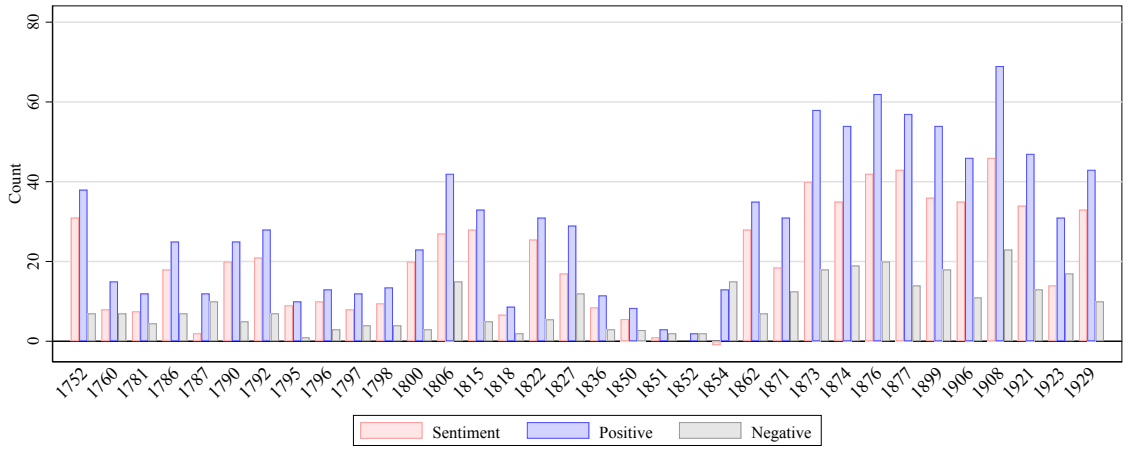


Figure 5: Digitized tribal territories from the Smithsonian's Handbook of North American Indians. Colours delineate maps that were digitized from separate volumes of the Handbook.

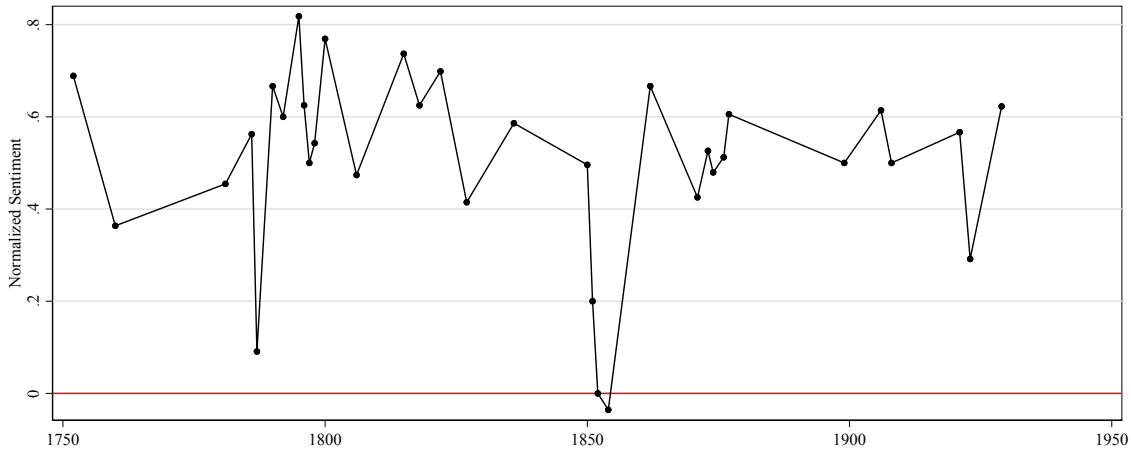


(a) All territories (b) Removing no-neighbour-matches (c) Final treatment and control

Figure 6: These maps display the construction of treatment and control territories for the contiguous border strategy. Figure (a) shows all tribal territories that intersect with present-day Canada. Purple regions represent ancestral territories where no associated bands ever signed a historic treaty, light green show those territories where treaties were signed on behalf of all bands, and aqua territories are those where some bands signed a treaty and other bands did not. In figure (b) we show the ancestral territories that are removed from the paired-analysis since all of their neighbours also consist of territories where all associated bands signed treaties. Figure (c) displays how our contiguous pairs are ultimately classified with purple representing "control" and light green representing "treatment". Here, we allow control territories to include those where"some signed" and treatment territories are always those where "all signed".



(a) Count of positive and negative words and the difference between positive and negative counts (sentiment)



(b) Treaty sentiment normalized by the total number of positive and negative words

Figure 7: The top panel shows treaty sentiment by date of treaty. Words are classified as positive or negative and the difference between the number of positive and negative words reflects the "sentiment" of the document. The bottom panel normalizes the sentiment by the total count of positive and negative words.

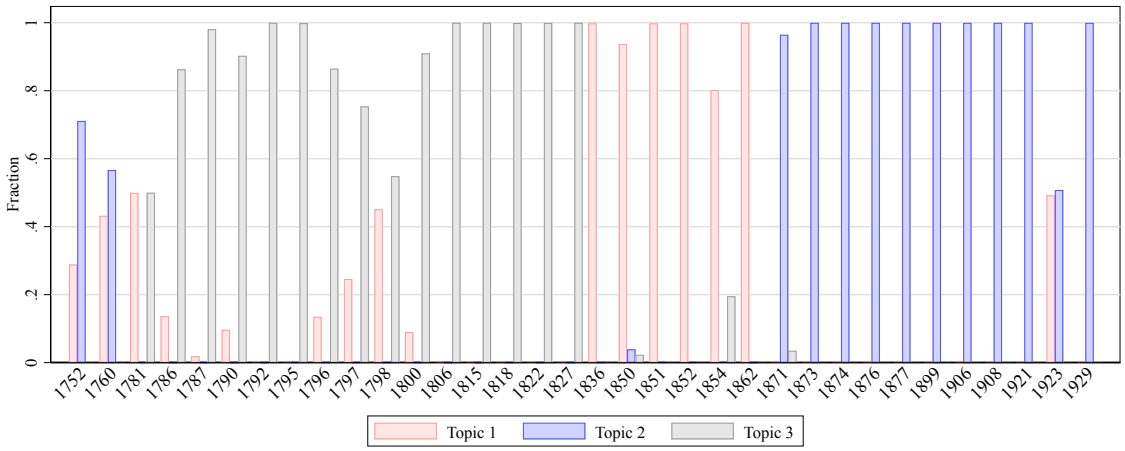
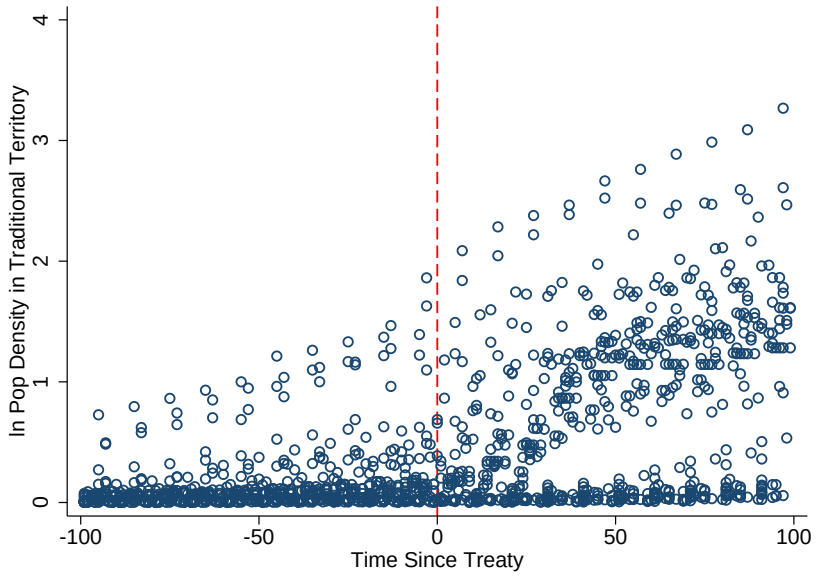
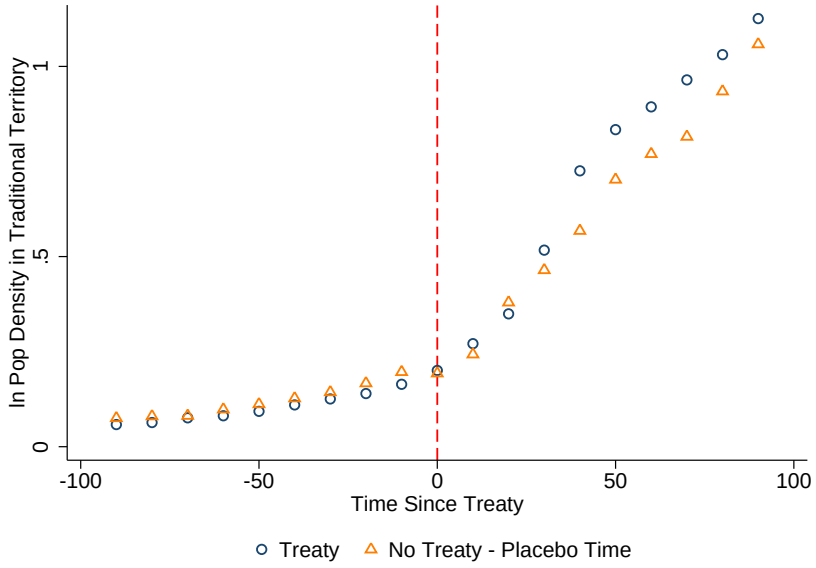


Figure 8: LDA groups over time.



(a) Treaty Signatories by First Nation



(b) Averaged by Treaty Status

Figure 9: Population Density in Traditional Territories Relative to Time of Signing a Treaty. Panel A is average population density by tribal traditional territory for all tribal groups that would sign a treaty and the date is the date of the earliest treaty signed. Panel B is the average population density for all tribes who signed a treaty normalized around the earliest date the treaty was signed and the average population density for all tribes who did not sign a treaty with the data normalized around the average date treaties were signed.

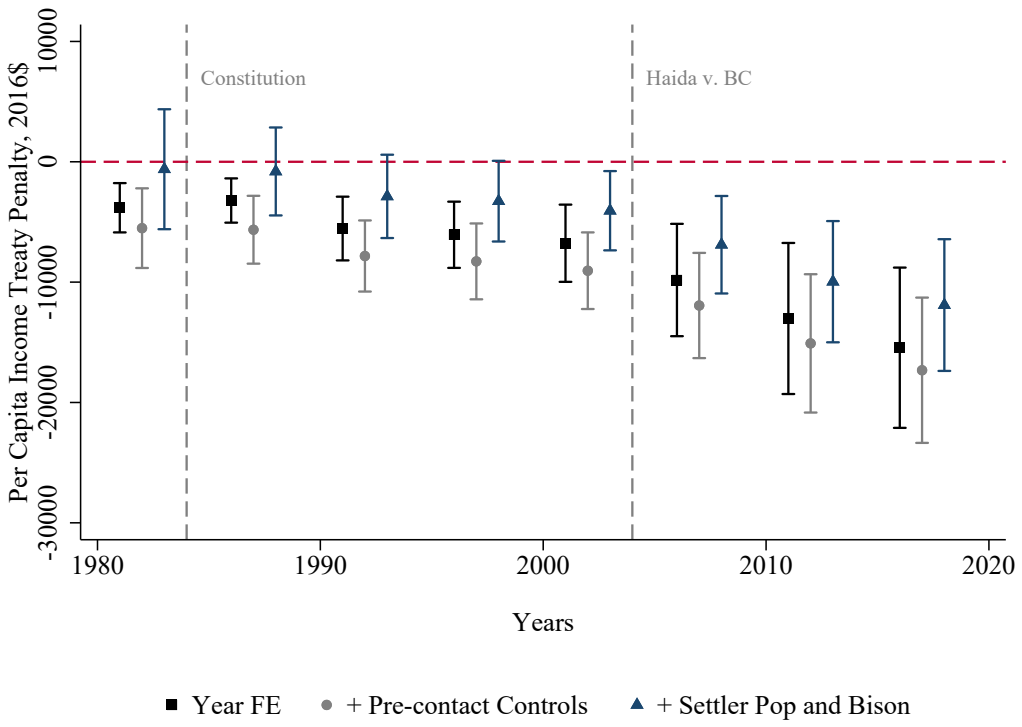


Figure 10: The figure depicts the estimated impact of having a treaty on total individual income using data using Confidential Census data from 1981, 1986, 1991, 1996, 2001, 2011, and 2016. The dashed lines correspond to the patriation of the Canadian Constitution in 1982 and Haida Nation vs. British Columbia in 2004.

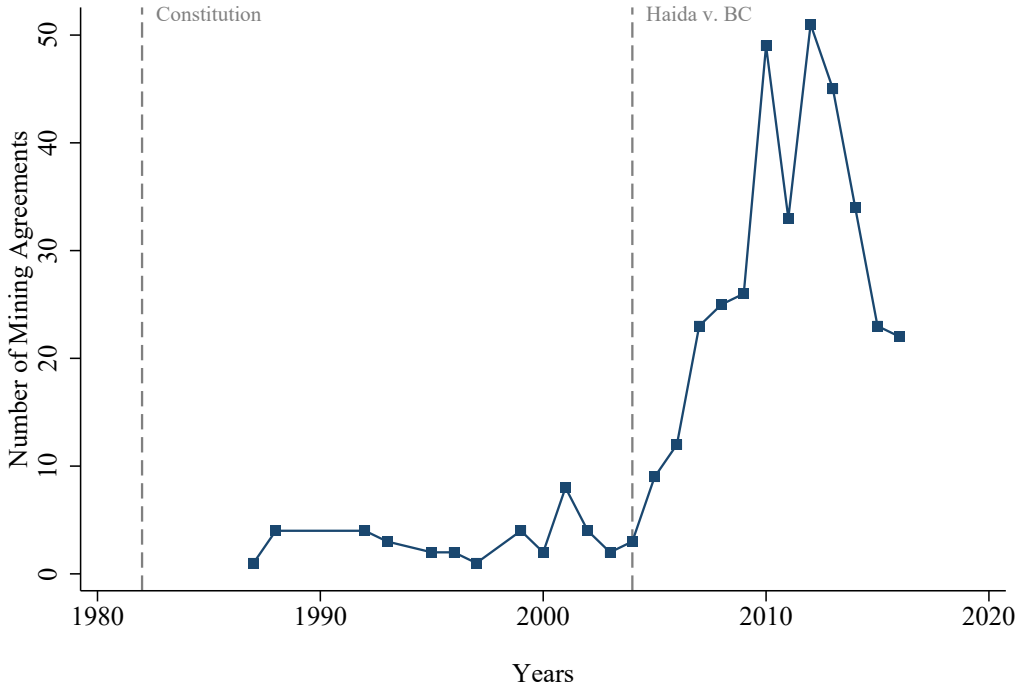


Figure 11: The figure depicts the number of agreements between Indigenous nations and mining firms over time. These agreements include formal impact benefit agreements and other revenue sharing agreements from mining projects. The outcome is total per capita income estimated using data from Indigenous Service's Canada Community well-being index over each year available. Data on agreements come from Natural Resources Canada: https://atlas.gc.ca/imaema/en/index.html.

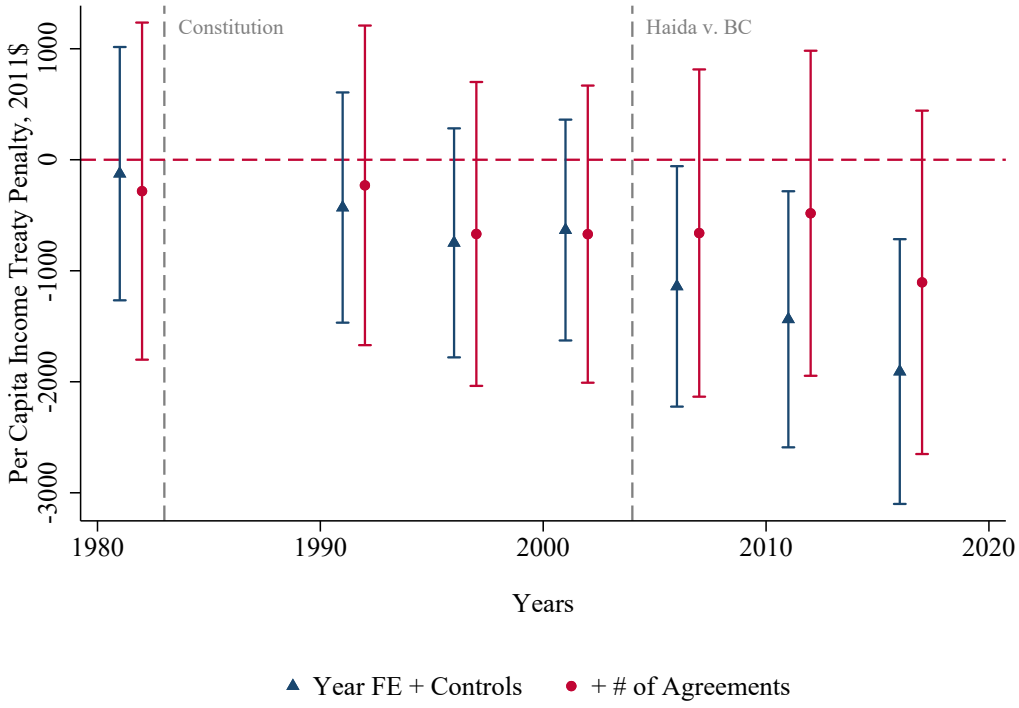


Figure 12: The figure depicts the number of agreements between Indigenous nations and mining firms over time.

9 Tables

Table 1: Expected Effects of Determinants on Value, Power to Exert Force, Probability of Signing, and Treaty Terms for Indigenous Nations

	Colonial Value of Treaty	**Colonial Power to Exert Force**	**Indigenous Value of Treaty**	**Indigenous Power to Exert Force**	**Probability of Signing**	**Treaty Terms for Indigenous Power**	**Data Source**
Log(Avg. Ruggedness) in Ancestral Territory	↓	↓	?	↑	↓	↑	Riley (1999)
Area of Ancestral Territory (KM^2)	↑	↑	↑	↓	↑	?	Smithsonian Maps
Renewable Resource Abundance	?	?	↓	↑	↓	↑	Hornaday 1889 Original Bison Range, Original Trapping Range
Renewable Resource Loss	?	?	↑	↓	↑	↓	Hornaday 1889 Rapid-loss Bison Range, Trapping Range After the Decline of the Fur Trade
Neighbour Signed (Geog)	N	?	?	↓	?	?	Author calculation from Smithsonian Maps
Neighbour Signed (Lang)	N	?	?	↓	?	?	Author calculation from Handbook of North American Indian
Minerals Valuable on European Markets	↑	N	N	N	↑	↑	Any gold or silver in 1915, Number of Mines in Territory

Notes: "N" refers to no implication; "?" refers to the implication being uncertain.

Table 2: Summary Statistics: Treaty Clauses

	(1) Mean	(2) St. Dev
No Liquor	0.55	0.50
School in Reserve	0.38	0.49
Teacher's Salary	0.24	0.42
Retain Village	0.04	0.18
Rights to Hunt/Fish/Trap	0.89	0.31
Medicine Chest	0.17	0.38
Cash for Chief	0.37	0.48
Land per Family of 5	456	274
Provides Farmland	0.82	0.38
Blanket Extinguishment	0.65	0.48
Land Surrender	0.04	0.20

Notes: Means and standard deviations for communities that signed treaties. Number of observations is 600 in all rows.

Table 3: Summary Statistics: Main Determinants

	(1) No Treaty	(2) Treaty	(3) Difference
Log(Avg. Ruggedness) in Ancestral Territory	5.43	3.22	2.21***
	(0.94)	(0.71)	
Area of Ancestral Territory (KM^2)	0.10	0.24	-0.14***
	(0.13)	(0.21)	
Loss of Bison 1730-1870	0.04	0.36	-0.32***
	(0.13)	(0.38)	
Loss of Bison 1870-1889	0.05	0.48	-0.43***
	(0.15)	(0.45)	
Share Trapping Range	0.10	0.36	-0.26***
	(0.28)	(0.45)	
Neighbor Signed (Geog)	0.50	0.76	-0.26***
	(0.50)	(0.43)	
Neighbor Signed (Lang)	0.29	0.69	-0.40***
	(0.46)	(0.46)	
Any Gold 1915	0.64	0.20	0.45***
	(0.48)	(0.40)	
Any Silver 1915	0.42	0.09	0.33***
	(0.49)	(0.28)	
Number of Mines in Territory	16.40	58.94	-42.54***
	(19.20)	(74.22)	
Observations	534	600	1134

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by geographic tribe grouping are in parentheses in panel A and by contiguous border pairs in panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Determinants of Signing a Treaty (Unconditional)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	-0.290***							-0.252***
	(0.015)							(0.042)
Loss of Bison 1730-1870		-0.213						-0.511***
		(0.174)						(0.172)
Loss of Bison 1870-1889		0.816***						0.665***
		(0.165)						(0.151)
Share Trapping Range			0.407**					0.0833
			(0.165)					(0.139)
Neighbour Signed (Geog)				-0.0858				-0.173*
				(0.183)				(0.095)
Neighbour Signed (Lang)				0.461**				0.0897
				(0.180)				(0.080)
Area of Ancestral Territory (KM^2)					0.945***			-0.430*
					(0.236)			(0.225)
Any Gold 1915						-0.360*		0.103
						(0.199)		(0.116)
Any Silver 1915						-0.179		-0.187*
						(0.233)		(0.095)
Number of Mines in Territory							0.00300***	0.00232***
							(0.001)	(0.001)
Constant	1.766***	0.349***	0.430***	0.352***	0.368***	0.719***	0.412***	1.559***
	(0.079)	(0.092)	(0.121)	(0.122)	(0.116)	(0.094)	(0.108)	(0.241)
Observations	1134	1134	1134	1134	1134	1134	1134	1134
Adjusted R^2	0.641	0.285	0.105	0.161	0.132	0.219	0.127	0.746

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Determinants of Signing a Treaty (Conditional)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	-0.281***							-0.228***
	(0.035)							(0.045)
Loss of Bison 1730-1870		-0.502**						-0.384**
		(0.194)						(0.159)
Loss of Bison 1870-1889		0.723***						0.544***
		(0.192)						(0.147)
Share Trapping Range			0.0397					0.108
			(0.125)					(0.112)
Neighbour Signed (Geog)				-0.154				-0.168**
				(0.127)				(0.068)
Neighbour Signed (Lang)				0.188				0.0537
				(0.139)				(0.072)
Area of Ancestral Territory (KM^2)					0.255			-0.128
					(0.610)			(0.442)
Any Gold 1915						-0.451***		-0.123
						(0.118)		(0.093)
Any Silver 1915						0.0167		-0.208***
						(0.155)		(0.068)
Number of Mines in Territory							0.000567	0.00225***
							(0.001)	(0.001)
Constant	5.867	-5.437	0.233	-0.255	1.167	-0.395	0.175	1.056
	(3.668)	(7.096)	(6.787)	(7.099)	(7.412)	(5.081)	(6.481)	(4.283)
Observations	1134	1134	1134	1134	1134	1134	1134	1134
Adjusted R^2	0.781	0.684	0.637	0.648	0.638	0.710	0.638	0.833

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by geographic tribe grouping are in parentheses. Each specification controls for historic centralization, calories from agriculture, semi-permanent settlements, history of property rights, history of egalitarianism, length of waterway in traditional territory, closest railway station, closest trading post, historical population at trading post, date of railway entering traditional territory, traditional territory borders US, and population from 1600-1900. Please see Table B.2 for coefficient estimates on controls. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Timing of Signing a Treaty (Cox Proportional Hazard Models)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	0.426***							0.415***
	(0.088)							(0.113)
Loss of Bison 1730-1870		0.223**						0.0243***
		(0.141)						(0.034)
Loss of Bison 1870-1889		10.31***						18.27**
		(7.590)						(21.966)
Share Trapping Range			0.680					0.479
			(0.425)					(0.396)
Neighbour Signed (Geog)				0.316				0.127**
				(0.317)				(0.119)
Neighbour Signed (Lang)				2.237				3.443
				(1.883)				(3.326)
Area of Ancestral Territory (KM^2)					1.822			0.0788
					(2.658)			(0.155)
Any Gold 1915						0.121		0.505
						(0.161)		(0.529)
Any Silver 1915						0.879		0.00924***
						(0.955)		(0.013)
Number of Mines in Territory							1.005	1.027***
							(0.004)	(0.007)
Observations	1134	1134	1134	1134	1134	1134	1134	1134

Notes: The dependent variable is the time elapsed between 1700 and the date the treaty was signed. treaty-making is censored from above at 1930 because this is the year in which historical treaty-making halted in Canada. Standard errors in parentheses are clustered by geographic tribe grouping. All columns include controls for historic centralization, calories in diet from agriculture, semi-permanent settlements, historically had property rights, egalitarian, length of waterway in traditional territory, closest railway station, closest trading post, historical population at trading post, data of railway entering traditional territory, traditional territory borders US, and population from 1600-1900. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Determinants of Signing a Treaty (Time-Varying Sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bison Gradual X 1(1730-1870)	-0.00602***	-0.00738***	-0.00823***	-0.00829***	-0.00858***	-0.00820***	-0.00834***	-0.00824***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
Bison Gradual	0.000893	-0.00101	0.000774	-0.000853	0.000715			
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)			
Bison Rapid X 1(1870-1889)	0.0239***	0.0244***	0.0244***	0.0244***	0.0244***	0.0237***	0.0238***	0.0237***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Bison Rapid	0.00280	0.00100	0.00145	0.00333	0.00354			
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)			
Share Trapping X Pre-1850	-0.00527**	-0.00535**	-0.00493*	-0.00488*	-0.00501*	-0.00448	-0.00451	-0.00452
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Share Trapping	0.00229	0.000267	0.000914	0.000320	0.00316			
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)			
Yrs Since Neighbour (Geog)	0.0000821**	0.0000651*	0.0000416*	0.0000362	-0.00000739	-0.0000187	-0.0000181	-0.0000173
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbour Never (Geog)	-0.00221	-0.00242	-0.00146	-0.00132	-0.000723	-0.00294	-0.00298	-0.00296
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Neighbour Same Yr (Geog)	0.0929*	0.0924*	0.0922*	0.0922*	0.0919*	0.0923*	0.0923*	0.0923*
	(0.053)	(0.053)	(0.053)	(0.053)	(0.054)	(0.054)	(0.054)	(0.054)
Yrs Since Neighbour (Lang)	-0.0000926	-0.0000826	-0.0000763	-0.0000941	-0.0000613	-0.0000748	-0.0000774	-0.0000753
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Neighbour Never (Lang)	-0.000957	-0.0000409	-0.00111	-0.00154	-0.00237	-0.00239	-0.00247	-0.00244
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Neighbour Same Yr (Lang)	-0.00488	-0.00484	-0.00489	-0.00498	-0.00486	-0.00540	-0.00541	-0.00540
	(0.049)	(0.049)	(0.049)	(0.049)	(0.050)	(0.050)	(0.050)	(0.050)
Yrs Since Mine Disc	-0.0000301	-0.00000515	0.00000336	-0.000000139	-0.0000115	-0.0000126	-0.0000130	-0.0000122
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No Mine Disc Yet	0.00206	0.00116	0.000918	0.000855	0.00109	0.00135	0.00136	0.00150
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
# Mines in Territory	0.0000263**	0.0000342***	0.0000377***	0.0000317***	0.0000250***			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
Already Signed Treaty	-0.0163***	-0.0178***	-0.0188***	-0.0191***	-0.0211***	-0.0226***	-0.0230***	-0.0231***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Log(Avg. Ruggedness)		-0.00199***	-0.00149***	-0.00147***	-0.000906**			
		(0.001)	(0.000)	(0.000)	(0.000)			
Area of Ancestral Territory (KM^2)		-0.00845***	-0.00332	-0.00126	-0.000202			
		(0.002)	(0.003)	(0.004)	(0.004)			
Any Gold by 1915		0.00121	0.000283	0.000818	0.000268			
		(0.001)	(0.001)	(0.001)	(0.001)			
Any Silver by 1915		-0.00201	-0.00210*	-0.00182*	-0.000122			
		(0.001)	(0.001)	(0.001)	(0.001)			
Year F.E.	X	X	X	X	X	X	X	X
Prov F.E.					X		X	X
Tribe F.E.						X	X	X
Colonial		X	X	X				X
Settlement			X	X	X			X
Context				X	X			
Observations	261954	261954	261954	261954	261954	261954	261954	261954
Adjusted R^2	0.109	0.110	0.111	0.112	0.113	0.114	0.114	0.114

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty in year t. Standard errors clustered by geographic tribe grouping are in parentheses. In regressions with tribe fixed effects, colonial controls include the number of years since the first rail entered the tribe's traditional territory, an indicator for the rail not having entered yet, the length of waterway in traditional territory, the distance to the closest historical railway station, the distance to the closest historical trading post, the population at the historical trading post, and whether the traditional territory borders the US; settlement controls. Context controls include historic centralization, calories from agriculture, semi-permanent settlements, history of property rights, and history of egalitarianism. In regressions without tribe fixed effects the colonial controls include the number of years since the first rail entered the tribe's traditional territory and an indicator for the rail not having entered yet. Settlement controls in both cases include average population density in traditional territory. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Determinants of Treaty Clauses

	No Liquor	Hunt/Fish/ Trap	Retain Village	Farmland	Cash for Chief	Blanket Extinguishment	Land Surrender	Education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	-0.0508	-0.0414	0.0496**	-0.128***	0.151**	-0.0613	-0.0554**	-0.115*
	(0.072)	(0.046)	(0.019)	(0.031)	(0.069)	(0.092)	(0.022)	(0.063)
Loss of Bison 1730-1870	0.333	-0.118	0.230***	-0.335***	-0.164	0.526	-0.0114	-0.196
	(0.342)	(0.137)	(0.052)	(0.108)	(0.308)	(0.370)	(0.101)	(0.366)
Loss of Bison 1870-1889	0.356	-0.176	-0.384***	0.734***	1.251***	0.105	0.120	0.437
	(0.239)	(0.214)	(0.099)	(0.081)	(0.285)	(0.378)	(0.142)	(0.311)
Share Trapping Range	0.362	-0.499	-0.346**	0.271*	-0.118	0.0727	-0.0928	0.203
	(0.307)	(0.322)	(0.152)	(0.150)	(0.276)	(0.484)	(0.184)	(0.285)
Neighbour Signed (Geog)	0.0857	0.428*	0.108	0.157	0.145	0.603*	0.0200	0.540*
	(0.156)	(0.223)	(0.103)	(0.142)	(0.182)	(0.352)	(0.032)	(0.279)
Neighbour Signed (Lang)	-0.0202	0.0179	0.00982	-0.00258	0.308*	-0.515**	0.0256	-0.329
	(0.120)	(0.051)	(0.023)	(0.025)	(0.168)	(0.235)	(0.030)	(0.243)
Area of Territory (KM^2)	1.634**	-0.413	-0.768***	0.318	1.321*	0.197	-0.669**	-0.468
	(0.758)	(0.563)	(0.234)	(0.395)	(0.657)	(1.131)	(0.257)	(0.712)
Any Gold by 1915	0.479**	-0.158	-0.391***	0.409***	-0.141	0.193	-0.0438	0.425**
	(0.231)	(0.172)	(0.084)	(0.092)	(0.196)	(0.371)	(0.099)	(0.189)
Any Silver by 1915	-0.313	0.355	0.625**	-0.200	1.843***	0.609	0.532	0.876*
	(0.480)	(0.595)	(0.304)	(0.169)	(0.600)	(0.732)	(0.445)	(0.475)
# of Mines in Territory	-0.00405**	-0.00192	-0.000896	-0.000830	-0.00566**	-0.00105	0.000593	-0.00372
	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)
Observations	600	600	600	600	600	600	600	600
Adjusted R^2	0.646	0.693	0.691	0.868	0.512	0.658	0.519	0.539

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty with the indicated clause. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Determinants of Treaty Sentiment

	(1)	(2)
Log(Avg. Ruggedness)	-0.0794**	-0.0534***
	(0.032)	(0.012)
Loss of Bison 1730-1870	-0.197**	-0.291***
	(0.079)	(0.051)
Loss of Bison 1870-1889	0.155	0.178***
	(0.128)	(0.061)
Share Trapping Range	0.0378	0.155*
	(0.067)	(0.089)
Neighbour Signed (Geog)	-0.0558	-0.0778
	(0.082)	(0.077)
Neighbour Signed (Lang)	0.0492	0.0353
	(0.046)	(0.036)
Area of Ancestral Territory (KM^2)	0.0950	0.166
	(0.175)	(0.174)
Number of Mines in Territory	-0.000471	0.000982**
	(0.000)	(0.000)
Any Gold 1915	0.132	0.171***
	(0.115)	(0.052)
Any Silver 1915	0.106	-0.383**
	(0.075)	(0.157)
Controls		X
Observations	600	600
Adjusted R^2	0.268	0.707

Notes: All columns are conditional on signing a treaty. The dependent variable in column (1) and (4) is the normalized sentiment, in columns (2) and (5) it is the fraction of positive words, and in columns (3) and (6) it is the fraction of negative words. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table 10: The Impact of Historical Treaties on Income and Labour Force Participation

	(1) Total Income	(2) After Tax Income	(3) Employment Income	(4) Investment Income	(5) Government Transfers	(6) Not in Labour Force
Signed Treaty	-5955.15***	-3594.57***	-5073.31***	-510.74***	237.93	-0.0225
	(1216.00)	(768.54)	(1136.62)	(140.87)	(152.33)	(.0161)
Adjusted R^2	0.0471	0.0512	0.0460	0.0110	0.0404	0.0410

Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical determinants and additional controls. Determinants include These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table 11: The Impact of Historical Treaties on Total Income, Conditional on Identity

	(1)	(2)	(3)	(4)	(5)
Signed Treaty	-6938.6***	-6673.7***	-6863.9***	-7122.3***	-7124.8***
	(1683.015)	(1814.017)	(1591.086)	(1779.867)	(1787.259)
Indigenous		-25446.7***			
		(2232.927)			
Member of First Nation				-19221.9***	
				(2106.568)	
Registered Status					-18974.7***
					(2120.317)
Just Reserves			X		
Adjusted R^2	0.041	0.061	0.030	0.041	0.041

Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical determinants and additional controls. Determinants include These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table 12: The Impact of Historical Treaties on Total Income, Conditional on Surrounding Characteristics

	(1)	(2)	(3)	(4)	(5)
Signed Treaty	-6938.6***	-8714.5***	-7060.4***	XXXX	XXXX
	(1683.015)	(2974.509)	(1651.652)	XXXX	XXXX
Small Reserve		-687.1			XXXX
		(687.216)			XXXX
Medium Reserve		28262.7***			XXXX
		(4769.204)			XXXX
Urban Reserve		21210.7***			XXXX
		(978.049)			XXXX
# Mines			104.4		XXXX
			(71.101)		XXXX
Avg Total Income				XXXX	XXXX
				XXXX	XXXX
Adjusted R-squared	0.041	0.048	0.041	0.029	0.036

Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical determinants and additional controls. Determinants include These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table 13: The Impact of Historical Treaties on Total Income, Conditional on Labour Market Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Signed Treaty	-7013.9***	-6698.9***	-6239.6***	XXXX	-6293.1***	-7105.6***	-7524.9***	XXXX
	(1617.893)	(1769.175)	(1231.411)	XXXX	(1456.411)	(1320.081)	(1206.592)	XXXX
Moved CSD Since 5 Yrs	6148.2***							
	(1278.275)							
Age		2653.4***						XXXX
		(220.249)						XXXX
Age-Sq		-26.06***						XXXX
		(2.598)						XXXX
Distance to Closest CMA			25.86***					XXXX
			(6.131)					XXXX
Log(Surrounding Lights)			8031.2***					XXXX
			(1260.485)					XXXX
Log(Ruggedness)			1008.9					XXXX
			(611.814)					XXXX
Signed Modern Treaty			5067.0**					XXXX
			(2006.289)					XXXX
Highest Degree HS						10533.7***		XXXX
						(729.675)		XXXX
Highest Degree PSE						12438.1***		XXXX
						(590.575)		XXXX
Employed							28422.0***	XXXX
							(1230.237)	XXXX
Industry F.E.				X				X
Adjusted R-squared	0.043	0.050	0.046	0.055	0.072	0.100	0.105	0.098

Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical determinants and additional controls. Determinants include These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Online Appendix: The Determinants and Impacts of Historical Treaty-Making in Canada

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Last Updated: December 16, 2022

A Additional Figures

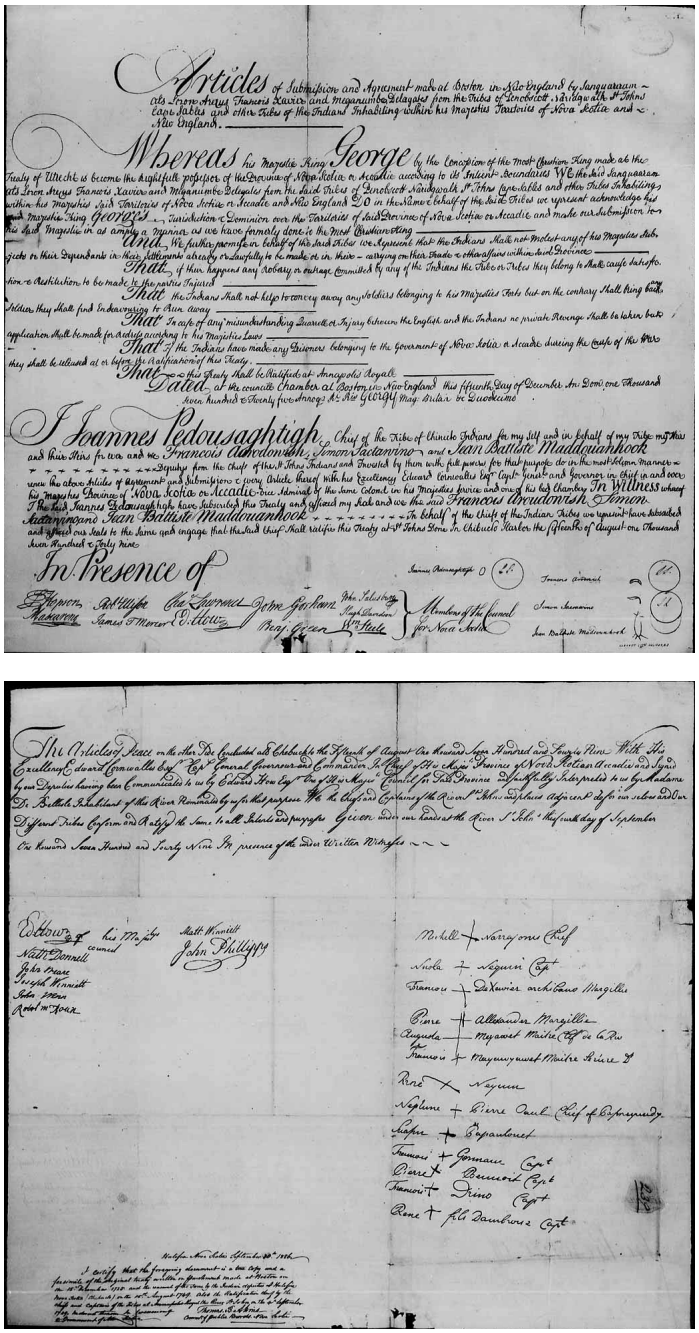


Figure A.1: Example of a peace and friendship treaty from December 15th, 1749.

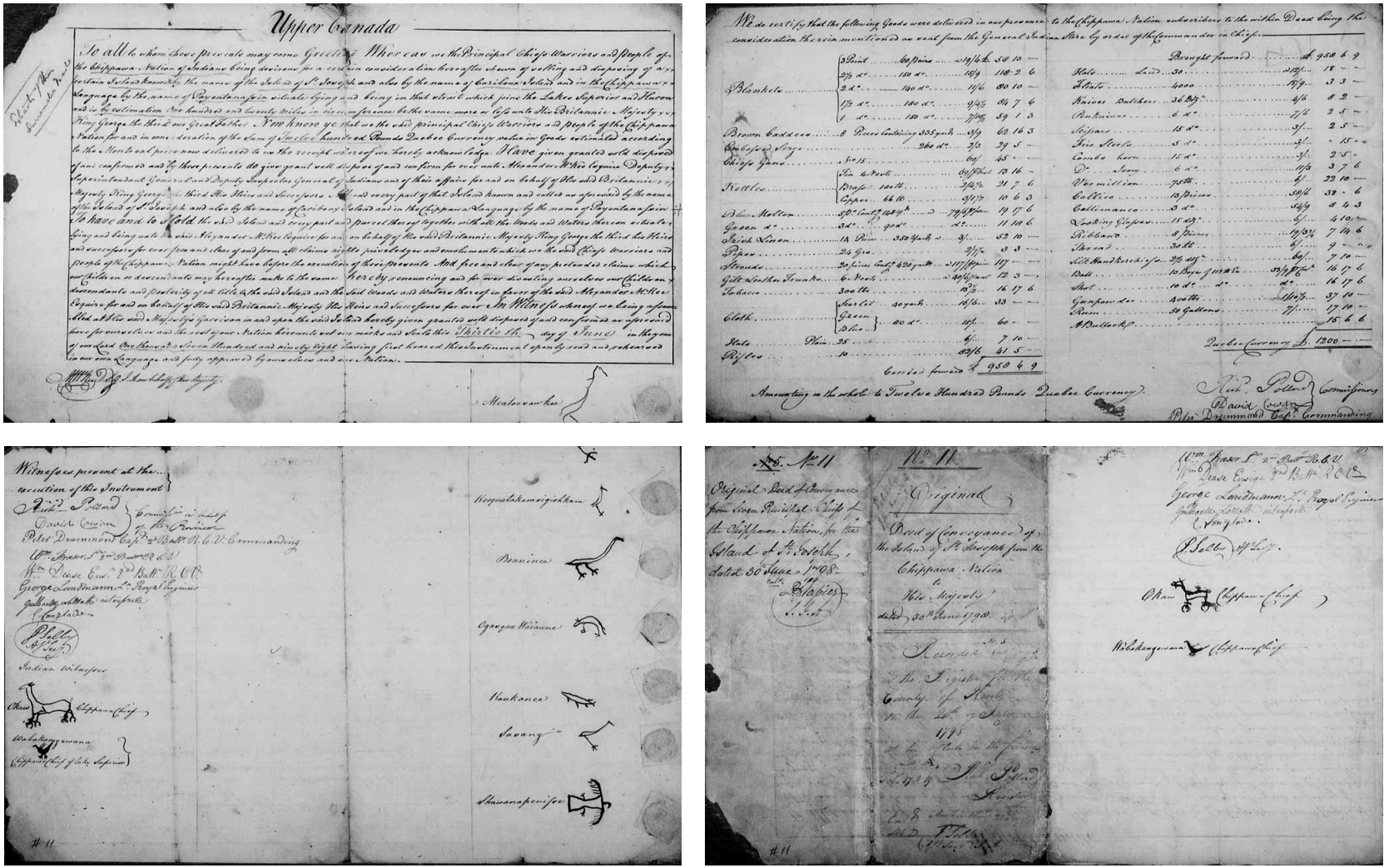


Figure A.2: Example of a land surrender from June 13th, 1798: St. Joseph's Island Treaty.

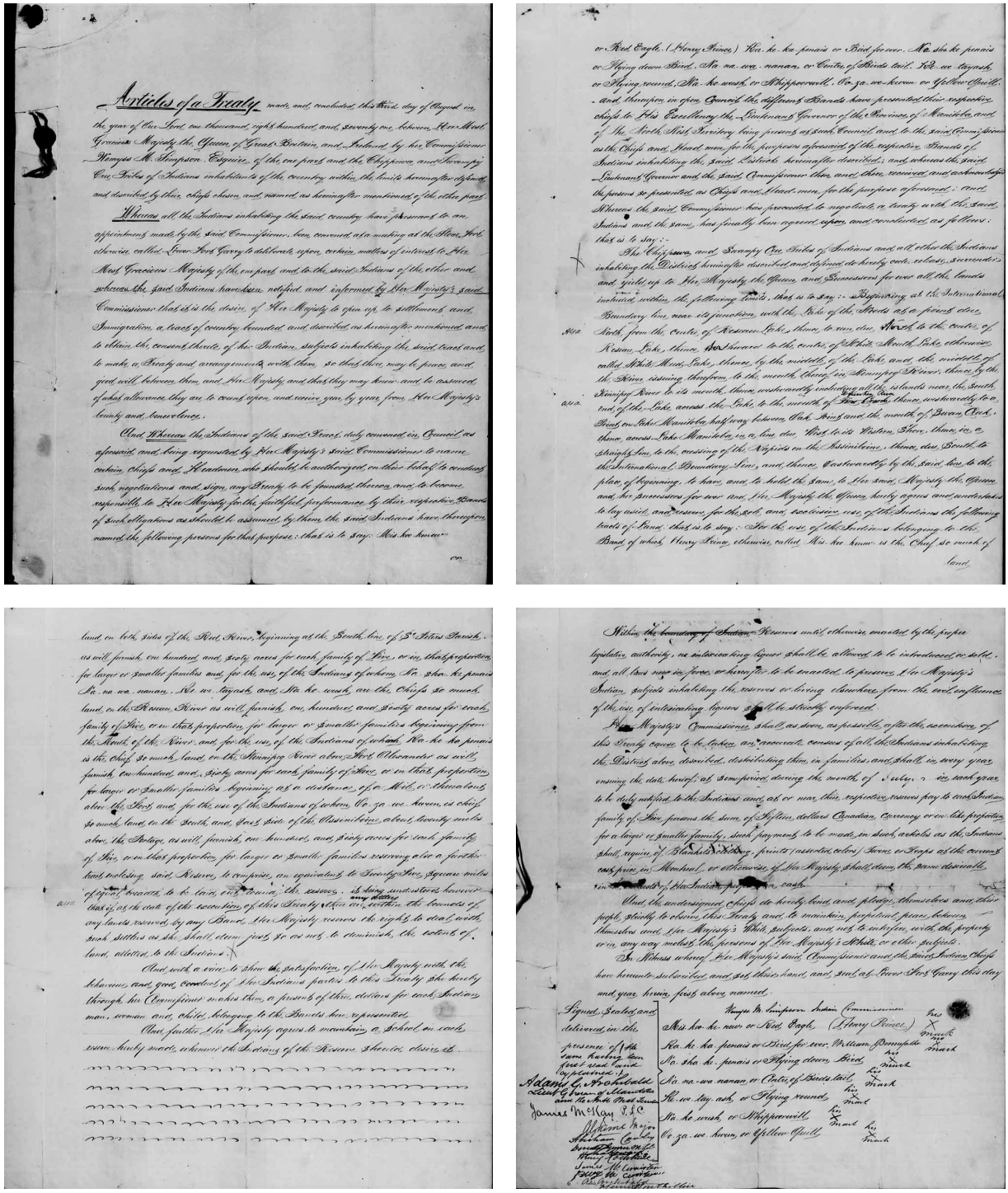


Figure A.3: Example of a number treaty from August 3rd, 1871: Treaty No. 1.

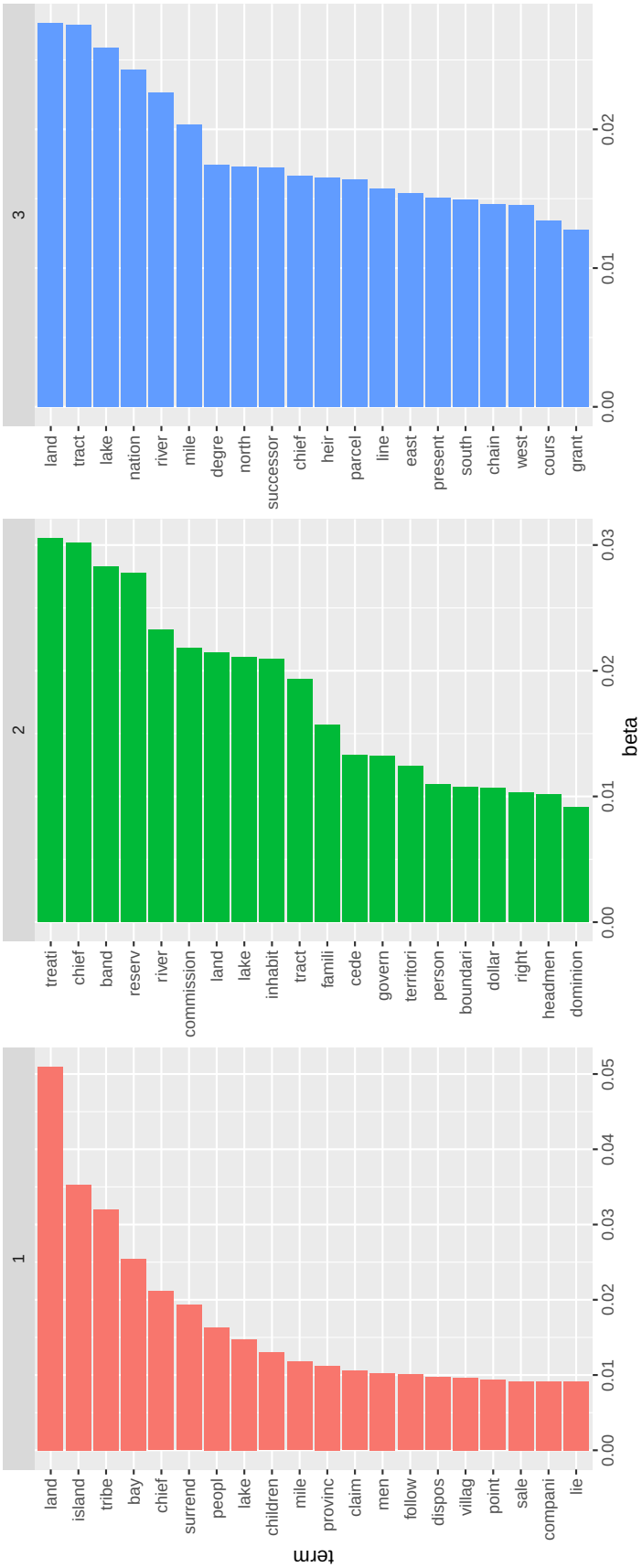
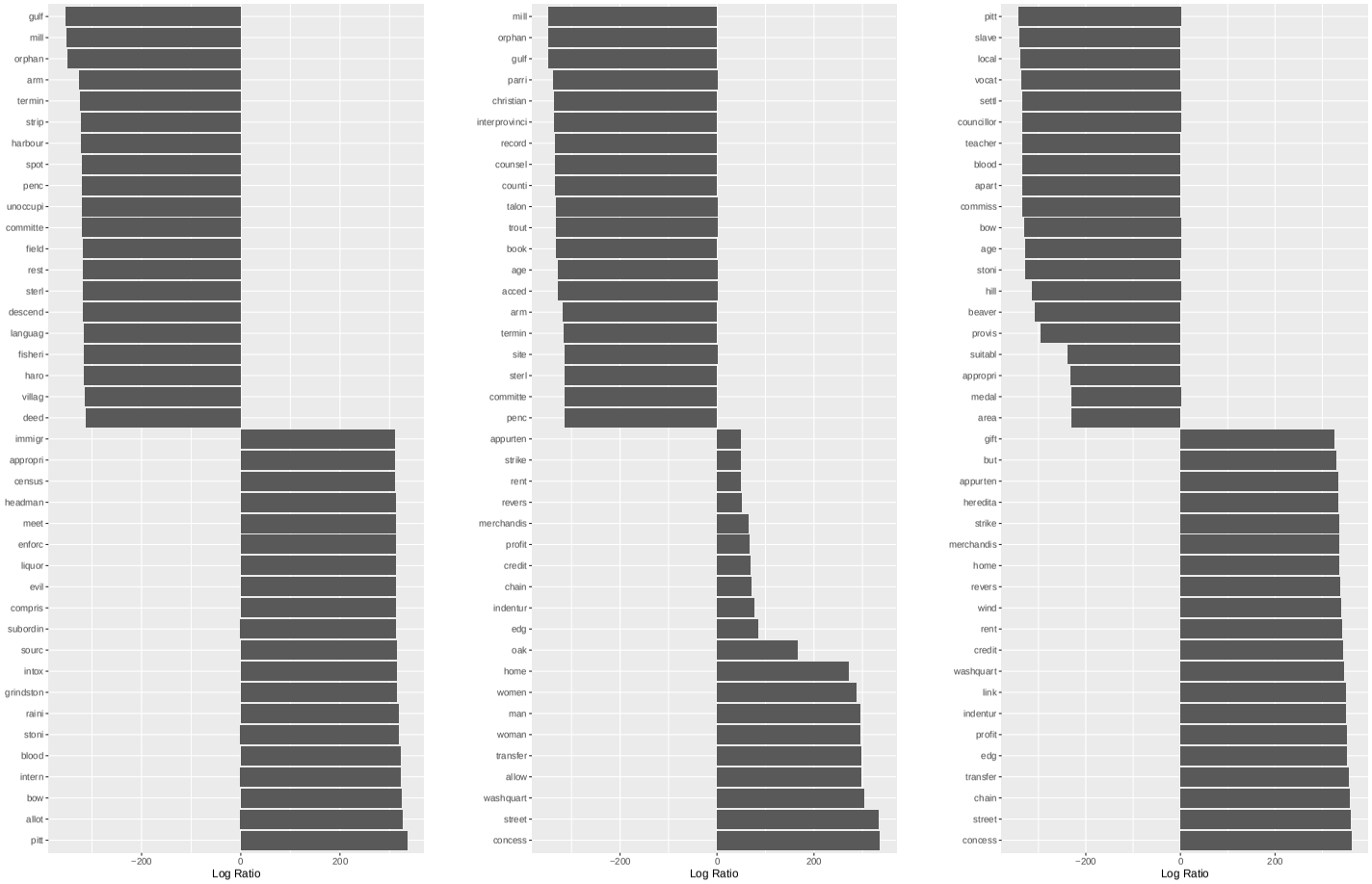
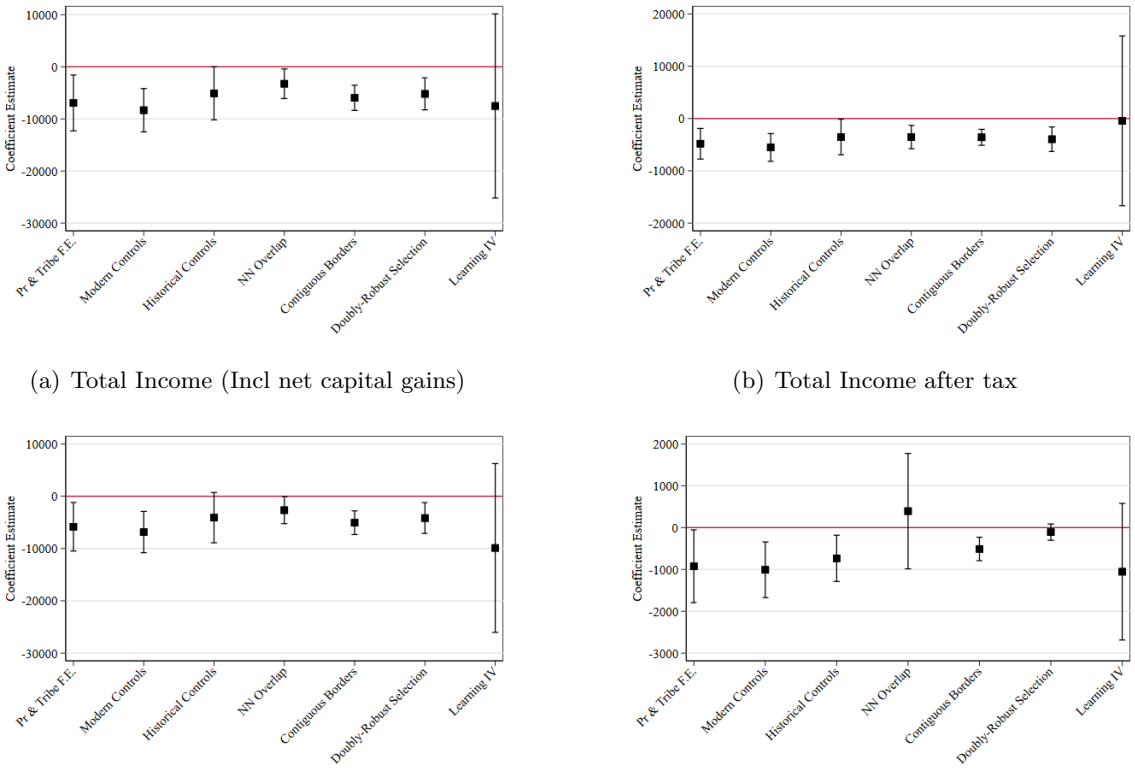


Figure A.4: Top 20 words in each of the three LDA topics.



(a) Topic 1 vs. Topic 2 (b) Topic 1 vs. Topic 3 (c) Topic 2 vs. Topic 3

Figure A.5: Each panel displays the words that are most different between topics.



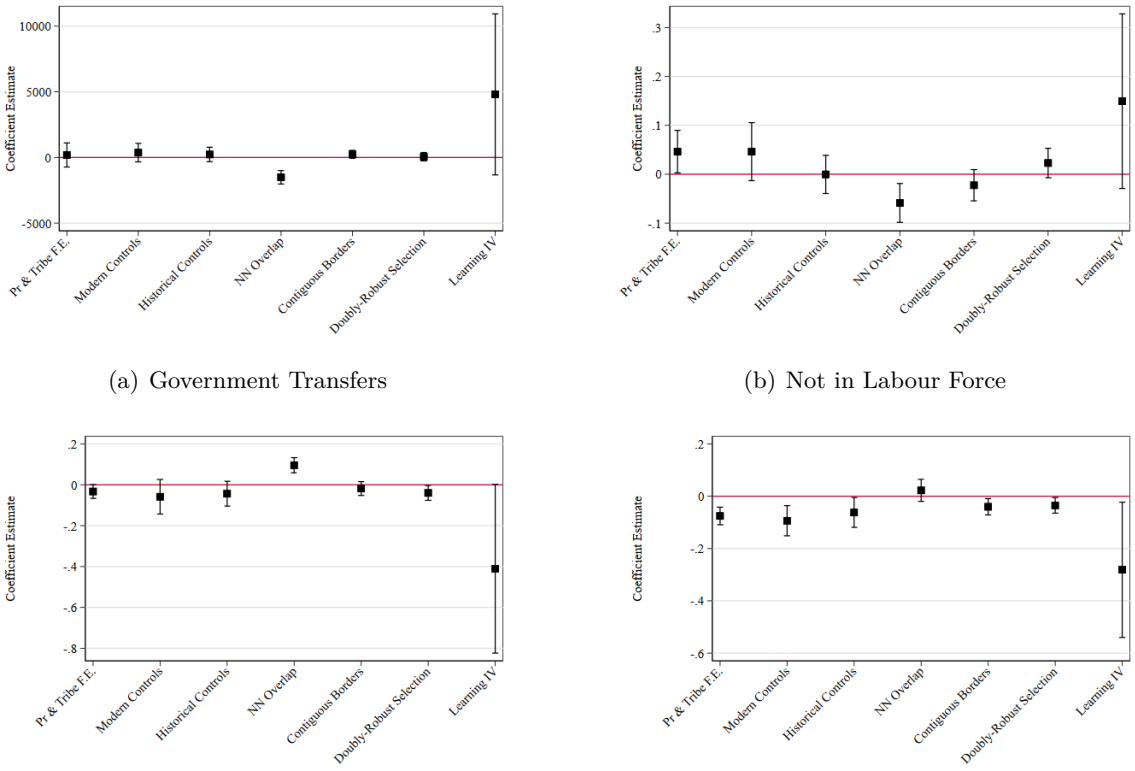
(a) Total Income (Incl net capital gains)

(b) Total Income after tax

(c) Employment Income

(d) Investment Income

Figure A.6: Each panel show the estimated effect of signing a treaty for each estimation strategy on the outcome indicated at the bottom of each panel.



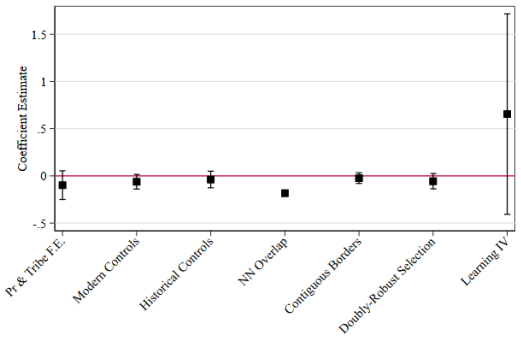
(a) Government Transfers

(b) Not in Labour Force

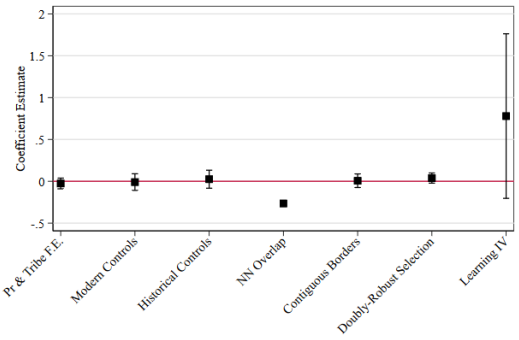
(c) At Least High School

(d) At Least Post Secondary

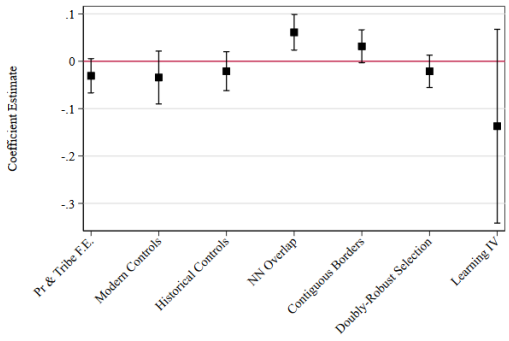
Figure A.7: Each panel show the estimated effect of signing a treaty for each estimation strategy on the outcome indicated at the bottom of each panel.



(a) Speaks an Indigenous Language at Home



(b) Member of a Band



(c) Probability of Being Employed

Figure A.8: Each panel show the estimated effect of signing a treaty for each estimation strategy on the outcome indicated at the bottom of each panel.

B Additional Tables

Table B.1: Summary Statistics: Other Factors

	(1) No Treaty	(2) Treaty	(3) Difference
Panel A: Historical Controls			
Historic Centralization	0.33	0.18	0.16***
	(0.47)	(0.38)	
% Calories from Agriculture	0.07	0.08	-0.00
	(0.48)	(0.51)	
Permanent/Semi-Perminent Villages	0.34	0.02	0.33***
	(0.48)	(0.13)	
No Individual Land Rights	0.46	0.34	0.12***
	(0.50)	(0.47)	
No Wealth Distinctions	0.34	0.95	-0.62***
	(0.47)	(0.21)	
Length of Waterways in Ancestral Territory (KM)	308.90	831.41	-522.51***
	(368.69)	(766.23)	
Distance to Closest Railway Station (KM)	381.50	187.49	194.01***
	(486.13)	(235.75)	
Distance to Closest Trading Post (KM)	219.23	88.62	130.61***
	(239.16)	(66.86)	
Hist Trading Pop 1000-10000	0.00	0.03	-0.02**
	(0.06)	(0.16)	
Hist Trading Pop Over 10000	0.04	0.20	-0.15***
	(0.21)	(0.40)	
Hist Trading Pop Missing	0.04	0.18	-0.14***
	(0.20)	(0.39)	
Never Had Rail in Territory	0.33	0.05	0.28***
	(0.47)	(0.21)	
Tribe Spans U.S Border	0.28	0.20	0.08**
	(0.45)	(0.40)	
Pop Density 1600	0.03	0.04	-0.01***
	(0.06)	(0.05)	
Pop Density 1700	0.03	0.05	-0.01**
	(0.07)	(0.05)	
Pop Density 1750	0.08	0.09	-0.01
	(0.31)	(0.17)	
Pop Density 1800	0.15	0.19	-0.04
	(0.77)	(0.43)	
Pop Density 1850	0.45	0.53	-0.07
	(2.60)	(1.43)	
Pop Density 1900	1.76	1.12	0.64
	(9.10)	(2.52)	
Panel B: Modern Controls			
Distance to Closest City (KM)	198.62	141.43	57.19***
	(347.67)	(130.35)	
Surrounding Log(Avg. Light Density)	0.77	1.05	-0.28***
	(0.93)	(0.83)	
Log(Avg. Ruggedness) on Community	5.25	5.68	-0.42***
	(1.53)	(0.96)	
1 if signed modern treaty	0.18	0.02	0.16***
	(0.38)	(0.13)	
Observations	534	600	1134

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by geographic tribe grouping are in parentheses in panel A and by contiguous border pairs in panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.2: Determinants of Signing a Treaty Including Estimates on Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	-0.281***							-0.228***
	(0.035)							(0.045)
Loss of Bison 1730-1870		-0.502**						-0.384**
		(0.194)						(0.159)
Loss of Bison 1870-1889		0.723***						0.544***
		(0.192)						(0.147)
Share Trapping Range			0.0397					0.108
			(0.125)					(0.112)
Neighbour Signed Before				-0.154				-0.168**
				(0.127)				(0.068)
Neighbour & Common Language Signed Before				0.188				0.0537
				(0.139)				(0.072)
Area of Ancestral Territory (KM^2)					0.255			-0.128
					(0.610)			(0.442)
Any Gold 1915						-0.451***		-0.123
						(0.118)		(0.093)
Any Silver 1915						0.0167		-0.208***
						(0.155)		(0.068)
Number of Mines in Territory							0.000567	0.00225***
							(0.001)	(0.001)
Historic Centralization	0.102	-0.251*	-0.334**	-0.289**	-0.330**	-0.0889	-0.358**	0.0816
	(0.095)	(0.134)	(0.151)	(0.111)	(0.151)	(0.121)	(0.168)	(0.068)
% Calories from Agriculture	-0.102	-0.0972	-0.123	-0.131	-0.120	-0.119	-0.106	-0.0122
	(0.092)	(0.131)	(0.102)	(0.104)	(0.100)	(0.098)	(0.096)	(0.093)
Permanent/Semi Villages	-0.0466	-0.0659	-0.0582	-0.106	-0.0494	-0.00501	-0.0632	0.0692
	(0.093)	(0.106)	(0.124)	(0.124)	(0.129)	(0.097)	(0.126)	(0.078)
No Individual Land Rights	-0.0539	-0.292***	-0.236**	-0.206**	-0.245**	-0.148	-0.238**	-0.00560
	(0.064)	(0.099)	(0.095)	(0.089)	(0.106)	(0.089)	(0.100)	(0.054)
No wealth distinctions	-0.0242	0.441***	0.532***	0.518***	0.523***	0.391***	0.528***	-0.0777
	(0.108)	(0.121)	(0.114)	(0.121)	(0.117)	(0.117)	(0.115)	(0.084)
Length of Waterways (KM)	-0.0000223	0.0000227	0.00000232	0.00000180	-0.0000457	0.0000338	-0.0000262	-0.000126
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Distance to Closest Railway	-0.000140*	-0.000123	-0.000256**	-0.000240**	-0.000248**	-0.000100	-0.000243**	0.00000197
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Distance to Closest Trading Post (1823)	-0.000241*	-0.000185	-0.0000927	-0.000163	-0.000169	-0.000267	-0.000113	-0.000451**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop. at Post $\in 1000, 10000$	0.313**	0.414*	0.337*	0.302*	0.283*	0.277*	0.331*	0.256
	(0.148)	(0.209)	(0.173)	(0.180)	(0.163)	(0.145)	(0.169)	(0.162)
Pop. at Post > 10000	0.163	0.199	0.174	0.126	0.126	0.143	0.170	0.0893
	(0.121)	(0.157)	(0.152)	(0.142)	(0.129)	(0.146)	(0.142)	(0.084)
Pop. at Post Missing	-0.0812	-0.0779	-0.0572	-0.0272	-0.0289	-0.0496	-0.0676	-0.0749
	(0.109)	(0.132)	(0.111)	(0.111)	(0.123)	(0.116)	(0.118)	(0.085)
Never Railway in Territory	-4.190	5.637	-0.000896	0.542	-0.930	0.628	0.0675	0.416
	(3.657)	(7.082)	(6.779)	(7.091)	(7.396)	(5.071)	(6.475)	(4.316)
Date Earliest Rail Entered Territory	-0.00208	0.00305	0.000106	0.000370	-0.000379	0.000495	0.000152	0.000357
	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)
Spans U.S. Border	-0.0531	-0.153	-0.172	-0.167	-0.185	-0.114	-0.164	0.0446
	(0.056)	(0.094)	(0.123)	(0.107)	(0.116)	(0.098)	(0.130)	(0.052)
Avg. Pop Density 1600	-10.88	10.90	-3.213	-2.151	-4.607	17.21	-3.336	9.869
	(15.837)	(18.686)	(19.159)	(16.419)	(19.461)	(17.317)	(18.265)	(11.984)
Avg. Pop Density 1700	11.08	-7.241	7.110	5.810	8.672	-12.99	6.773	-10.19
	(16.303)	(18.794)	(19.485)	(16.918)	(19.648)	(18.068)	(18.862)	(12.262)
Avg. Pop Density 1750	-1.581	-0.724	-1.501	-1.539	-1.482	-0.763	-1.458	-0.498
	(1.320)	(1.289)	(1.511)	(1.366)	(1.475)	(1.385)	(1.479)	(0.982)
Avg. Pop Density 1800	0.0630	-0.466	-0.522	-0.393	-0.597	-0.377	-0.441	0.302
	(0.309)	(0.513)	(0.507)	(0.504)	(0.471)	(0.427)	(0.556)	(0.307)
Avg. Pop Density 1850	0.234	0.253	0.341*	0.319	0.350*	0.219	0.318	0.0426
	(0.184)	(0.196)	(0.205)	(0.209)	(0.194)	(0.195)	(0.210)	(0.147)
Avg. Pop Density 1900	-0.0308	-0.0215	-0.0284	-0.0284	-0.0270	-0.0172	-0.0283	-0.0175
	(0.019)	(0.019)	(0.020)	(0.020)	(0.020)	(0.018)	(0.019)	(0.015)
Constant	5.867	-5.437	0.233	-0.255	1.167	-0.395	0.175	1.056
	(3.668)	(7.096)	(6.787)	(7.099)	(7.412)	(5.081)	(6.481)	(4.283)
Observations	1134	1134	1134	1134	1134	1134	1134	1134
Adjusted R^2	0.781	0.684	0.637	0.648	0.638	0.710	0.638	0.833

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by contiguous border pairs in panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: Timing of Signing a Treaty Including Estimates on Controls (Tobit Models)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Avg. Ruggedness)	27.45***							21.28***
	(7.215)							(5.952)
Loss of Bison 1730-1870		63.98***						98.89***
		(23.620)						(24.330)
Loss of Bison 1870-1889		-73.90***						-59.28**
		(25.914)						(24.143)
Share Trapping Range			12.20					16.23
			(16.939)					(18.488)
Neighbour Signed Before				30.96				45.88***
				(21.157)				(15.587)
Neighbour & Common Language Signed Before				-15.33				-26.94*
				(18.644)				(15.102)
Area of Ancestral Territory (KM^2)					-62.39			70.35*
					(60.770)			(36.541)
Any Gold 1915						48.93**		43.40**
						(24.514)		(17.475)
Any Silver 1915						36.77		137.9***
						(30.746)		(34.402)
Number of Mines in Territory							-0.122	-0.603***
							(0.117)	(0.105)
Historic Centralization	-17.18	23.49	30.98	33.65*	31.82	-21.57	42.54*	-36.09*
	(16.902)	(20.472)	(21.616)	(17.349)	(19.928)	(28.246)	(25.561)	(19.344)
% Calories from Agriculture	22.49	24.39	25.84	23.66	27.84	24.53	25.20	2.620
	(21.181)	(23.081)	(20.170)	(20.904)	(19.784)	(19.724)	(20.755)	(19.196)
Permanent/Semi Villages	31.73	36.88	38.76	40.59	32.62	48.67	37.58	39.18
	(34.416)	(37.664)	(34.211)	(35.128)	(34.547)	(39.522)	(34.405)	(24.695)
No Individual Land Rights	12.85	36.34***	30.54**	19.82*	24.78**	25.38**	23.45**	6.931
	(8.584)	(14.008)	(13.119)	(11.343)	(12.156)	(10.832)	(11.739)	(6.216)
No wealth distinctions	-0.307	-53.29***	-57.31***	-58.36***	-54.73***	-43.40**	-53.04***	5.692
	(22.224)	(18.727)	(18.610)	(20.652)	(18.295)	(19.610)	(18.952)	(19.566)
Length of Waterways (KM)	0.00761	0.00444	0.00227	0.00264	0.0180	0.00149	0.0132	0.0191
	(0.007)	(0.008)	(0.008)	(0.007)	(0.019)	(0.007)	(0.012)	(0.012)
Distance to Closest Railway	0.0159	0.0151	0.0237	0.0322*	0.0309	0.0195	0.0255	0.00160
	(0.018)	(0.021)	(0.022)	(0.019)	(0.020)	(0.018)	(0.020)	(0.014)
Distance to Closest Trading Post (1823)	0.0395*	0.0435	0.0319	0.0259	0.0397	0.0299	0.0288	0.0581***
	(0.023)	(0.027)	(0.028)	(0.025)	(0.032)	(0.023)	(0.026)	(0.020)
Pop. at Post $\in 1000, 10000$	-93.96**	-99.26**	-92.99**	-88.97**	-84.56**	-75.36**	-94.45**	-26.70
	(41.242)	(43.061)	(41.596)	(41.384)	(40.935)	(37.977)	(41.970)	(19.321)
Pop. at Post > 10000	-61.39***	-60.24***	-59.33**	-55.15**	-52.43**	-40.08**	-63.06**	1.264
	(23.253)	(23.001)	(24.256)	(22.707)	(23.359)	(19.334)	(25.498)	(9.527)
Pop. at Post Missing	46.48**	43.51**	41.37*	38.53*	39.09*	24.99	48.10*	-0.998
	(23.426)	(21.920)	(22.572)	(21.457)	(22.400)	(17.324)	(25.935)	(9.899)
Never Railway in Territory	957.0*	-311.2	221.8	297.4	670.0	-198.7	391.3	-1086.3**
	(531.798)	(788.496)	(680.318)	(791.829)	(837.401)	(532.709)	(661.614)	(512.785)
Date Earliest Rail Entered Territory	0.495*	-0.166	0.109	0.150	0.348	-0.114	0.198	-0.587**
	(0.274)	(0.409)	(0.353)	(0.411)	(0.434)	(0.274)	(0.342)	(0.265)
Spans U.S. Border	11.70	19.74*	24.72*	22.11	22.37*	11.49	18.53	-15.24**
	(9.331)	(11.863)	(14.093)	(13.764)	(12.335)	(15.600)	(13.316)	(7.388)
Avg. Pop Density 1600	-1021.0	-3567.1	-2248.3	-2003.6	-1739.2	-6650.3	-2006.1	-10009.0***
	(3021.759)	(3902.608)	(3103.257)	(2848.983)	(3244.737)	(5055.680)	(3193.248)	(3043.709)
Avg. Pop Density 1700	788.9	2831.6	1587.7	1335.8	976.5	5876.6	1394.2	9359.1***
	(3085.184)	(3980.869)	(3150.542)	(2907.878)	(3263.986)	(5123.416)	(3254.128)	(2948.277)
Avg. Pop Density 1750	211.0	142.2	184.5	228.2	220.3	-60.05	230.2	-378.9*
	(242.921)	(222.127)	(226.845)	(223.155)	(233.842)	(182.911)	(243.965)	(207.583)
Avg. Pop Density 1800	6.116	82.61	77.51	56.77	96.85*	113.9	55.07	86.40
	(54.180)	(61.023)	(64.502)	(66.253)	(58.261)	(73.767)	(64.063)	(53.034)
Avg. Pop Density 1850	-46.58	-55.47	-59.39*	-58.68*	-66.37**	-38.79	-60.90*	10.30
	(35.266)	(34.332)	(33.494)	(34.170)	(33.328)	(28.781)	(35.753)	(27.414)
Avg. Pop Density 1900	5.884	4.961	5.588*	5.910*	5.663*	2.191	6.409*	-0.423
	(3.832)	(3.197)	(3.314)	(3.402)	(3.362)	(2.357)	(3.766)	(3.656)
Constant	-850.1	560.5	25.31	-59.64	-422.7	447.6	-146.0	1202.1**
	(538.895)	(789.679)	(681.992)	(793.638)	(838.571)	(533.561)	(663.472)	(515.586)
Observations	1134	1134	1134	1134	1134	1134	1134	1134

Notes: The dependent variable is an indicator equal to 1 if csd-band signed a historic treaty. Standard errors clustered by contiguous border pairs in panel B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.4: Determinants of Treaty Sentiment

	Uncontrolled			Controlled		
	Sentiment (1)	Positive (2)	Negative (3)	Sentiment (4)	Positive (5)	Negative (6)
Log(Avg. Ruggedness)	-0.0794**	-0.0398**	0.0398**	-0.0534***	-0.0268***	0.0268***
	(0.032)	(0.016)	(0.016)	(0.012)	(0.006)	(0.006)
Loss of Bison 1730-1870	-0.197**	-0.0987**	0.0987**	-0.291***	-0.146***	0.146***
	(0.079)	(0.040)	(0.040)	(0.051)	(0.026)	(0.026)
Loss of Bison 1870-1889	0.155	0.0776	-0.0776	0.178***	0.0895***	-0.0895***
	(0.128)	(0.064)	(0.064)	(0.061)	(0.031)	(0.031)
Share Trapping Range	0.0378	0.0190	-0.0190	0.155*	0.0781*	-0.0781*
	(0.067)	(0.034)	(0.034)	(0.089)	(0.044)	(0.044)
Neighbour Signed (Geog)	-0.0558	-0.0279	0.0279	-0.0778	-0.0389	0.0389
	(0.082)	(0.041)	(0.041)	(0.077)	(0.039)	(0.039)
Neighbour Signed (Lang)	0.0492	0.0246	-0.0246	0.0353	0.0177	-0.0177
	(0.046)	(0.023)	(0.023)	(0.036)	(0.018)	(0.018)
Area of Ancestral Territory (KM^2)	0.0950	0.0478	-0.0478	0.166	0.0836	-0.0836
	(0.175)	(0.088)	(0.088)	(0.174)	(0.087)	(0.087)
Number of Mines in Territory	-0.000471	-0.000236	0.000236	0.000982**	0.000492**	-0.000492**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Any Gold 1915	0.132	0.0665	-0.0665	0.171***	0.0859***	-0.0859***
	(0.115)	(0.058)	(0.058)	(0.052)	(0.026)	(0.026)
Any Silver 1915	0.106	0.0530	-0.0530	-0.383**	-0.192**	0.192**
	(0.075)	(0.038)	(0.038)	(0.157)	(0.079)	(0.079)
Historic Centralization				-0.172***	-0.0864***	0.0864***
				(0.063)	(0.032)	(0.032)
% Calories from Agriculture				0.249***	0.125***	-0.125***
				(0.059)	(0.030)	(0.030)
Permanent/Semi Villages				-0.315***	-0.158***	0.158***
				(0.036)	(0.018)	(0.018)
No Individual Land Rights				0.0628**	0.0315**	-0.0315**
				(0.030)	(0.015)	(0.015)
No wealth distinctions				0.00775	0.00408	-0.00408
				(0.040)	(0.020)	(0.020)
Length of Waterways (KM)				-0.000115*	-0.0000579*	0.0000579*
				(0.000)	(0.000)	(0.000)
Distance to Closest Railway				0.0000691*	0.0000347*	-0.0000347*
				(0.000)	(0.000)	(0.000)
Distance to Closest Trading Post (1823)				-0.0000938*	-0.0000470*	0.0000470*
				(0.000)	(0.000)	(0.000)
Pop. at Post $\in 1000, 10000$				-0.0285	-0.0142	0.0142
				(0.032)	(0.016)	(0.016)
Pop. at Post > 10000				-0.0303	-0.0151	0.0151
				(0.035)	(0.017)	(0.017)
Pop. at Post Missing				-0.00508	-0.00256	0.00256
				(0.011)	(0.006)	(0.006)
Never Railway in Territory				0.830	0.415	-0.415
				(1.457)	(0.729)	(0.729)
Date Earliest Rail Entered Territory				0.000392	0.000196	-0.000196
				(0.001)	(0.000)	(0.000)
Spans U.S. Border				-0.0659***	-0.0330***	0.0330***
				(0.019)	(0.010)	(0.010)
Avg. Pop Density 1600				23.47***	11.75***	-11.75***
				(5.440)	(2.722)	(2.722)
Avg. Pop Density 1700				-16.78***	-8.394***	8.394***
				(5.257)	(2.631)	(2.631)
Avg. Pop Density 1750				-0.901	-0.452	0.452
				(0.598)	(0.299)	(0.299)
Avg. Pop Density 1800				-0.463***	-0.232***	0.232***
				(0.085)	(0.043)	(0.043)
Avg. Pop Density 1850				0.302***	0.151***	-0.151***
				(0.094)	(0.047)	(0.047)
Avg. Pop Density 1900				-0.142***	-0.0710***	0.0710***
				(0.014)	(0.007)	(0.007)
Constant	0.732***	0.866***	0.134**	-0.183	0.408	0.592
	(0.123)	(0.062)	(0.062)	(1.470)	(0.736)	(0.736)
Observations	600	600	600	600	600	600
Adjusted R^2	0.268	0.268	0.268	0.707	0.709	0.709

Notes: All columns are conditional on signing a treaty. The dependent variable in column (1) and (4) is the normalized sentiment, in columns (2) and (5) it is the fraction of positive words, and in columns (3) and (6) it is the fraction of negative words. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table B.5: Determinants of Treaty Topics

	Uncontrolled			Controlled		
	Topic 1	Topic 2	Topic 3	Topic 1	Topic 2	Topic 3
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Avg. Ruggedness)	0.0751**	-0.0744**	-0.000683	0.0935***	-0.0654**	-0.0282
	(0.035)	(0.036)	(0.025)	(0.019)	(0.026)	(0.019)
Loss of Bison 1730-1870	0.0720	-0.0487	-0.0233	0.254***	-0.261***	0.00682
	(0.073)	(0.092)	(0.046)	(0.054)	(0.064)	(0.073)
Loss of Bison 1870-1889	-0.436***	0.462***	-0.0259	-0.471***	0.368***	0.103
	(0.112)	(0.133)	(0.080)	(0.056)	(0.119)	(0.124)
Share Trapping Range	-0.201***	0.238***	-0.0368	-0.172*	0.170	0.00213
	(0.066)	(0.076)	(0.035)	(0.093)	(0.176)	(0.182)
Neighbour Signed (Geog)	-0.0130	0.0884	-0.0754	-0.0644	0.168	-0.103
	(0.070)	(0.138)	(0.078)	(0.067)	(0.154)	(0.089)
Neighbour Signed (Lang)	-0.0288	0.0207	0.00808	-0.0110	0.00679	0.00426
	(0.039)	(0.044)	(0.015)	(0.014)	(0.023)	(0.015)
Area of Ancestral Territory (KM^2)	-0.683***	0.770***	-0.0868	-0.340	0.594*	-0.254
	(0.152)	(0.188)	(0.090)	(0.226)	(0.325)	(0.238)
Number of Mines in Territory	0.00197***	-0.00229***	0.000322	0.000225	-0.00106	0.000837
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Any Gold 1915	-0.348***	0.423***	-0.0751	-0.343***	0.326***	0.0175
	(0.118)	(0.120)	(0.077)	(0.052)	(0.086)	(0.085)
Any Silver 1915	0.0366	-0.229*	0.192***	0.186	-0.398	0.212
	(0.072)	(0.122)	(0.066)	(0.144)	(0.309)	(0.374)
Historic Centralization				0.370***	-0.316***	-0.0534
				(0.052)	(0.097)	(0.088)
% Calories from Agriculture				0.0499	-0.129	0.0791
				(0.065)	(0.143)	(0.154)
Permanent/Semi Villages				0.0243	-0.174	0.149
				(0.081)	(0.111)	(0.103)
No Individual Land Rights				-0.0159	0.0202	-0.00431
				(0.032)	(0.052)	(0.029)
No wealth distinctions				-0.0693	0.0707	-0.00139
				(0.056)	(0.090)	(0.060)
Length of Waterways (KM)				0.0000396	-0.0000319	-0.00000777
				(0.000)	(0.000)	(0.000)
Distance to Closest Railway				-0.000241***	0.000216**	0.0000243
				(0.000)	(0.000)	(0.000)
Distance to Closest Trading Post (1823)				0.000114	-0.000189	0.0000756
				(0.000)	(0.000)	(0.000)
Pop. at Post $\in 1000, 10000$				0.00917	-0.0184	0.00923
				(0.017)	(0.033)	(0.027)
Pop. at Post > 10000				0.00278	0.00536	-0.00814
				(0.017)	(0.037)	(0.046)
Pop. at Post Missing				0.0240	-0.0589*	0.0348
				(0.022)	(0.034)	(0.042)
Never Railway in Territory				-2.021	-0.165	2.186
				(1.987)	(2.948)	(3.053)
Date Earliest Rail Entered Territory				-0.00101	-0.000178	0.00119
				(0.001)	(0.002)	(0.002)
Spans U.S. Border				0.0371*	-0.0674**	0.0303
				(0.021)	(0.026)	(0.026)
Avg. Pop Density 1600				-11.52**	26.32**	-14.80
				(5.206)	(9.941)	(11.300)
Avg. Pop Density 1700				6.278	-18.58*	12.30
				(5.549)	(9.827)	(11.027)
Avg. Pop Density 1750				1.654**	-1.404	-0.250
				(0.695)	(1.429)	(1.609)
Avg. Pop Density 1800				0.370***	-0.984***	0.614**
				(0.124)	(0.204)	(0.275)
Avg. Pop Density 1850				-0.474***	0.552**	-0.0774
				(0.115)	(0.248)	(0.295)
Avg. Pop Density 1900				0.138***	-0.135***	-0.00270
				(0.019)	(0.026)	(0.024)
Constant	0.243*	0.639***	0.118	2.174	0.892	-2.066
	(0.130)	(0.179)	(0.081)	(1.957)	(2.948)	(3.063)
Observations	600	600	600	600	600	600
Adjusted R^2	0.624	0.677	0.286	0.786	0.812	0.582

Notes: All columns are conditional on signing a treaty. The dependent variable in columns (1) and (4) is Topic 1, in columns (2) and (5) it is Topic 2, and in columns (3) and (6) it is Topic 3, where topics were determined using a Latent Dirichlet Allocation model. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table B.6: The Impact of Signing a Historical Treaty on Total Income

	(1)	(2)	(3)	(4)	(5)
Signed Treaty	-4055.9*	-8010.0***	-6090.7**	-7134.0***	-4446.2*
	(1885.116)	(1305.194)	(2338.573)	(1874.379)	(2336.824)
Province F.E.	X		X	X	X
Tribe F.E.		X	X	X	
Modern Controls				X	X
Historical Controls					X
Adjusted R^2	0.046	0.064	0.066	0.068	0.062

Notes: The dependent variable in all columns is individual total income including net capital gains and losses. Number of observations are suppressed for confidentiality reasons. Modern controls include the distance between an individual's community and the closest Census Metropolitan Area, the log average nighttime light density in an individual's surrounding area, the log ruggedness of the community, and an indicator for whether the community is part of a modern treaty. Historical controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table B.6 reports coefficient estimates on the "Signed Treaty" indicator where we investigate whether different levels of fixed effects or controls change the coefficient estimate in a meaningful way. Column (1) only includes province fixed effects. Using this within-province variation in signing a treaty yields a coefficient estimate of -4055.9, suggesting that the average adult in Indigenous communities with historic treaties had roughly $4,000 lower total income than the average adult in Indigenous communities without historic treaties. Column (2) uses within-tribe variation in treaty-making to identify the impact of signing a historic treaty and we see the coefficient estimate doubles in magnitude; however, we are hesitant to employ tribe fixed effects as our preferred specification owing to the small number of tribes that actually had variation in signing a historic treaty. Column (3) uses province and tribe fixed effects in the same specification, but we also do not prefer this specification owing to the same concern as with column (2). Column (4) adds our modern controls on top of the province and tribe fixed effects and column (5) replaces tribe fixed effects with our tribe-level historical controls. Throughout each specification, the coefficient estimate on "Signed Treaty" remains relatively stable and both statistically and economically significant.

Table B.7: The Impact of Treaty Type on Income and Employment

	(1) Total Income	(2) After Tax Income	(3) Employment Income	(4) Investment Income	(5) Government Transfers	(6) Not in Labour Force
Comprehensive	-3248.6***	-2430.5***	-2360.0***	-299.1***	-358.0	-0.0283*
	(827.733)	(686.794)	(844.421)	(83.763)	(260.105)	(0.015)
Peace and Friendship	-10858.7**	-9676.5**	-6118.7	-379.9**	-4444.3***	0.174***
	(4578.262)	(3985.031)	(4068.654)	(178.422)	(461.451)	(0.039)
Land Surrender	-7263.0***	-6083.2***	-6242.4***	-164.6**	-853.4***	0.0404***
	(1756.279)	(1576.579)	(1698.083)	(81.099)	(318.635)	(0.014)
Adjusted R^2	0.071	0.068	0.071	0.003	0.032	0.040

Notes: The dependent variable in all columns is individual total income including net capital gains and losses. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table B.8: The Impact of Treaty Type on Education and Culture

	(1) High School	(2) Post-Secondary	(3) Speaks Indigenous Lang.	(4) Band Member
Comprehensive	0.00636	-0.0153	-0.169**	0.0294
	(0.017)	(0.014)	(0.069)	(0.042)
Peace and Friendship	0.0977*	-0.0259	0.109	-0.0967
	(0.058)	(0.044)	(0.110)	(0.077)
Land Surrender	-0.00240	-0.0525***	-0.144**	0.0336
	(0.018)	(0.012)	(0.070)	(0.035)
Adjusted R^2	0.057	0.036	0.450	0.494

Notes: The dependent variable in all columns is individual total income including net capital gains and losses. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table B.9: The Impact of Treaty Clauses on Income and Labour Force Participation

	(1) Total Income	(2) After Tax Income	(3) Employment Income	(4) Investment Income	(5) Government Transfers	(6) Not in Labour Force
No Liquor	-2264.3	-1962.2	-1943.5	89.28	-460.0**	0.0432
	(1856.120)	(1656.980)	(1601.297)	(89.553)	(206.034)	(0.038)
Hunt/Trap/Fish	-4178.8	-3881.5*	-3502.6	-40.03	-638.3	-0.0230
	(2795.639)	(2283.134)	(2454.819)	(160.182)	(512.832)	(0.038)
Retain Village	-97.90	585.4	-116.6	-382.7***	377.7	0.0233
	(2492.534)	(2183.891)	(2099.070)	(124.198)	(662.609)	(0.032)
Contains Farmland	-501.8	517.5	8.886	-326.7**	1155.7	-0.0190
	(1997.142)	(1812.100)	(1904.898)	(163.457)	(701.679)	(0.042)
Cash for Chief	267.8	278.2	0.912	55.84	141.1	0.00201
	(1730.416)	(1511.365)	(1466.788)	(86.091)	(302.971)	(0.029)
Land Surrender	-5009.2**	-4754.7**	-4534.0**	214.6**	-869.6*	0.0613***
	(2468.559)	(2330.623)	(2084.834)	(88.612)	(515.111)	(0.022)
Education	1691.1	939.1	1070.3	214.8	-463.1	-0.0168
	(2213.636)	(1926.979)	(2007.281)	(154.285)	(352.417)	(0.032)
Adjusted R^2	0.071	0.068	0.072	0.003	0.032	0.040

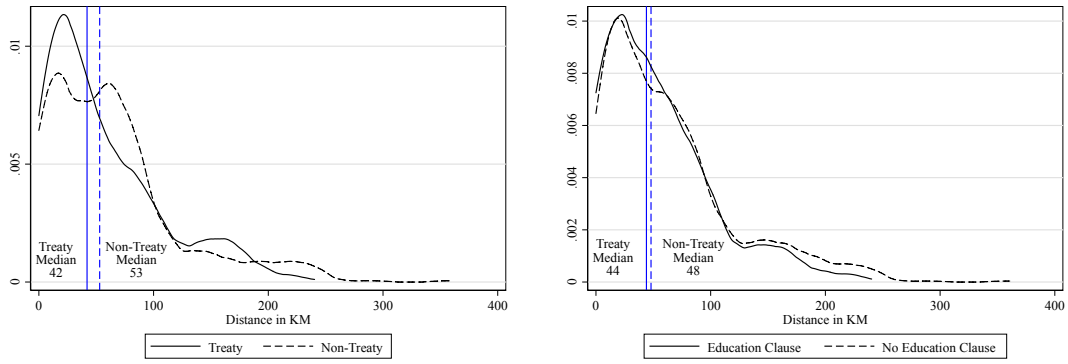
Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical controls. These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

C Differences in Education as an Explanation for Differences in Income

One possible explanation for the difference in income between treaty and non-treaty communities is that the education clauses contained in treaties had direct effects on educational attainment. Although conditioning on education does not impact the coefficient estimate of signing a treaty, we provide an additional analysis of education here.

The federal government was responsible for providing education on all reserves; however, treaty clauses might have influenced how this education was delivered. For example, if nations with education clauses were first to be impacted by the residential school system or were closer to residential schools, this may have led to persistently lower levels of educational attainment into the present. Existing work has shown that the distance to residential schools was a predictor of the intensity with which residential schooling impacted community-members. Feir (2016b) shows that educational attainment among those forced to attend was higher, but that this was associated with a loss of culture which has led to lower levels of educational attainment among subsequent generations (Feir, 2016a; Jones, 2021). Figure C.1 shows that treaty nations and treaty nations with an education clause were both were located closer to residential schools.

Table C.2 of the Online Appendix presents results that indicate that nations that signed treaties with an education clause were located further away from residential schools. Further, conditioning on an individual's level of education directly does not change the results for total income or employment income.



(a) Signed Historic Treaty

(b) Signed Historic Treaty with Education Clause

Figure C.1: The top panel shows kernel densities of distance to the closest residential school by community treaty status. The bottom panel shows kernel densities of distance to the closest residential school by education clause status.

Table C.1: The Impact of Treaty Clauses on Education

	(1) High School	(2) Post-Secondary
No Liquor	-0.0182	-0.0355
	(0.035)	(0.028)
Hunt/Trap/Fish	0.0537*	-0.00595
	(0.031)	(0.029)
Retain Village	-0.0261	0.0000343
	(0.026)	(0.025)
Contains Farmland	-0.0150	0.0247
	(0.029)	(0.025)
Cash for Chief	0.0314	0.00922
	(0.029)	(0.024)
Land Surrender	-0.00562	-0.0444***
	(0.016)	(0.017)
Education	-0.0871***	-0.0554*
	(0.031)	(0.032)
Adjusted R^2	0.058	0.037

Notes: All columns are estimated using the contiguous border strategy and condition on the full set of historical controls. These controls include an indicator for historical centralization, calories from agriculture, whether the Nation was semi-permanent, whether they had property rights, whether they were egalitarian, the distance of waterways in ancestral territories, the closest railway station, the closest historical trading post, population bins for settlement at the closest trading post, the earliest date a railway entered the ancestral territory and an indicator equal to 1 if the Nation never had a railway enter their territory, an indicator for sharing a border with the United States, population density in ancestral territories as of 1600, 1700, 1750, 1800, 1850 and 1900, and our determinants of treaty-making: log of ruggedness in ancestral territory, indicators for whether your geographic neighbour or neighbour in your language network signed a treaty in a previous period, the gradual and rapid loss of the bison, share of ancestral territory covered by the primary trapping range, territory area, any gold or silver discovered in ancestral territory by 1915 and the number of mines in ancestral territory. Number of observations are suppressed for confidentiality reasons. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

Table C.1 shows the relationship between treaty clauses and the probability of having a high school degree (column 1) or a post-secondary degree (column 2) in 2016. We condition on the full set of historical controls and we again use the contiguous border strategy to estimate the impact of individual clauses, so that pair fixed-effects are included in all specifications. We see that individuals in communities that signed treaties with education clauses have notably lower educational attainment than those in communities that did not sign historical treaties. Signing a treaty with an education clause is associated with decreases of 8.7 percentage points in the probability of completing high school and 5.5 percentage points in the probability of completing a post-secondary degree.

Although education clauses are associated with lower levels of contemporary educational attainment, this does not appear to be what is driving the differences in per capita income across communities, as Table B.9 reveals that communities that signed treaties with education clauses do not actually have statistically different levels of income. Further, the coefficient estimate on the education clause indicator in these specifications is positive, suggesting, if anything, the opposite.

Table C.2: Relationship between signing a treaty and distance to nearest residential school

	(1)	(2)	(3)	(4)	(5)	(6)
Signed Historic Treaty	-0.223	-0.192	-0.0114			
	(0.234)	(0.241)	(0.227)			
Signed Treaty with Education Clause				-0.370	-0.366**	-0.321*
				(0.250)	(0.165)	(0.181)
Historical Controls		X	X		X	X
Province F.E.			X			X
Observations	1134	1134	1134	1134	1134	1134
Adjusted R^2	0.007	0.190	0.274	0.017	0.196	0.279

Notes: The dependent variable in all columns is the natural logarithm of the distance (in KM) to the closest residential school. Standard errors clustered by geographic tribe grouping are in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$

D Data Appendix

- Tribal names book: Clark (2009)
- Ancestral territory maps: Smithsonian Handbook of the North American Indian
- Waterway length: historical atlas of Canada Map of Historic Canoe Routes: https://www.fadedpage.com/books/20140220/html.php
- Average population density from HYDE: https://themasites.pbl.nl/tridion/en/themasites/hyde/
- Ethnographic Atlas: language network, handbook map
- Closest trading post, population at the closest trading post, distance to closest railway station: ESRI Aboriginal People, European Settlement and Trading Posts 1823: https://www.arcgis.com/home/item.html?id=5bc10f68263d4116a700d33fb5405c23
- Treaty texts, dates: Collected from Historic Treaty information on Government of Canada website. See "Pre-1975 Treaties" section: https://www.aadnc-aandc.gc.ca/eng/1290453474688/1290453673970
- Modern treaties: https://www.rcaanc-cirnac.gc.ca/eng/1100100028574/1529354437231#chp4
- Incompletely enumerated reserves: https://www12.statcan.gc.ca/census-recensement/2011/ref/aboriginal-autochtones-eng.cfm
- Community wellbeing index: https://www.sac-isc.gc.ca/eng/1100100016579/1557319653695
- Bison: https://www.loc.gov/resource/g3301d.ct000308/?r=-0.385,-0.062,1.776,1.402,0
- Trapping: https://www.canadiangeographic.ca/article/rethinking-beaver
- Ruggedness on reserves and ancestral territories: Computed in GIS with overlay of DEM files and ancestral territory files from HBNAI
- Mines in territory: https://www.nrcan.gc.ca/earth-sciences/geography/atlas-canada/explore-our-maps/map-archives/16868
- Earliest rail: Provided to us from an ESRI representative. Can be viewed online here: https://www.arcgis.com/home/item.html?id=89044dbd4e7a4ec288d18b2b477237d4andAmericanrailwaysfrom https://my.vanderbilt.edu/jeremyatack/data-downloads/
- Band number: Provided to us directly from CIRNAC
- Statistics Canada geographic boundary files: https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-eng.cfm
- United States Geological Survey: number of mines

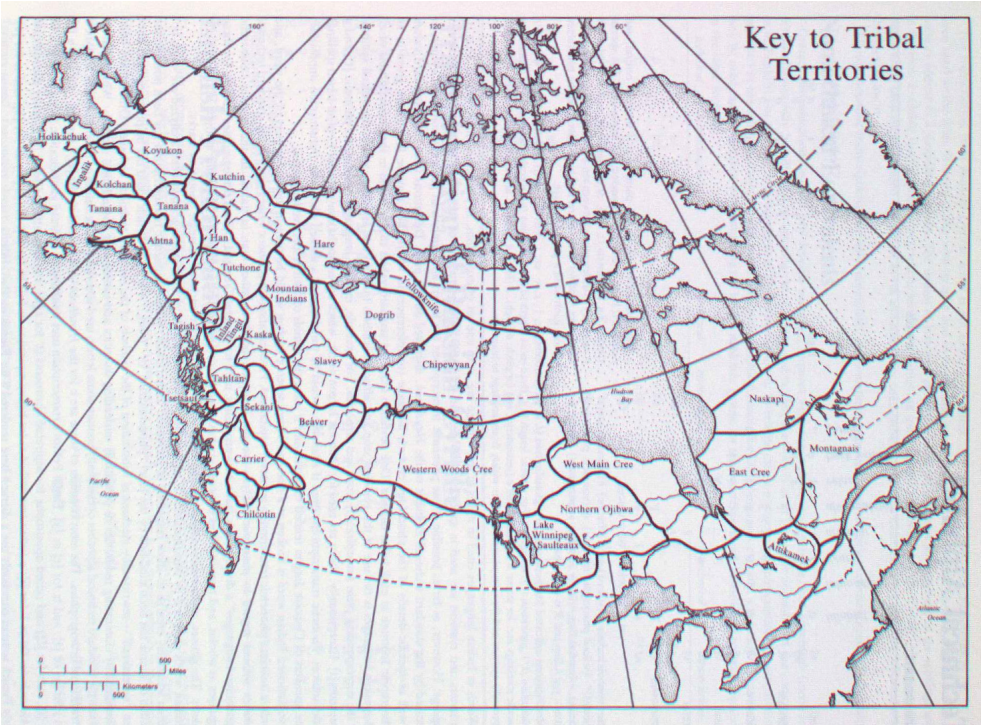


Figure D.1: An example of one of the maps from the Smithsonian Handbook. This map displays the tribal territories located in the subarctic region of Canada.

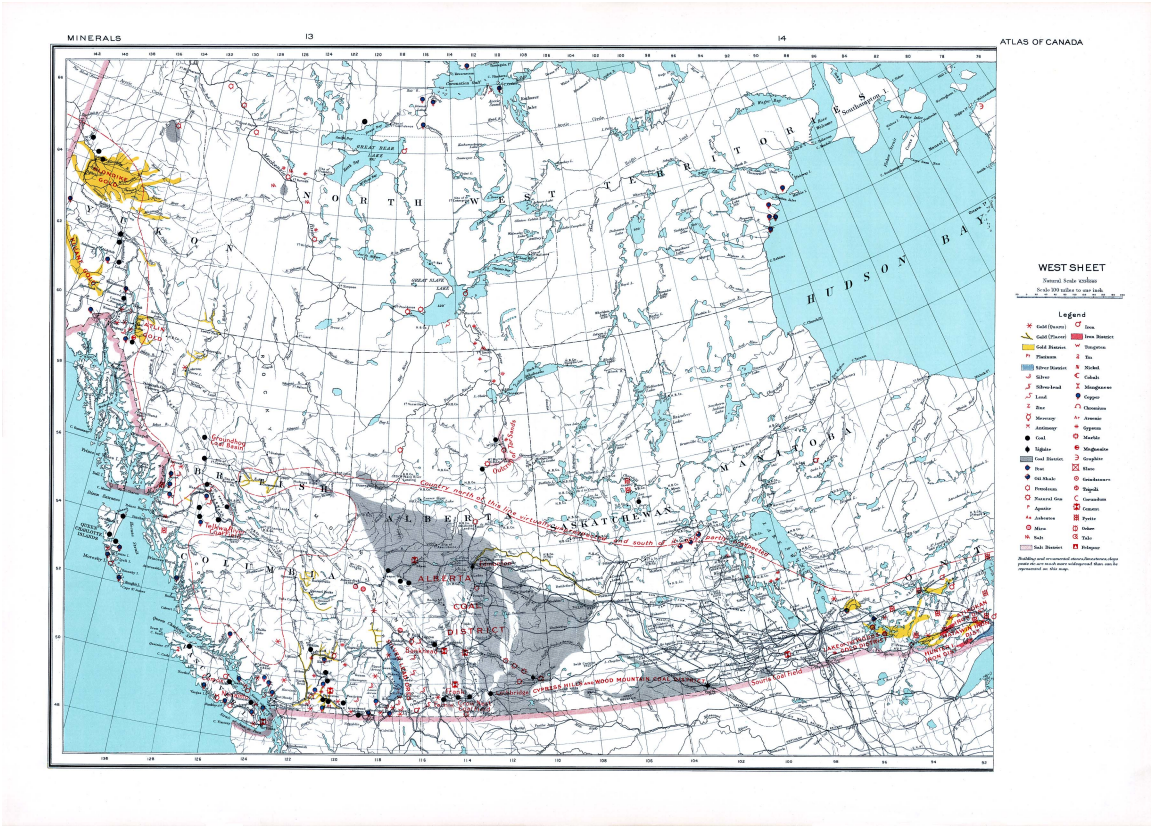


Figure D.2: An example of one of the maps that we digitize from the 1915 Atlas of Canada. This map depicts the location of minerals across Western Canada.



Figure D.3: The bison's range at various points in time, as documented by William Hornaday, in Hornaday (1889).

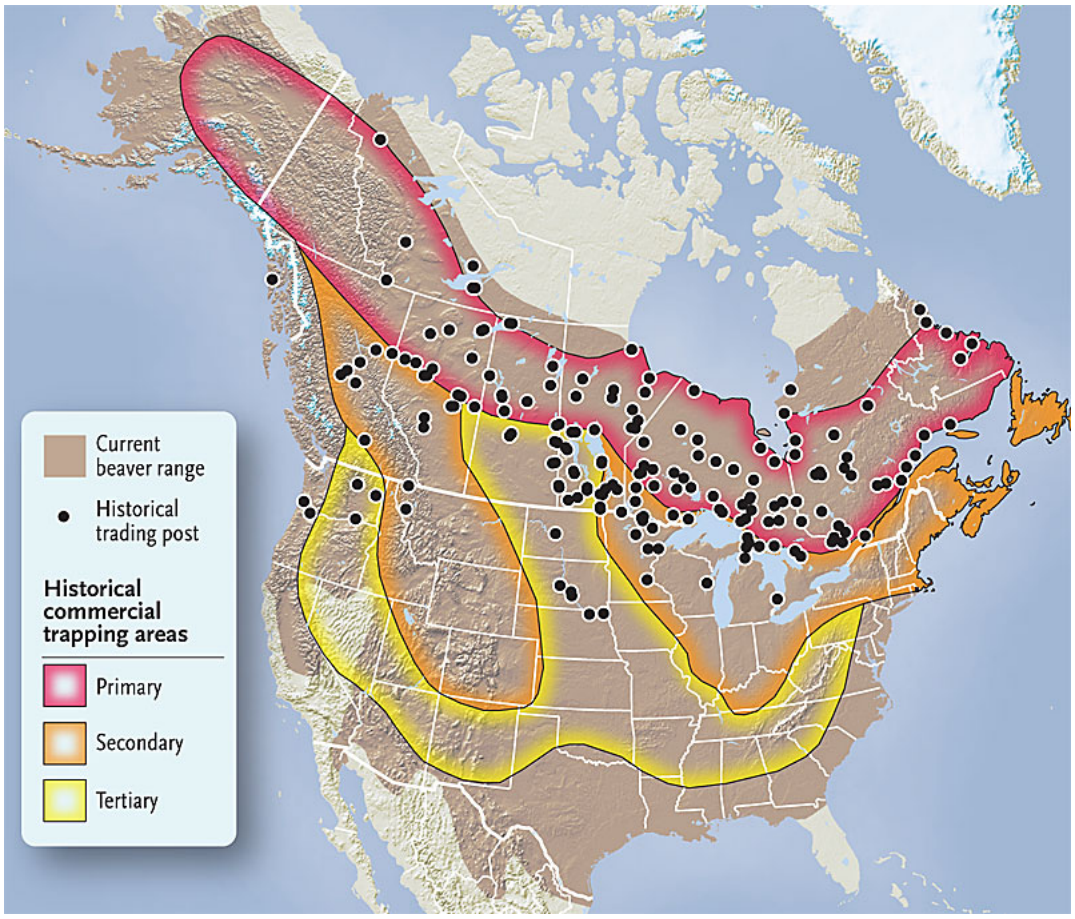


Figure D.4: Historical commercial trapping areas from the Canadian Atlas.

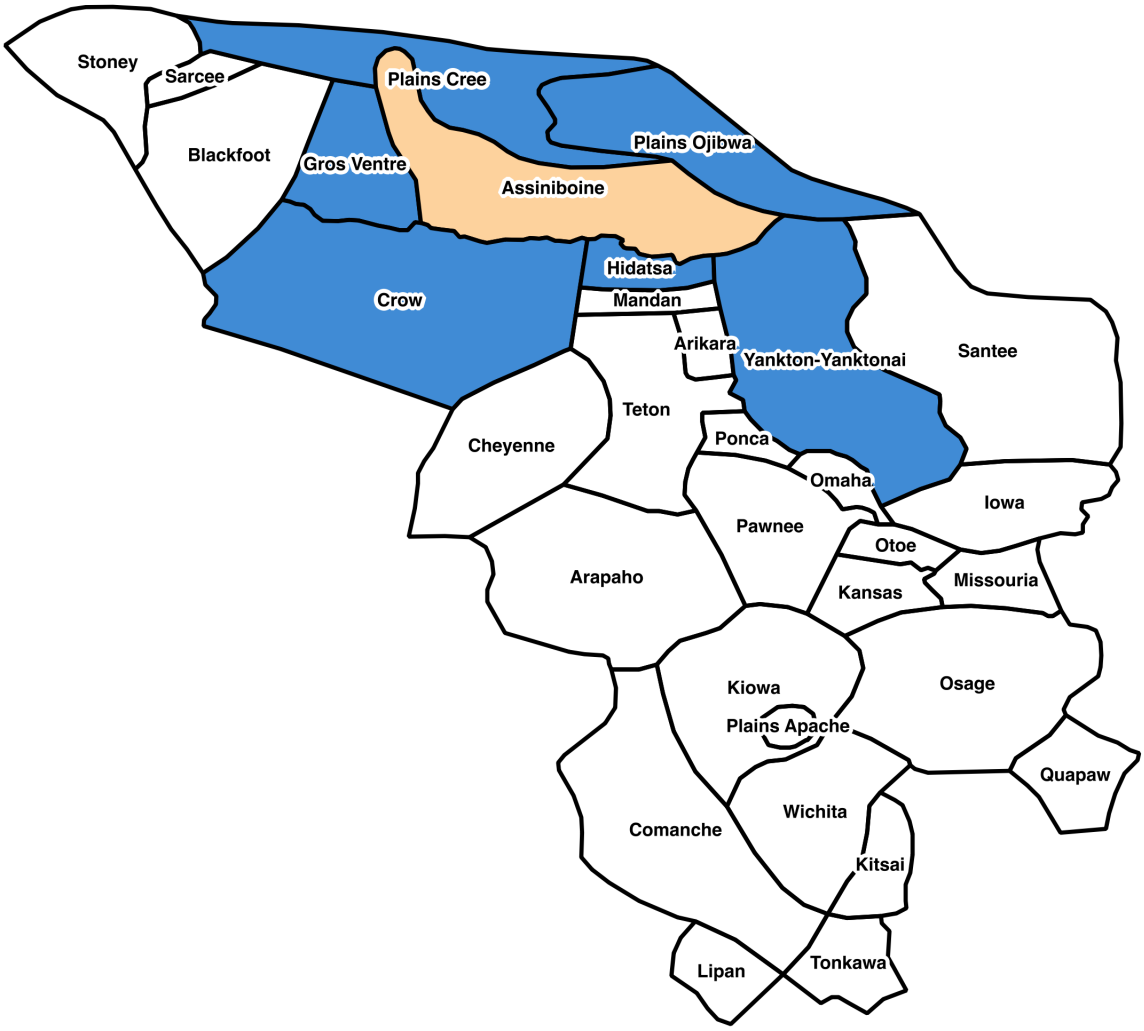


Figure D.5: Example of how geographic neighbours are identified in our coding. Here, any of the tribes located on blue polygons would be coded as a geographic neighbour of the Assiniboine (beige).



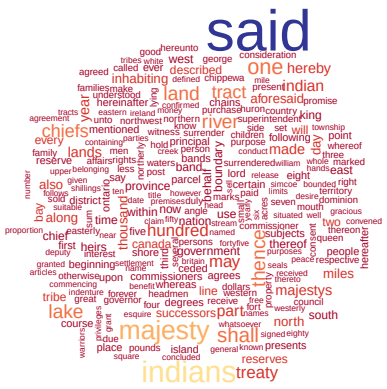
Figure D.6: Example of how we overlay controls and ancestral territories.

E Additional Information on Natural Language Processing

This section outlines our procedure for pre-processing the treaty texts. We first remove all stop words from each document. Stop words are words like "the" and "and"—words that do not convey meaning in a sentence. Figure E.1(a) displays a word cloud for words that occur 25 times or more, once we have excluded stop words. Figure E.1(c) displays the 100 most frequently occurring words. In both figures we see words like "indians" and "majesty" which reflect each party involved in the treaty. We also see words like "land" and "reserves", those that convey information in relation to the content of the documents.

In the next step of our procedure we made a list of all the unique words contained in the treaties and then classified them according to their relevance. This step relies on human judgement, but ensures that we are not including words like "said" that appear prominently in Figure E.1(a) and (c), but do not convey any information as they are used in the phrase "said indians" in almost every treaty to refer to the Indigenous groups involved in the treaties. Once we have compiled this list, we remove these words from the texts.

Finally, we remove common endings, so that, for example, words with different grammatical tenses, like "surrender" versus "surrendered", do not show up as separate words in the analysis. The end result is displayed for words that occur 25 times or more in Figure E.1(b) and for the 100 most frequent words in Figure E.1(d). Comparing these word clouds to those that were made prior to the pre-processing makes it clear how much more informative the average word is once we have processed the documents.



(a) Words that occur 25 times or more



(b) Words that occur 25 times or more (reduced sample)



(c) 100 most frequently occurring words



(d) 100 most frequently occurring words (reduced sample)

Figure E.1: Word clouds of the treaty texts after stop words have been removed. The full sample has otherwise not been modified, while the reduced sample excludes a list of words that we deem to convey irrelevant information. We have also removed common endings in the reduced sample.