The link between community well-being and Aboriginal language retention

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1. Introduction

Over 1.4 million individuals in Canada are aboriginal people and 637,660 of them are Registered or Treaty Indians. Approximately half of them (49.1%) are living in reserves and other settlements. With more than 600 bands and over 60 languages, the majority of First Nations population with registered Indian status live in Ontario (19.7%), British Columbia (17.6%), Manitoba (16.6%), Alberta (15.2%) and Saskatchewan (14.8%).[1] Around 99.4% of First Nations people can converse in English or French and only 22.4% can communicate in their Aboriginal language. The First Peoples' Heritage, Language and Culture Council (2010) indicates that the share of First Nations individuals in British Columbia who can communicate in Aboriginal language has decreased from 100% in the year 1890 to only 5.1% in 2010. The Council highlights the importance of the First Nations languages from cultural, identity and knowledge perspectives.

In the past years, the aboriginal people have experienced discrimination and forceful assimilation orders, which affected also the poverty level of First Nations communities.[2] According to information from Aboriginal Affairs and Northern Development Canada (further referred as AANDC), the well-being level of First Nations communities is significantly lower than the level for Non-Aboriginal communities. In recent years, the Government of Canada and the Assembly of First Nations are trying to intensify the cooperation with the aim of better mutual development of Canada and First Nations in the fields of education, administration and economics. Moreover, those initiatives indicate the importance of the First Nations' integral rights for primary and secondary education in Aboriginal languages. Several articles aim to research the important association between well-being and Aboriginal (native) languages (Capone, Spence and White (2009), Laitin and Ramachandran (2015), Fleras (1987)).

In this empirical study, I try to evaluate the link between the Community Well-Being Index Scores and the Aboriginal language knowledge ratio for selected First Nations communities in Canada in time perspective. Previous research indicated a negative relation (Capone, Spence and White 2009). My analysis will use 2001 and 2006 Canadian Census data, the 2011 National Household Survey, and the corresponding Community Well-Being Index (CWB) data tables.

[1] Statistics Canada, National Household Survey, 2011
[2] AANDC: https://www.aadnc-aandc.gc.ca/eng/1100100013778/1100100013779

AANDC has developed the CWB scoring system to enhance the comparability of the development and wellbeing of aboriginal and non-aboriginal communities. The score includes four components – Income, Education, Housing and Labour Force Activity. Regarding language knowledge, there are issues with the survival of aboriginal languages in Canada. According to information from AANDC, there are 617 First Nations Communities, who speak around 50 Aboriginal languages which are considered as vulnerable, endangered or even extinct.[3] In contemporary Canada, the Constitution Act protects the rights of Aboriginal peoples.[4] The objective of my paper is not to discuss the problems of aboriginal languages' retention or revitalization, but rather to evaluate the link and trends in wellbeing of First Nations communities and aboriginal language knowledge ratio.

The regression results of the models confirm the negative relation between Community Well-Being Index scores of the selected sample of First Nations' communities and Aboriginal language knowledge ratio. This relation is significant across three Canada Census years from 2001 to 2006 and 2011. The regressions results also confirm the negative link between CWB index and the remoteness measure for selected sample.

This paper is organized as follows: Section 2 covers literature overview; Section 3 describes the selected data set and summary statistics; Section 4 presents the econometric models' description; Section 5 provides the interpretation of empirical results; Section 6 presents the discussion of the model's robustness; Section 7 provides main findings.

2. Literature overview

2.1. Aboriginal languages

The study of relation between Aboriginal language skills and the Community Well-Being Index measure is the main topic of research made by Capone, Spence and White (2009). For selected ninety-five First Nations communities in Canada, they study the correlation behavior between Community Well-Being Index scores and Aboriginal language skills. The language skills is a ratio of the community population who can understand and/or speak Aboriginal language. The study uses the data from 2001 Aboriginal Peoples Survey and Community Well-Being Scores published by AANDC. The study reveals a negative association between Aboriginal language

[3] AANDC: http://www.aadnc-aandc.gc.ca/eng/1100100013791/1100100013795
[4] Justice Laws Website: http://laws-lois.justice.gc.ca/eng/const/page-16.html#h-52

skills and the Community Well-Being Index. However, their article presents very interesting questions, which need further research in the future. For example, how those language skills and Well-Being Index scores are causally related? Is there place for the positive association? What is the role of community isolation?

Fleras (1987) studies the case of the Maori language in New Zealand. The author stresses the importance of Aboriginal language in the Maori population's identity and power building in negotiations with the government. As one of the possible strategies to implement Maori identity and influence building, the author describes the system of popularization of the Maori language (immersion) preschools. Since 1982, many preschool centers has appeared throughout New Zealand. The efforts of Maori activists reached considerable results in popularization of Maori language and raising significant awareness on political level. The government sees this initiative as one of the possible solutions for social and economic problems, or improving wellbeing level of Maori people. Fleras discusses the opportunity of applying the experience of Maori people in New Zealand to Aboriginal people in Canada. Even though there are many differences between New Zealand and Canada cases, Fleras points out that there is a potential to do so by uniting the efforts on both community and political levels.

O'Sullivan (2012) evaluates the relationship between Community Well-Being Index (further referred as CBW) scores and isolation Aboriginal people in Canada. The analysis includes the evaluation of this relationship for a sample of 537 First Nations communities across Canada. He uses CWB scores calculated in 2006 and proposes to compare those communities with the "proximate population" (measured in natural log) in the neighboring non-Aboriginal communities within 25 km of the communities' territory.[5] The author regresses CBW scores (and local differences in CWB scores) on Proximity Population and the local CWB differences on the Proximate Population. He finds a negative link between CWB scores and isolation among all 3,860 non-Aboriginal communities across regions and among Aboriginal First Nations in Ontario, Quebec, British Columbia and the Territories. Moreover, the author observes that the local differences decrease as the proximate population density increases. In addition, the author indicates that the isolation is not statistically significant for First Nations communities from Prairies regions.

[5] Proximate population

Cooke and O'Sullivan (2015) study the relation between Community Well-Being Index scores for the year 2006 and the migration rates between the two Canadian Census years of 2001 and 2006. They analyze the impacts for 533 Canadian First Nations communities. The purpose is to study the trends in migration flows in and out of communities and to see how those flows are related to the well-being of the communities. In general, the results indicate a weak association between migration flows and well-being index scores for the selected Canadian First Nations communities.

2.2. The benefits of bilingualism

Peal and Lambert (1962) study the influence of bilingualism on intellectual functioning. They compare the performance of the two groups of Non-Aboriginal schoolchildren in six schools in Quebec (Canada) taking into account the socio-economic position, sex and age balance. The results of their research showed that there were significant differences between the two groups, even though students were from the same schools. They found that the bilingual group performed better on different verbal and non-verbal tests than unilingual group.

Cummins (1976) proposes an interesting summary via discussing and hypothesizing on previous studies of bilingualism effects on human cognitive abilities. Cummins refers to the works of Cummins and Gulutsan (1975) for bilingual students in English/French from Edmonton schools, Ben-Zeev (1972) for bilingual students in Hebrew/English from New York and Israel, and Ianco-Worrall (1972) for bilingual students in Afrikaans/English from South Africa to conclude that the bilingual individuals has more than one language instrument to describe objects. That can help them to separate the meaning of the word from its sound at an earlier age. Cummins (1977) by studying a sample of bilingual in English/French students from Edmonton schools indicates that for bilingual individuals there must be some critical mass or line in the knowledge of the second language to allow him to gain more in intellectual abilities. In contrast, the insufficient mastery level in the second language may bring negative effects in comparison with unilingual individuals.

Hakuta and Diaz (1985) make a good overview of the previous studies that tries to compare bilingual and unilingual individuals' educational abilities. They mention that, in the first half of the 20th century, the general trend was that the bilinguals are less successful in various educational tests. However, according to the authors, early researches did not pay attention to the balancedness of the compared groups of individuals in social and economic status, and to the real

abilities of the selected bilingual sample groups. This, in turn, makes their conclusions not reliable. In their study of 123 bilingual public school students (Spanish and English) in New Haven, Connecticut, they indicate positive effects of bilingualism on cognitive abilities and acquire the evidence that the direction of causality goes from bilingual abilities to cognitive ones.

Laitin and Ramachandran (2015) provide an interesting approach in evaluating language policies effects on social and economic aspects of the country. They studied two ways to test the bilingualism ability effects those aspects: via linguistic distance between the individual's language and the official language of the country, and via exposure to the official language. Here, the official languages are English, French, Spanish or Portuguese in post-colonial countries. They assume that the higher distance is associated with higher cost of learning and slower accumulation of human capital. The same association is assumed for a lower exposure to the official language. To test the first statement they use the data from 2005/06 National Family and Health Survey of India with a sample size of 76,476 observations, to follow migrants across Indian states with different official languages. Their results show that the distance to the official language is accompanied with lower socio-economic outcomes. To test the second statement they select eleven African countries where English is an official language. They use the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) program as the source of information on 40,000 students. They find that by additional exposure to English language, the selected students demonstrate higher educational performance, which can help achieve higher well-being in the future.

The researches analyze the link between First Nations native language knowledge, isolation, migration and the wellbeing level in First Nations communities in Canada in cross-sectional format. The findings indicate both a significant negative relation between First Nations Aboriginal language knowledge and wellbeing level, and between isolation and wellbeing level in those communities. The effects of migration is not a significant influencing factor on wellbeing level in First Nations communities. Moreover, there is an evidence that indicate possible benefits for bilingual individuals in possessing better cognitive abilities, which positively influence socio-economical (or wellbeing) level of those individuals. In my paper, I analyze the relation between Community Well-Being Index scores and Aboriginal language retention ratios for selected First Nations communities in Canada over several periods. I try to

answer the question whether this relation negative or positive. If positive, that could indicate the presence of benefits from being bilingual.

3. Data description

I used the Census Aboriginal Population Profiles in 2001 and 2006 (further referred as "Census 2001" and "Census 2006"), National Household Survey on Aboriginal Population Profile in 2011 (further referred as "NHS 2011"), distributed by Statistics Canada, as the sources of data. In addition, I used the Community Well-Being Index calculated by AANDC (further referred as "CWB Index") as another source of data. For robustness test, I will use the Google Maps measurement data (further referred as "Google Maps") and the list of medium and large population centers, based on the population counts by Statistics Canada in 2011 census (further referred as "population centers").

Specifically, I selected 245 First Nation communities for which I was able to collect the data on Aboriginal identity population and Aboriginal identity population with the knowledge of Aboriginal language(s) from Census 2001, Census 2006 and NHS 2011. AANDC has provided the lists of First Nations communities, which Statistics Canada matched with census subdivision codes. According to the definition of Statistics Canada, the Aboriginal identity population defines those people who declared themselves as members of Aboriginal group, Indian band or First Nations. The knowledge of Aboriginal language represents single and multiple language responses.

According to the Statistics Canada website, for the Census 2001 the information was collected based on the 20 % of the population sample that received the long questionnaire.[6] The Aboriginal Population Profiles data was collected for First Nation communities with 250 members or more.[7]

The data for Aboriginal Population Profile in Census 2006 was also collected based on 20 % samples, but for Indian reserves and distant areas, the coverage was 100 %.[8]

Statistics Canada launched NHS 2011 survey in 2011 to substitute for the long questionnaire. According to the information of Statistics Canada, for the Indian reserves and settlements it used

[6] Statistics Canada: http://www12.statcan.ca/english/Profil01/AP01/Help/Help_About_Census.cfm?Lang=E

[7] Statistics Canada: http://www12.statcan.ca/english/Profil01/AP01/Help/Help_FAQ01.cfm?Lang=E

[8] Statistics Canada: http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-594/help-aide/H04.cfm?Lang=E

survey Form N2 questionnaire with a coverage of 100 % of households. It is important to note here that to preserve the quality of the survey data Statistics Canada uses several data suppression filters. The Statistics Canada suppressed the information in NHS 2011 when the global non-response rate (GNR) to the survey was higher than 50 % or over 25 % for the Census of the Population. AANDC has provided the Indian bands' information, which Statistics Canada has identified by census subdivision codes.[9]

According to AANDC information, the CWB Index score ranges from zero to 100 and includes four components: income, education, housing conditions and labour force activity. The income component (*Income*) assigns values from zero to 100 based on the per capita total income for a specific community. The education component (*Education*) consists of the two parts: share of the community population 20 years old and over who have attained higher school certificate (attributed to 2/3 of the component), and share of the community populations 25 years old and over with a university bachelor degree or higher (attributed to 1/3 of the component). The housing component (*Housing*) consists of two parts with equal weights: proportion of the community population living in houses with no more than one person per room and share of the population living in houses which do not need major repair. The labour force activity component (*LFA*) also consists of two parts: the share of the community population aged 20 to 65 years who was in the labour force during the week before the census, and the share of the community population aged 20 to 65 years, who was employed during the week census carried out. The AANDC also indicates that the CWB index is based on mandatory census questionnaires in 2001 and 2006, but on voluntary NHS survey in 2011. Taking into account the possible limitations and issues with measuring CWB index scores at different times, they are still comparable at national and reginal levels.[10]According to AANDC, the First Nation group consists of legally defined reserves and other communities with an identifiable majority of First Nations population.[11]

Based on the stated above information, I was able to trace and collect information on 245 First Nations communities in three points of time: 2001, 2006 and 2011, for a sample of 735 observations.

[9] Statistics Canada: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/help-aide/about-apropos.cfm?Lang=E#a6

[10] Statistics Canada: https://www.aadnc-aandc.gc.ca/eng/1345816651029/1345816742083#chp3

[11] Aboriginal Affairs and Northern Development Canada: https://www.aadnc-aandc.gc.ca/eng/1421245446858/1421245712063

Table 1 shows summary statistics of the data per region (provinces and territories) and per year. The selected sample covers the following regions: "*Alberta, British Columbia, Manitoba, New Brunswick, Northwest Territories, Nova Scotia, Ontario, Quebec and Saskatchewan*". The regions with the largest number of communities are *Saskatchewan* province (60), *Manitoba* (43), Alberta (36) and the lowest numbers of communities are in *New Brunswick* (7) and *Nova Scotia* (9). The shares of the Aboriginal identity population in the regions demonstrates very interesting similarities. The Prairies regions still keep the lead with *Manitoba*, *Saskatchewan* and *Alberta* accounting for 22%, 20% and 17% on average for three points in time. The shares of Aboriginal identity populations by region are almost the same in the three Canadian Census years. All regions demonstrate an increasing trend in the average Aboriginal identity population. The highest average Aboriginal identity populations per First Nation community are in *Quebec* (1,372), *Manitoba* (1,159), *Alberta* (1,096), and the lowest are in *Ontario* (552), *Northwest Territories* (612) and *British Columbia* (635). The highest average share of Aboriginal identity population with the knowledge of aboriginal language(s) across the three points in time is in *Quebec* (82%), followed by the *Northwest Territories* (55%). The lowest average shares are in *Ontario* (35%) and *British Columbia* (20%). There is a significant difference gap between *Quebec* and the rest of the group.

The average *Income* and *Education* indices have an increasing trend through time for almost all regions except for *Saskatchewan* and *Manitoba*. The total average *Housing* index decreases from 2001 to 2006 and then stays the same. The total average *LFA* index increases from 2001 to 2006 then decreases in 2011. The total average *CWB* index is the same in 2001 and 2006, at 54, but it slightly increases to 55 in 2011. For comparison, the average *CWB* index scores for Non-Aboriginal communities for the 2001, 2006 and 2011 are 73, 77 and 79 respectively.[12]

I divide my sample of Aboriginal identity population by the following Aboriginal languages: Blackfoot, Cree languages, Dene, Innu/Montagnais, Mi'kmaq, Oji-Cree, Ojibway, Slavey, Stoney and Other languages.[13] For 15 First Nations communities with mixed bands, where the minor band accounts for 20% or more of the total aboriginal identity population, I sorted them by

[12] Aboriginal Affairs and Northern Development Canada: https://www.aadnc-aandc.gc.ca/eng/1421956465811/1421956529797

[13] According to Statistics Canada (2011) NHS Aboriginal Population Profile data source, Cree languages includes Cree not otherwise specified, Swampy Cree, Plains Cree, Woods Cree, and a category labelled 'Cree not included elsewhere' (which includes Moose Cree, Northern East Cree and Southern East Cree). Other languages include all other Aboriginal languages, including Atikamekw, Algonquin, Carrier and Tlicho.

the major band's language. The first thing to notice is that all aboriginal languages are region and community specific, and if accounted in the regression model together with region dummies, they would significantly correlate with them. As an average for three time points, the largest Aboriginal language groups are *Cree languages* making (42.5%), *Ojibway* (15.3%), *Mi'kmaq* (6.3%) and *Other languages* (15.5%).

Table 2 shows summary statistics for the model variables. As I mentioned, I selected 245 First Nation communities with corresponding data on Aboriginal identity population share (ratio) for each community and with corresponding CWB index score data for three census years. The minimum population in a community is 252 and the maximum is 5,820 individuals. The maximum CWB index score is 83, the maximum score is 99 for the Income component, 70 for the Education component, 88 for the Housing component, and 83 for the Labour Force Activity component.

To analyze specific year effect I created two mutually exclusive census year dummy variables: *Y2006* to capture time effects in 2006 and *Y2011* to capture time effects in 2011. They take value 1 if the specific observation pertains to that specific census year, and zero otherwise. The reference period is Census year 2001.

To create the Aboriginal language retention ratio (*RATIO*) I divided the Aboriginal population with the knowledge of Aboriginal language by the total Aboriginal identity population for the community and multiplied by 100. The range of the values is from zero to 100.

The 245 First Nation communities in Table 1 represent nine geographical regions: "*Alberta, British Columbia, Manitoba, New Brunswick, Northwest Territories, Nova Scotia, Ontario, Quebec and Saskatchewan"*. To account for geographical effects I have created eight mutually exclusive dummy variables Each specific regional dummy variable is equal to one if the observation is from that specified region and zero otherwise. I collectively named them as GEO , to account for the following respective geographical regions: "*Alberta, British Columbia, Manitoba, New Brunswick, Northwest Territories, Nova Scotia, Ontario, Quebec"*. The reference geographical region is *Saskatchewan*.

To control for Aboriginal language effects I created nine mutually exclusive dummy variables: *Blackfoot, Cree languages*, *Dene*, *Innu/Montagnais*, *Mi'kmaq*, *Oji-Cree*, *Ojibway*, *Slavey*, *Stoney* and *Other languages*. The language specific dummy variable is equal to one if the corresponding community is speaking that language and zero otherwise. The vector of language dummy

variables will be ***LAN***. I selected *Other languages* as the reference language category. Because of the potential high level of correlation between region dummies and language dummies, I decided to include the language effects in robustness check Section 6.

To capture the possible effects of the size of First Nation communities on wellbeing level, I decided to include into the model the Aboriginal identity population variable. To smooth the scale of the values I used the natural logarithm of Aboriginal identity population, named as *POPULATION*.

4. Econometric model

The general form of the regression model is:

$$CWB_i = \alpha_0 + \beta RATIO_i + \beta_2 POPULATION_i + \gamma_1 Y2006 + \gamma_2 Y2011 + \boldsymbol{GEO'\delta} + \varepsilon_i\,, \quad (1)$$

$$where\ i = from\ 1\ to\ 735.$$

To estimate the relation between dependent variable *CWB* (or one of its components) with *RATIO*, *POPULATION*, different census years, geographical region of community, I will run five sets of regressions for different well-being index score dependent variables (*CWB*, *Income*, *Education*, *Housing*, *LFA*). Because I present the data on the same communities across three periods, the series are not independent (correlated) in the data set. To relax this assumption I will assign 245 clusters in the models to generate "cluster-robust standard errors".[14]

Model 1 is an OLS regression with one explanatory variable *RATIO* and *POPULATION*. In Model 2, I add two time dummies *Y2006* and *Y2011*. In Model 3, I add eight mutually exclusive regional dummies expressed by vector variable ***GEO*** with 8 corresponding coefficients in vector ***β***.

Model 3 has the general form as in equation 1.

[14] STATA manual on estimation and post estimation commands

5. Empirical results

5.1. The Total Community Well-Being (CWB) Index as a dependent variable (First three models of Table 3)

In Model 1 regression results, the *RATIO* variable is negative and statistically significant at 1% level for CWB index score (Table 3). The Model 1 results generally supports the hypothesis of a negative relation between CWB index score and Aboriginal language retention ratio (Capone, Spence and White 2009).

In Model 2 with time dummies Y2006 and Y2011, the Aboriginal language retention ratio is statistically significant with the expected negative sign. I observe that 2006 and 2011 time effects have a positive sign, with the 2006 effects being statistically significant only at 10% level and the 2011 effects being statistically significant at 5% and 10% levels. That means that there is a positive overall increase in CBW index score in 2011 when compared with the year 2001. The Aboriginal identity population variable is not significant at 10% level of significance.

For Model 3 with additional control variables for regions, the R^2 significantly increases from 0.12 to 0.54. The Aboriginal language retention ratio is still strongly statistically significant with the negative sign and its economic significance increases by approximately 20% if compared to the coefficient for *RATIO* in Model 2. The regional dummy variables, except *Alberta* and *Manitoba*, are strongly significant and have a positive sign, which means that those regions have higher CWB index score than the reference region *Saskatchewan*. The insignificance of the coefficient for *Manitoba* and the weak statistical significance for *Alberta* could indicate similar patterns for the link between well-being score and Aboriginal language retention in the Prairies provinces. The Aboriginal identity population variable is again not significant. This may mean that the population does not explain the *CWB* index score, with or without regional dummy variables.

5.2. Income component of the CWB Index as a dependent variable (First three models of the Table 4)

In Model 1, the regression results demonstrates a weak relation between the dependent variable *CWB* and the explanatory variable *RATIO*. The Aboriginal language retention ratio is statistically significant only at 10% level. However, the R^2 has a quite low value at 0.01.

For Model 2, with time control variables for 2006 and 2011, the Aboriginal language retention ratio is not statistically significant at 10% level. The time dummy for 2006 is statistically significant at 5% and 10% levels and the time dummy variable for 2011 is statistically significant at 1% level. The R^2 is still low at 0.03. Here, the time effects have taken over the other variables.

In Model 3 specification, the explanatory power of the model significantly increases with R^2 growing from 0.03 to 0.50. Almost all the regional dummy variables are statistically significant at, except for *Manitoba*. That means the model predicts a similar relations both in *Manitoba* and in the reference region *Saskatchewan*. The highest coefficient is for Northwest Territories that reflect the highest average Income component CBW index score in that region.

Here, the Aboriginal identity population variable is not statistically different from zero in Model 2 and Model 3. Although statistically significant in Model 3, the economic significance of Aboriginal language retention ratio is relatively low.

5.3. Education component of the CWB Index as a dependent variable (First three models of the Table 5)

In Model 1, the regression results demonstrates a significant negative relation between the dependent variable and the *RATIO* variable. Remarkably, the R^2 has a highest value of 0.23 among the CWB components.

In Model 2, with time control variables for 2006 and 2011 and Aboriginal identity population, the Aboriginal language retention ratio is statistically significant. Both time dummy variables are statistically significant. The R^2 increases slightly to a moderate 0.25. The coefficient for Aboriginal identity population is not statistically significant.

The explanatory power of Model 3 significantly increases from 0.25 to around 0.53. The regional dummy variables are statistically significant at one of the three levels of significance, except for British Columbia. The coefficient for *British Columbia* is not statistically significant at the 10% level, and the coefficient for *Northwest Territories* is statistically significant at the 10% level. The highest coefficient is for *Nova Scotia* that partially reflect the highest average *Education* component CBW index score among the regions. The coefficient for Aboriginal identity population, in combination with regional dummies, became statistically significant and positive. In this specification, that could mean the *Education* Index score increases with the increase in the Aboriginal identity population.

5.4. Housing component of the CWB Index as a dependent variable (First three models of the Table 6)

In Model 1, the regression results demonstrates a significant relation between the dependent variable and the explanatory variable. The Aboriginal language retention ratio is statistically significant. The explanatory power R^2 has a moderate value of 0.12.

In Model 2, the Aboriginal language retention ratio is statistically significant. Both time dummy variables are statistically significant. The Aboriginal identity population variable is statistically and economically significant at 5% and 10% significance levels. The R^2 is around 0.14 and it has not significantly changed. All the variables have a negative relation with the dependent variable.

Model 3 specification significantly increases the explanatory power the R^2 from 0.14 to 0.50. Almost all regional dummy variables are statistically significant, except for *Manitoba* and *Alberta*, where the value are not statistically significant at 10% level. The highest coefficient is for *Quebec* that may partially reflect the highest average Housing component CBW index score among the regions. The Aboriginal language retention ration and Aboriginal identity population are both economically and statistically significant.

5.5. LFA component of the CWB Index as a dependent variable (First three models of the Table 7)

In Model 1, the regression results demonstrates a weak relation between dependent variable and explanatory variable. The Aboriginal language retention ratio is statistically significant only at 10 % and 5 % levels of significance. The regressor's coefficient is comparatively low at negative 0.04 and the explanatory power R^2 has a low value of 0.02.

In Model 2, the Aboriginal language retention ratio is statistically significant only at the 10% level. *Y2006* time dummy variable is statistically significant and positively related to dependent variable. Y2011 time dummy variable is statistically significant at 10% and negatively related to dependent variable. The Aboriginal identity population regressor is negative and economically and statistically significant at 5% and 10%. The R^2 is still low at around 0.04.

In Model 3, the explanatory power has significantly increased from 0.03 to 0.34. All the variables are statistically significant. Regional dummy variables are statistically significant at least at 5% level of significance. The highest coefficient is for *Northwest Territories* that may

partially reflect the highest average Labour Force Activity component CBW index score among the regions.

5.6. CWB and components

On overall, the five regressions for Community Well-Being Index scores (*CWB*) and, separately, for its four components, demonstrate the negative relation between Community Wellbeing Index and Aboriginal language retention ratio. That means that I observe higher wellbeing index scores with the lower Aboriginal language knowledge in the First Nations' communities and vice versa. I found economically and statistically significant effect of Aboriginal language retention ratio for *Education* and *Housing* components. At the same time, I observe a weak relation between the *Income* and *LFA* components of *CWB* index score and the Aboriginal language retention ratio.

About the dummy variables for time effects *Y2006* and *Y2011* in Model 2 and Model 3 for general *CWB* model, I think that the time effects of year 2006 are weak and that the time effects for year 2011 are not economically significant. In addition, by looking at Model 3 regressions results for the components of *CWB* Index score, I found the following statistically significant fixed time changes: positive for *Income* and *Education*, negative for *Housing*, and mixed for the *Labour Force Activity*.

The Aboriginal identity population is not statistically significant for total *CWB* variable and the *Income* component, but it is statistically and economically significant in regressions for the *Housing*, *Labour Force Activity* and *Education* components. Specifically, for the *Housing* and *LFA* components, the Aboriginal identity population has a negative sign. That seems to support the "Malthusian" situation of First Nations communities, whereas housing and employment opportunities become limited in response to the growing Aboriginal population. The only instance, where the coefficient of the Aboriginal identity population is positive and economically and statistically significant is in Model 3 for the *Education* component. That may indicate a positive stimulating factor of the First Nations community population size on the general education attainment in high school, college or university.

The introduction of control dummy variables for regions increased the explanatory power of the regression Model 3 from 0.11 to 0.54 for CWB Index Score. The regression coefficients for *Alberta* and *Manitoba* are not statistically different from zero for general *CWB* and *Housing* score. That indicates that those regions are not different from reference *Saskatchewan* region in *CWB* Model 3 specification.

6. Robustness Check

As mentioned by Capone, Spence and White (2009), there could be many concerns in studying the relation between well-being level and Aboriginal language retention. Those include the question of the proper selection of variables and the direction of causality.

There could be endogeneity problem in my model equation 1. I would like to evaluate briefly the possible sources of endogeneity: measurement error, simultaneity, omitted variable or model misspecification problem.

I have selected the data from for Canada Census Aboriginal Population Profiles in 2001, Canada Census Aboriginal Population Profiles in 2006, and National Household Survey Aboriginal Population Profile 2011. The long Census questionnaires and 2011 National Household Survey N2 questionnaire contain similar questions about the Aboriginal identity population, knowledge of the Aboriginal language. Statistics Canada collected the data for Indian reserves for Census 2011, Census 2006 and NHS 2011 on a 100 % basis. Moreover, I have minimized the possible errors by crosschecking the available information on Indian band areas with census sub-division names and alternative names.[15] In addition, I have already mentioned that according to the AANDC, the CWB Index can be compared across the census years, at least at the regional (provincial level). That makes me confident that the quality of my data collection is acceptable. In other words, I have minimized the data collection (measurement) errors.

The simultaneity problem addresses the question whether there is a reverse causality between the CBW Index score and Aboriginal language retention. In general, the knowledge of Aboriginal language by First Nations' community population is normally acquired during the early ages, and mostly as a mother tongue.[16] Consequently, this learning process precedes their ability to earn income (*Income* component of CBW Index), to maintain their houses in proper condition (*Housing* component of CBW Index), to attain higher- college- or upper education levels (*Education* component of CBW Index) and to join actively seeking labour force (*LFA* component of CBW Index). I also accept the geographical regions as a direct causality factor towards the possible source of the influence on CWB index. Hence, I do not think that the issues of reverse causality is a major problem in my model.

15 Statistics Canada: https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/help-aide/a-tab.cfm?Lang=E
16 Statistics Canada: http://www.statcan.gc.ca/pub/89-655-x/89-655-x2014001-eng.htm

To check the third possible problem with endogeneity due to omitted variables in the model equation (1), I propose two scenarios. In the first one, I will use a different set of regressors. I will substitute the set of regional control dummies with the set of Aboriginal language control variables and I will add additional variables to the model (some measure of isolation of First Nations communities' geographical location). In the second scenario, I assume that there are First Nations community-specific differences. Hence, I will try to use the micro panel model with community heterogeneity.

6.1. First scenario

As I have mentioned above in data summary statistics, the set of Aboriginal language control variables $\boldsymbol{LAN}$ can be a good candidate for regional control variables $\boldsymbol{GEO}$. In addition, I will use the relative distance from the specific First Nation's community to the nearest medium or large population center as a measure of *Remoteness* (isolation). Using Google Maps, I have collected the data on available surface road distance between the First Nation community and the closest population center. For population centers, I used the data of Statistics Canada on 85 medium and large centers based on population counts in the 2011 census. Table 8 contains the list of those centers, with the population counts of no less than 30,000 people. In cases when it was not possible to trace on (Google Maps) the surface road between a specific community and a population center I used the "Measure distance" utility and created a binary variable *Noroad*, which is equal to one to capture additional possible effects of isolation in the absence of road, and is equal to zero otherwise.

The new model 4 equation will be as follows:

$$CWB_i = \alpha_0 + \beta_1 RATIO_i + \beta_2 POPULATION_i + \gamma_1 Y2006 + \gamma_2 Y2011 + \boldsymbol{LAN'\delta} + \varepsilon_i, \quad (2)$$

$$where\ i = from\ 1\ to\ 735.$$

The model 5 equation will be as follows:

$$CWB_i = \alpha_0 + \beta_1 RATIO_i + \beta_2 POPULATION_{it} + \gamma_1 Y2006 + \gamma_2 Y2011 + \boldsymbol{GEO'\delta} + \\ + \mu_1 \ln(Remoteness_i) + \mu_2 Noroad + \varepsilon_i\,, \quad (3)$$

$$where\ i = from\ 1\ to\ 735.$$

I take the natural logarithm of the *Remoteness* variable to smooth the possible discrepancies in the scale of the variable. The minimum value of the *Remoteness* variable is 3.7 km and maximum is 1,123 km. below is the test results for the model with CWB Index as dependent variable.

According to the Model 4 in Table 3, adding control variables for selected Aboriginal languages slightly decreases the economic significance of the Aboriginal language retention ratio, but it is statistically significant at the 1% level and it has a negative sign. The coefficients for relatively large Cree languages and Ojibway language groups of Aboriginal people are negative and strongly statistically significant if compared to the *Other languages*. The statistical significance of Aboriginal identity community population does not change. The statistical significance of time fixed effect dummy variables increase by one level, but the economic magnitudes have stayed more or less the same.

Model 5 uses equation (3). With *Remoteness* and *Noroad* variables, the explanatory power of the model increases from 0.54 to 0.58. The *Remoteness* variable is statistically significant and negatively related to the dependent variable. The coefficient of Aboriginal language retention ratio is statistically significant, alas lost some economic significance. The other parameters do not change if compared with Model 3, except for the *Alberta* regional dummy and the time control variables. The coefficient for *Alberta* dummy variable becomes insignificant, *Y2006* becomes statistically significant at the 10 % level, and *Y2011* became statistically significant at the 10 and 5 % levels. The *Noroad* variable is not statistically significant.

As I observe with the sample of 245 First Nations communities, using the new set of Aboriginal language control variables (equation 2) and adding the *Remoteness* variable and *Noroad* dummy (equation 3) do not changed the statistical significance and the sign of the coefficient for Aboriginal language retention ratio. It may support to the idea that the sign and the significance of the Aboriginal language retention ratio in model equation (1) is reasonable.

6.2. Second scenario

The selected data sample for 245 First Nations communities could be actually viewed as a micro panel data set. I have three consecutive Canadian Census time periods and a relatively larger number of First Nations communities. If in the sample there is no community-specific

differences, then I can use pooled OLS. However, I will try to run the model with the heterogeneity of communities. The general form of the fixed effects model is as follows:

$$WB_{it} = \alpha_i + \beta_1 RATIO_{it} + \beta_2 POPULATION_{it} + \gamma_1 Y2006 + \gamma_2 Y2011 + \omega_{it}\,, \qquad (4)$$

$where\ i = from\ 1\ to\ 245,\ t = 1,2,3, \omega_{it} = h_i + \varepsilon_{it}.$

The model drops out the time-invariant variables such as Aboriginal languages and regions. By adding time dummies Y2006 and Y2011, I try to account for any unobserved fluctuations, which are not related to the regressors. The reference Canadian Census year is 2001. Since I am interested in estimating the coefficient for Aboriginal language retention ratio, this will be sufficient for me to check the heterogeneity.

Panel data needs correction for possible correlation in standard errors. Therefore, I still use the clustering option for 245 communities.

The decision rule is if the OLS regression of Model 2 for *CWB* and its components (as a dependent variable) does not differ much from the micro panel regression with fixed effects, then the OLS specification in equation (1) is correct. However, I could think about the alternative, that the First Nations communities may have their own significant specific difference and the Fixed Effects model in equation (4) may better describes the relation between Community Well-Being Index and Aboriginal language retention ratio.

In Table 9, I present the results of the fixed effects model regression. What is interesting is that I observe a positive and statistically significant Aboriginal language retention ration in *CWB*, *Income*, *Education* and *LFA* components. However, it is not economically and statistically significant at all levels for the *Housing* component. The model drops out even the natural logarithm of Aboriginal identity population (the time dummies absorbed it).[17] The Hausman test for the fixed effects model and the random effects model concludes in favor of fixed effects model. Moreover, the positive residuals in STATA output corr(u_i, Xb) also may indicate the preference for fixed effects model. I should note here, that according to Baltagi (2005), technically, the results of Hausman test are not final. It is necessary to perform further test for model restriction.

[17] According to Table 1, the shares of regional Aboriginal identity populations in the total sample Aboriginal identity population are more or less constant in three Census years.

7. Conclusion

In this paper, using an OLS regression model, I found significant negative relations between First Nations Community Well-Being Index scores and the ratio of aboriginal language knowledge. This confirms the results of Capone, Spence and White (2009), but for a larger sample and in a time perspective of three Canada Census years of 2001, 2006 and 2011. The explanatory power of the regression results for the Education component of Community Well-Being Index score is the highest. The negative sign of the Aboriginal language retention ration may also indicate the negative association between the level Aboriginal language identity and the wellbeing level.

Alternatively, the introduction of the isolation proxy variable and observing its negative association with CWB scores, partly confirms the results of O'Sullivan (2012)'s work on the relation between isolation and well-being of aboriginal communities in Canada. Particularly, the less isolated the First Nations community, the higher well-being score. This, in turn, supports idea that the extent of exposure to the official language (for example, English) can positively influence the well-being of the individuals in education, job opportunities, health and social networks.

Even though statistically significant, my OLS regression model may suffer from wrong specification, omitted important variables, or even from the absence of causality or the wrong direction of causality.

Unlike what I found previously, in my robustness section, the fixed effects model finds a positive relation between Community Well-Being index score and Aboriginal language retention. That possible synergy may benefit people with bilingual abilities in both an Aboriginal language and in one of the official Canadian languages. According to summary statistics of the sample data in Table 1, the aboriginal language knowledge among the First Nations communities decreases alongside with the increase in well-being of those communities, as measured by CWB scores. The positive relation between Community Well-Being index score and Aboriginal language retention does not contradict to the negative relation in OLS model. Due to the fixed effects model specification, the econometric software can consider the overall declining trend in Aboriginal language retention as a time-invariant event. In this declining trend, the fixed effects model may still capture this positive link between wellbeing and the aboriginal language retention ratio. Taking into account that most of the Aboriginal people are able to communicate in one of the official languages, this could also indicate a significant positive link of the

bilingualism of the First Nations people with higher levels wellbeing.[18] However, additional research and data is necessary to confirm the validity of the fixed effects model.

With active Government of Canada involvement in support to Aboriginal communities and closer collaboration with Aboriginal organizations, such as the Assembly of First Nations, in Aboriginal education, economic development, and governance, could decrease the gap in wellbeing between the Aboriginal and Non-Aboriginal populations. The questions of the allocation of limited resources to support and develop necessary infrastructures in First Nations communities and of the appropriateness of government policies are interesting topics for further analysis.

To expect a positive relation between Aboriginal language knowledge ratio and the well-being level or synergy effect from being bilingual, I propose that the First Nations communities will need a higher penetration of the Aboriginal language in primary education and in administrative communications. For a more precise picture, it would be good to have more frequent surveys on Aboriginal people.

References

Aboriginal Population Profile 2006 Census, Statistics Canada Catalogue no. 92-594-XWE. Ottawa. Accessed March 15, 2016. Released January 15, 2008. Available at http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-594/index.cfm?Lang=E

Aboriginal Population Profile 2001 Census, Statistics Canada. Accessed Released June 17, 2003. Last modified: 2005-11-30, accessed March 15, 2016. Available at http://www12.statcan.ca/english/Profil01/AP01/Index.cfm?Lang=E

Aboriginal Affairs and Northern Development Canada. 2016. *The Community Well-Being (CWB) Index.* 02. Available at https://www.aadnc-aandc.gc.ca/eng/1100100016579/1100100016580

Baltagi, B. (2005) *Econometric Analysis of Panel Data Third Edition.* John Wiley & Sons, Ltd.

Ben-Zeev, S. (1972) "The influence of bilingualism on cognitive development and cognitive strategy." *University of Chicago,* Unpublished Ph.D. dissertation

Capone, K., N. Spence, and J. White (2009) "5. Examining the Association between Aboriginal Language Skills and Well-Being in First Nations Communities." *Aboriginal Policy Research Vol. 9 - Health and Well-Being, Series by Thompson Educational Publishing, Inc.*, Volume 9, pp. 57-77

Cooke, M. and E. O'Sullivan (2015) "The Impact of Migration on the First Nations Community Well-Being Index." *Social Indicators Research Vol.122(2)* ,pp. 371-389

[18] Statistics Canada: https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-011-x/99-011-x2011003_1-eng.cfm

Cummins, J. (1976) "The Influence of Bilingualism on Cognitive Growth: A Synthesis of Research Findings and Explanatory Hypotheses." *Bilingual Education Project, The Ontario Institute for Studies in Education, No. 9*, pp.1-43

Cummins, J. (1977) "Cognitive Factors Associated with the Attainment of Intermediate Levels of Bilingual Skills." *Modern Language Journal, Jan/Feb77 Vol. 61 Issue 1/2*, pp. 3-12

Cummins, J. and M. Gulutsan (1975) "Set, objectification and second language learning." *International Journal of Psychology VoL 10, N2*, pp. 91-100

First Peoples' Heritage, Language and Culture Council (2010) "Report on the Status of B.C. First Nations Languages." pp. 1-64

Fleras, A. (1987) "Redefining the Politics over Aboriginal Language Renewal: Maori Language Preschools as Agents of Social Change." *The Canadian Journal of Native Studies*, pp. 1-40

2016. *Google Maps.*Available at https://www.google.ca/maps

Hakuta, K. and R. M. Diaz (1985) "The relationship between degree of bilingualism and cognitive ability: a critical discussion and some new longitudinal data." *In K. E. Nelson (Ed.), Children's Language, Volume 5, Hillsdale, N. J.: Lawrence Erlbaum Associates*, pp. 319-344

Ianco-Worrall, A. D. (1972) "Bilingualism and Cognitive Development." *Child Development. Dec1972, Vol. 43 Issue 4*, pp. 1390-1400

Laitin, D. D. and R. Ramachandran (2015) "Language Policy and Human Development." *Forthcoming in the American Political Science Review*, pp. 1-67

National Household Survey (NHS) Aboriginal Population Profile 2011. Statistics Canada Catalogue no. 99-011-X2011007." *Statistics Canada.* 11 13. Accessed 03 15, 2016. Available at http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/index.cfm?Lang=E

National Household Survey 2011 "Education and occupation of high-income Canadians." *Statistics Canada.* Available at http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-014-x/99-014-x2011003_2-eng.cfm

O'Sullivan, E. (2012) "The Community Well-Being Index: Investigating the Relationship between Isolation and Well-Being." *Unpublished report submitted to Aboriginal Affairs and Northern Development Canada*, pp.1-20

Peal, E. and W.E. Lambert (1962) "The Relation Of Bilingualism To Intelligence." *Psychological Monographs: General and Applied, Peer Reviewed Journal*, Vol.76(27), pp.1-23

TABLE 1

Summary statistics of the data on First Nation communities

Description	Year	Regions									Total
		AB	BC	MB	NB	NT	NS	ON	QC	SK	
Number of communities		36	29	43	7	12	9	22	27	60	245
Number of observations		108	87	129	21	36	27	66	81	180	735
Share in total number of communities, in percentage		15%	12%	18%	3%	5%	4%	9%	11%	24%	100
Total Aboriginal identity population	2001	32,630	15,195	41,986	5,045	6,950	6,960	10,085	30,080	36,855	185,786
	2006	35,015	17,440	44,325	5,520	7,425	7,420	11,360	32,460	40,755	201,720
	2011	39,455	18,415	49,845	5,740	7,340	8,435	12,135	37,040	46,900	225,305
Total Aboriginal identity population (in %)	2001	18%	8%	23%	3%	4%	4%	5%	16%	20%	100%
	2006	17%	9%	22%	3%	4%	4%	6%	16%	20%	100%
	2011	18%	8%	22%	3%	3%	4%	5%	16%	21%	100%
Average Aboriginal identity population	2001	906	524	976	721	579	773	458	1,114	614	758
	2006	973	591	1,031	789	619	824	516	1,202	679	822
	2011	1,096	635	1,159	820	612	937	552	1,372	782	920
Average Ratio of Aboriginal identity population with knowledge of aboriginal language(s)	2001	48%	21%	56%	44%	57%	49%	37%	83%	51%	50%
	2006	51%	21%	54%	41%	56%	50%	36%	83%	49%	50%
	2011	45%	17%	51%	35%	53%	46%	33%	81%	42%	45%
Average Income Index:	2001	47	60	46	50	69	48	58	60	43	51
	2006	51	60	46	56	73	50	59	61	42	52
	2011	55	64	43	58	80	54	63	64	46	55
Average Education Index:	2001	26	34	22	44	28	43	35	29	29	29
	2006	27	39	23	48	33	48	39	33	30	32
	2011	29	43	23	48	33	52	40	35	33	34
Average Housing Index :	2001	59	79	61	79	72	76	76	75	61	67
	2006	59	76	55	80	72	78	77	76	57	65
	2011	59	77	55	81	71	80	74	72	59	65
Average LFA Index :	2001	66	71	64	62	78	67	74	71	63	67
	2006	68	71	64	71	77	71	77	73	63	68
	2011	65	68	63	66	73	69	74	73	61	66
Average CWB Index :	2001	49	61	48	59	62	59	61	59	49	54
	2006	51	61	47	64	63	61	63	61	48	54
	2011	52	63	46	63	64	64	63	61	50	55

TABLE 1 (continuation)

Aboriginal identity population and Aboriginal languages spoken

Description	Year	Regions									Total
		AB	BC	MB	NB	NT	NS	ON	QC	SK	
Blackfoot	2001	8,035									8,035
	2006	8,190									8,190
	2011	8,810									8,810
Cree languages (note 1)	2001	17,460		18,380					12,040	29,855	77,735
	2006	19,380		19,705					13,620	32,940	85,645
	2011	21,420		22,325					15,720	38,030	97,495
Dene	2001	2,190		610		475				4,245	7,520
	2006	2,305		590		445				4,695	8,035
	2011	2,595		800		425				5,155	8,975
Innu/Montagnais	2001								8,610		8,610
	2006								8,765		8,765
	2011								9,780		9,780
Mi'kmaq	2001				3,600		6,960		1,370		11,930
	2006				4,025		7,420		1,410		12,855
	2011				4,005		8,435		1,620		14,060
Oji-Cree	2001			5,286				1,340			6,626
	2006			5,670				1,345			7,015
	2011			6,890				1,505			8,395
Ojibway	2001	495		17,085				8,385		2,755	28,720
	2006	440		17,725				9,620		3,120	30,905
	2011	750		19,135				10,255		3,715	33,855
Slavey	2001					3,635					3,635
	2006					3,780					3,780
	2011					3,730					3,730
Stoney	2001	4,450									4,450
	2006	4,700									4,700
	2011	5,880									5,880
Other (note 2)	2001		15,195	625	1,445	2,840		360	8,060		28,525
	2006		17,440	635	1,495	3,200		395	8,665		31,830
	2011		18,415	695	1,735	3,185		375	9,920		34,325

Sources: (1) Statistics Canada. 2002. 2001 Census Aboriginal Population Profiles. Released June 17, 2003. Last modified: 2005-11-30. Statistics Canada Catalogue no. 93F0043XIE. (2) Statistics Canada. 2007. Aboriginal Population Profile. 2006 Census. Statistics Canada Catalogue no. 92-594-XWE. Ottawa. Released January 15, 2008; (3) Statistics Canada. 2013. National Household Survey (NHS) Aboriginal Population Profile. 2011 National Household Survey. Statistics Canada Catalogue no. 99-011-X2011007. Ottawa. Released November 13, 2013. (4) Aboriginal Affairs and Northern Development Canada. 2001, 2006, 2011The Community Well-Being (CWB) index.

Notes: (1) Statistics Canada. 2011 NHS Aboriginal Population Profile, (n.37), Cree languages includes Cree not otherwise specified, Swampy Cree, Plains Cree, Woods Cree, and a category labelled 'Cree not included elsewhere' (which includes Moose Cree, Northern East Cree and Southern East Cree). (2) Statistics Canada. 2011 NHS Aboriginal Population Profile, (n.38), Other includes all Aboriginal languages that are not displayed separately including Atikamekw, Algonquin, Carrier, Tlicho.

TABLE 2

Summary statistics of the models' variables

Variable	Observations	Mean	Std. Dev.	Min	Max
Census subdivision population	735	904.29	751.39	252	5820
CWB Index	735	54.32	9.79	33	83
Income Index	735	52.48	12.79	16	99
Education Index	735	31.60	11.64	4	70
Housing Index	735	65.94	14.36	26	95
LFA Index	735	67.25	8.61	35	88
Ratio of the Aboriginal identity population with knowledge of Aboriginal language(s)	735	48.34	29.65	0	100
Aboriginal identity population with knowledge of Aboriginal language(s)	735	452.67	555.65	0	4177
Aboriginal Identity Population	735	833.35	667.14	235	4645
Logarithm of Aboriginal identity population	735	6.52	0.60	5.46	8.44
Remoteness	735	296.79	249.36	3.7	1,123
Logarithm of Remoteness	735	5.28	1.02	1.31	7.02

TABLE 3

OLS regression results for The Total Community Well-Being (CWB) Index for selected Indian communities

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
Aboriginal language knowledge ratio	-0.1101***	(0.0197)	-0.1019***	(0.0203)	-0.1227***	(0.0128)	-0.0897***	(0.0204)	-0.0775***	(0.0168)
Aboriginal Identity population (Note 1)			-1.2465	(0.8657)	-0.4700	(0.5920)	-0.4589	(0.8473)	-0.9124	(0.6125)
Time effects, 2006			0.5887*	(0.3072)	0.5126	(0.3152)	0.5354*	(0.3059)	0.5798*	(0.3045)
Time effects, 2011			0.9988**	(0.3910)	0.7499**	(0.3795)	0.9226**	(0.3887)	1.0677***	(0.3780)
Alberta					2.1826*	(1.2482)			2.0372	(1.3054)
British Columbia					9.6967***	(1.8658)			9.5594***	(1.6340)
Manitoba					-0.8718	(0.9646)			0.5449	(1.1669)
New Brunswick					12.3870***	(1.6597)			11.4312***	(1.7749)
Northwest Territories					15.2454***	(1.4617)			17.2725***	(1.7372)
Nova Scotia					12.5096***	(1.5265)			10.1647***	(1.5321)
Ontario					11.7624***	(1.7771)			11.7891***	(1.6399)
Quebec					15.8471***	(1.2775)			16.3538***	(1.3470)
Blackfoot language							-6.3928***	(2.1332)		
Cree languages							-8.2396***	(1.3380)		
Dene language							-6.4476***	(1.9246)		
Innu/Montagnais language							1.6536	(2.0871)		
Mi'kmaq language							2.1292	(1.6001)		
Oji-Cree language							-10.2714***	(1.9801)		
Ojibway language							-6.7491***	(1.8186)		
Slavey language							5.2980**	(2.3321)		
Stoney language							-15.7084***	(1.7460)		
Remoteness (Note 1)									-2.1862***	(0.5790)
No roads on Google Maps(Note 2)									-1.4821	(1.3841)
Constant	59.6477***	(1.1460)	66.8435***	(5.4795)	57.2234***	(3.7344)	66.2468***	(5.4490)	69.2767***	(4.8182)
R^2	0.1112		0.1175		0.5448		0.3188		0.5778	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population and Remoteness data were converted to log values for better comparability with the data components. Remoteness data was constructed based on the Google Maps surface road distance from the Indian community to the closest Medium or Large population centers with equal to or higher than 30,000 population dwelling size according to the 2011 Census (85 centers). Note 2: No roads on Google Maps means that there is missing surface road on map between Indian community and any Medium or Large population centers. The distance was approximated by the Google "Measure distance" utility.

TABLE 4

OLS regression results for the Income component of the CWB Index for selected Indian reserves

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
Aboriginal language knowledge ratio	-0.0446*	(0.0266)	-0.0312	(0.0277)	-0.0501***	(0.0176)	-0.0289	(0.0281)	-0.0127	(0.0225)
Aboriginal Identity population (Note 1)			-1.5624	(1.2039)	-0.4751	(0.8351)	-0.1319	(1.2154)	-0.8304	(0.8781)
Time effects, 2006			0.9497**	(0.3945)	0.8506**	(0.4008)	0.8387**	(0.3948)	0.9053**	(0.3922)
Time effects, 2011			3.7747***	(0.5707)	3.4810***	(0.5371)	3.5319***	(0.5629)	3.7421***	(0.5453)
Alberta					7.7132***	(1.9433)			7.5775***	(1.9705)
British Columbia					16.6899***	(2.5848)			16.4382***	(2.3825)
Manitoba					1.6508	(1.2323)			2.7160*	(1.5446)
New Brunswick					11.2320***	(2.1978)			10.3568***	(2.3475)
Northwest Territories					30.5137***	(1.9091)			32.0912***	(2.3221)
Nova Scotia					7.4009***	(2.3351)			5.2902**	(2.5458)
Ontario					15.8662***	(1.8334)			15.7384***	(1.7899)
Quebec					20.4476***	(1.8080)			20.9543***	(1.8827)
Blackfoot language							-7.9482***	(2.5961)		
Cree languages							-11.6125***	(2.0252)		
Dene language							-3.5613	(3.1381)		
Innu/Montagnais language							-0.5793	(3.0727)		
Mi'kmaq language							-6.7161***	(2.5220)		
Oji-Cree language							-12.4831***	(2.6684)		
Ojibway language							-10.5332***	(2.3785)		
Slavey language							15.0913***	(3.1343)		
Stoney language							-16.0600***	(2.2740)		
Remoteness (Note 1)									-1.9925**	(0.8517)
No roads on Google Maps(Note 2)									-0.5472	(1.9135)
Constant	54.6413***	(1.5852)	62.6022***	(7.6218)	47.3976***	(5.2945)	60.6620***	(7.8001)	58.2398***	(7.2451)
R^2	0.0107		0.0287		0.5038		0.2561		0.5188	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population and Remoteness data were converted to log values for better comparability with the data components. Remoteness data was constructed based on the Google Maps surface road distance from the Indian community to the closest Medium or Large population centers with equal to or higher than 30,000 population dwelling size according to the 2011 Census (85 centers). Note 2: No roads on Google Maps means that there is missing surface road on map between Indian community and any Medium or Large population centers. The distance was approximated by the Google "Measure distance" utility.

TABLE 5

OLS regression results for the Education component of the CWB Index for selected Indian communities

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
Aboriginal language knowledge ratio	-0.1892***	(0.0204)	-0.1949***	(0.0213)	-0.2036***	(0.0166)	-0.1716***	(0.0219)	-0.1327***	(0.0186)
Aboriginal Identity population (Note 1)			1.4927	(0.9734)	2.5429***	(0.7271)	1.3600	(08761)	1.8307***	(0.7025)
Time effects, 2006			2.3474***	(0.4042)	2.2584***	(0.4047)	2.3745***	(0.3994)	2.3651***	(0.3884)
Time effects, 2011			3.3823***	(0.5053)	3.1487***	(0.4963)	3.5293***	(0.5010)	3.6504***	(0.4742)
Alberta					-3.9204***	(1.2824)			-4.1224***	(1.3853)
British Columbia					3.2094	(2.1287)			3.2259*	(1.8100)
Manitoba					-7.1211***	(1.1338)			-4.7183***	(1.2637)
New Brunswick					14.4093***	(2.2755)			13.0512***	(2.7626)
Northwest Territories					2.8071*	(1.6551)			6.1552***	(1.8771)
Nova Scotia					16.8606***	(1.8971)			13.4678***	(1.4355)
Ontario					5.7044**	(2.3605)			5.9981***	(2.0308)
Quebec					7.6503***	(1.6266)			8.2984***	(1.6545)
Blackfoot language							0.1062	(2.5313)		
Cree languages							-4.4577***	(1.5317)		
Dene language							-7.9560***	(2.2025)		
Innu/Montagnais language							-1.4444	(2.3454)		
Mi'kmaq language							11.8935***	(1.9789)		
Oji-Cree language							-10.4362***	(2.5198)		
Ojibway language							-5.0493**	(2.0855)		
Slavey language							-0.8833	(2.5725)		
Stoney language							-8.3598***	(2.1957)		
Remoteness (Note 1)									-3.1218***	(0.5952)
No roads on Google Maps(Note 2)									-3.4660**	(1.5701)
Constant	40.7518***	(1.1778)	29.3876***	(6.1395)	21.9974***	(4.6030)	31.9206***	(5.5092)	39.4494***	(5.0627)
R^2	0.2324		0.2551		0.5283		0.4023		0.5732	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population and Remoteness data were converted to log values for better comparability with the data components. Remoteness data was constructed based on the Google Maps surface road distance from the Indian community to the closest Medium or Large population centers with equal to or higher than 30,000 population dwelling size according to the 2011 Census (85 centers). Note 2: No roads on Google Maps means that there is missing surface road on map between Indian community and any Medium or Large population centers. The distance was approximated by the Google "Measure distance" utility.

TABLE 6

OLS regression results for the Housing component of the CWB Index for selected Indian communities

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
Aboriginal language knowledge ratio	-0.1664***	(0.0265)	-0.1495***	(0.0274)	-0.1826***	(0.0199)	-0.1393***	(0.0234)	-0.1246***	(0.0253)
Aboriginal Identity population (Note 1)			-3.2096**	(1.2963)	-2.7398***	(0.9704)	-1.8884	(1.1536)	-3.3210***	(0.9838)
Time effects, 2006			-2.0334***	(0.6061)	-2.0940***	(0.6206)	-2.1302***	(0.6152)	-2.0069***	(0.6138)
Time effects, 2011			-2.2166***	(0.6848)	-2.4750***	(0.6895)	-2.3988***	(0.6887)	-2.0657***	(0.6969)
Alberta					0.5718	(1.9278)			0.4069	(1.9882)
British Columbia					12.7189***	(2.1557)			12.7325***	(1.9745)
Manitoba					-0.1360	(1.6554)			1.8247	(1.8492)
New Brunswick					19.6211***	(1.7696)			18.5129***	(1.6673)
Northwest Territories					13.5572***	(2.3322)			16.2894***	(2.4452)
Nova Scotia					19.2267***	(2.1344)			16.4583***	(2.1480)
Ontario					13.2896***	(2.7765)			13.5293***	(2.6208)
Quebec					22.7904***	(1.8303)			23.3192***	(1.8985)
Blackfoot language							-15.7170***	(5.7200)		
Cree languages							-12.8861***	(1.5562)		
Dene language							-9.5608***	(2.5321)		
Innu/Montagnais language							11.0152***	(2.5398)		
Mi'kmaq language							5.1871***	(1.7092)		
Oji-Cree language							-16.1654***	(4.8630)		
Ojibway language							-9.5696***	(2.1408)		
Slavey language							-1.1047	(3.2240)		
Stoney language							-29.6046***	(3.1444)		
Remoteness (Note 1)									-2.5473***	(0.7193)
No roads on Google Maps(Note 2)									-2.8286	(1.9783)
Constant	73.9895***	(1.4465)	95.5010***	(8.0969)	86.9433***	(6.0420)	94.2602***	(7.2920)	101.183***	(7.2444)
R^2	0.1182		0.1420		0.4971		0.4091		0.5204	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population and Remoteness data were converted to log values for better comparability with the data components. Remoteness data was constructed based on the Google Maps surface road distance from the Indian community to the closest Medium or Large population centers with equal to or higher than 30,000 population dwelling size according to the 2011 Census (85 centers). Note 2: No roads on Google Maps means that there is missing surface road on map between Indian community and any Medium or Large population centers. The distance was approximated by the Google "Measure distance" utility.

TABLE 7

OLS regression results for the Labor Force Activity component of the CWB Index for selected Indian communities

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
Aboriginal language knowledge ratio	-0.0401**	(0.0167)	-0.0316*	(0.0170)	-0.0557***	(0.0128)	-0.0195	(0.0194)	-0.0424**	(0.0176)
Aboriginal Identity population (Note 1)			-1.7454**	(0.7290)	-1.2954**	(0.6108)	-1.2281	(0.8012)	-1.4054**	(0.6359)
Time effects, 2006			1.1149***	(0.4157)	1.0622**	(0.4198)	1.0828***	(0.4140)	1.0804**	(0.4199)
Time effects, 2011			-0.9372*	(0.4996)	-1.1447**	(0.4953)	-0.9655*	(0.5082)	-1.0547**	(0.5004)
Alberta					4.3761***	(1.3139)			4.3046***	(1.3348)
British Columbia					6.1495***	(1.5913)			5.8523***	(1.5223)
Manitoba					2.1687**	(1.0649)			2.3859*	(1.2468)
New Brunswick					3.9582**	(1.5715)			3.5204**	(1.5207)
Northwest Territories					13.9700***	(1.3685)			14.3802***	(1.5925)
Nova Scotia					6.8998***	(1.5534)			5.8935***	(1.7174)
Ontario					11.9051***	(1.2783)			11.6341***	(1.3026)
Quebec					12.7376***	(1.5062)			13.0491***	(1.5165)
Blackfoot language							-2.0213	(1.9376)		
Cree languages							-3.9617***	(1.2693)		
Dene language							-4.7184**	(1.9406)		
Innu/Montagnais language							-2.0450	(1.9923)		
Mi'kmaq language							-1.6328	(1.5689)		
Oji-Cree language							-1.9822	(2.2465)		
Ojibway language							-1.9451	(1.4890)		
Slavey language							8.1620***	(2.0020)		
Stoney language							-8.6614***	(1.5767)		
Remoteness (Note 1)									-0.9840*	(0.5442)
No roads on Google Maps(Note 2)									0.8274	(1.4673)
Constant	69.1939***	(0.9391)	80.0984***	(4.6697)	73.1425***	(3.8538)	78.4694***	(5.1480)	78.3015***	(4.9168)
R^2	0.0191		0.0442		0.3437		0.1245		0.3519	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population and Remoteness data were converted to log values for better comparability with the data components. Remoteness data was constructed based on the Google Maps surface road distance from the Indian community to the closest Medium or Large population centers with equal to or higher than 30,000 population dwelling size according to the 2011 Census (85 centers). Note 2: No roads on Google Maps means that there is missing surface road on map between Indian community and any Medium or Large population centers. The distance was approximated by the Google "Measure distance" utility.

TABLE 8
List of medium and large population centers.

Geographic code	Geographic name	Population center size group	Population, 2011	Population, 2006	Total private dwellings, 2011	Population density per square kilometer, 2011
3	Airdrie (Alta.)	Medium	42,564	28,927	15,638	1,286
43	Barrie (Ont.)	Large urban	166,634	157,501	65,158	969
61	Belleville (Ont.)	Medium	63,985	64,310	29,285	808
63	Beloeil (Que.)	Medium	50,796	46,574	20,647	1,068
87	Bowmanville - Newcastle (Ont.)	Medium	43,555	38,265	16,418	1,314
91	Brandon (Man.)	Medium	46,061	41,511	20,235	599
92	Brantford (Ont.)	Medium	93,650	90,192	39,397	1,275
115	Calgary (Alta.)	Large urban	1,095,404	988,079	445,238	1,555
119	Campbell River (B.C.)	Medium	34,514	33,121	15,649	880
159	Charlottetown (P.E.I.)	Medium	42,602	38,801	19,339	736
167	Chatham (Ont.)	Medium	44,074	45,783	19,585	1,367
176	Chicoutimi - Jonquiere (Que.)	Large urban	106,666	106,184	49,872	809
177	Chilliwack (B.C.)	Medium	66,382	58,593	28,189	823
205	Cornwall (Ont.)	Medium	49,243	48,792	22,437	639
207	Courtenay (B.C.)	Medium	40,809	37,435	19,043	733
240	Drummondville (Que.)	Medium	66,314	62,199	31,438	1,063
252	Edmonton (Alta.)	Large urban	960,015	862,544	404,796	1,122
292	Fort McMurray (Alta.)	Medium	61,374	47,705	26,401	1,025
305	Fredericton (N.B.)	Medium	61,522	57,255	28,632	434
314	Georgetown (Ont.)	Medium	40,150	36,755	13,805	1,736
328	Granby (Que.)	Medium	60,281	56,777	27,999	666
336	Grande Prairie (Alta.)	Medium	54,913	47,066	22,933	1,298
343	Guelph (Ont.)	Large urban	122,362	115,635	52,620	1,552
348	Halifax (N.S.)	Large urban	297,943	285,480	139,837	1,106
349	Hamilton (Ont.)	Large urban	670,580	647,682	276,319	1,811
396	Joliette (Que.)	Medium	42,883	39,219	20,489	901
397	Kamloops (B.C.)	Medium	73,472	70,549	32,480	1,406
399	Kanata (Ont.)	Large urban	101,760	86,632		

					35,431	2,052
403	Kelowna (B.C.)	Large urban	141,767	128,127	66,335	991
415	Kingston (Ont.)	Large urban	117,787	112,580	55,756	1,260
419	Kitchener (Ont.)	Large urban	444,681	422,514	180,406	1,417
463	Leamington (Ont.)	Medium	31,254	31,113	12,650	1,219
467	Lethbridge (Alta.)	Medium	83,679	74,870	37,474	683
480	London (Ont.)	Large urban	366,191	353,874	168,142	1,653
523	Medicine Hat (Alta.)	Medium	65,671	62,203	29,572	511
531	Midland (Ont.)	Medium	31,428	31,312	14,672	422
532	Milton (Ont.)	Medium	75,573	45,486	24,934	2,357
539	Moncton (N.B.)	Large urban	107,086	96,987	49,277	820
547	Montreal (Que.)	Large urban	3,407,963	3,260,508	1,524,857	2,205
549	Moose Jaw (Sask.)	Medium	33,617	32,526	15,554	535
568	Nanaimo (B.C.)	Medium	88,799	84,100	40,866	861
595	North Bay (Ont.)	Medium	53,515	53,100	24,675	393
609	Orangeville (Ont.)	Medium	30,729	29,110	11,140	986
610	Orillia (Ont.)	Medium	30,586	30,259	13,863	1,069
614	Oshawa (Ont.)	Large urban	290,937	270,059	109,716	1,771
616	Ottawa - Gatineau (Ont./Que.)	Large urban	933,596	867,593	409,697	1,860
632	Penticton (B.C.)	Medium	36,902	35,846	18,615	437
636	Peterborough (Ont.)	Medium	80,660	77,348	36,450	1,060
678	Prince Albert (Sask.)	Medium	35,552	34,547	14,968	535
679	Prince George (B.C.)	Medium	65,503	65,066	29,173	656
685	Quebec (Que.)	Large urban	696,946	661,011	330,634	1,041
694	Red Deer (Alta.)	Medium	90,207	82,732	38,643	1,478
698	Regina (Sask.)	Large urban	192,756	179,246	83,052	1,621
709	Rimouski (Que.)	Medium	37,664	35,948	18,623	923
734	Saint John (N.B.)	Medium	95,902	91,352	42,968	457
737	Sarnia (Ont.)	Medium	79,526	78,827	35,976	843
738	Saskatoon (Sask.)	Large urban	222,035	202,425	96,215	1,479
739	Sault Ste. Marie (Ont.)	Medium	67,646	67,734	30,973	1,177

750	Shawinigan (Que.)	Medium	47,735	49,236	24,634	434
758	Sherbrook (Que.)	Large urban	140,628	134,882	70,525	822
770	Sorel (Que.)	Medium	36,969	36,594	17,954	707
788	St. Catharines - Niagara (Ont.)	Large urban	309,319	308,820	136,501	817
792	St. John's (N.L.)	Large urban	165,346	152,729	72,562	891
799	St. Thomas (Ont.)	Medium	41,688	39,573	17,698	1,047
834	Saint-Hyacinthe (Que.)	Medium	48,576	47,306	23,784	1,085
836	Saint-Jean-sur-Richelieu (Que.)	Medium	83,053	78,519	36,791	957
842	Saint-Jerome (Que.)	Medium	65,825	62,368	31,348	1,186
897	Stratford (Ont.)	Medium	30,886	30,516	13,892	1,146
904	Sudbury (Ont.)	Large urban	106,840	106,612	50,563	393
913	Cape Breton - Sydney (N.S.)	Medium	31,597	32,496	14,703	719
935	Thunder Bay (Ont.)	Large urban	102,222	103,247	47,389	570
944	Toronto (Ont.)	Large urban	5,132,794	4,732,361	1,918,983	2,931
953	Trois-Rivieres (Que.)	Large urban	126,460	121,671	63,494	713
971	Salaberry-de-Valleyfield (Que.)	Medium	39,391	38,936	18,757	766
973	Vancouver (B.C.)	Large urban	2,135,201	1,955,278	876,274	1,856
983	Vernon (B.C.)	Medium	44,600	42,731	20,178	846
984	Victoria (B.C.)	Large urban	316,327	303,977	154,637	1,142
987	Victoriaville (Que.)	Medium	41,701	38,435	19,321	1,069
1021	White Rock (B.C.)	Medium	82,368	74,023	36,530	1,791
1032	Windsor (Ont.)	Large urban	276,165	278,869	119,849	1,571
1036	Winnipeg (Man.)	Large urban	671,551	641,556	282,975	1,493
1039	Woodstock (Ont.)	Medium	37,362	35,424	16,297	1,200
1048	Abbotsford (B.C.)	Large urban	149,855	140,275	56,707	944
1099	Timmins (Ont.)	Medium	30,614	30,253	13,547	1,801
1177	Chateauguay (Que.)	Medium	70,812	66,204	29,107	774

Source: Statistics Canada. 2012. Population and dwelling counts, for population centers, 2011 and 2006 censuses (table). Population and Dwelling Count Highlight Tables. 2011 Census. Statistics Canada Catalogue no. 98-310-XWE2011002. Released February 8, 2012. http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/FullFile.cfm?T=801&LANG=Eng&OFT=CSV&OFN=98-310-XWE2011002-801.CSV.

TABLE 9

Micro panel regression for CWB index score and its components in searching for community specific differences.

Fixed effects Model regression (6) with time dummies

Dependent variable	CWB		Income		Education		Housing		LFA	
Aboriginal language retention ratio	0.0872***	(0.0202)	0.1261***	(0.0397)	0.0823***	(0.0275)	0.0298	(0.0403)	0.1234***	(0.0312)
Aboriginal Identity population (Note 1)	-0.2638	(1.4114)	-2.9664	(1.8359)	2.5415	(2.0641)	-5.8440**	(2.9406)	5.1161**	(2.0388)
Time effects in 2006	0.6462**	(0.3046)	1.1726***	(0.3901)	2.4625***	(0.3957)	-1.6979***	(0.6416)	0.6849	(0.4259)
Time effects in 2011	1.8217***	(0.3986)	4.8562***	(0.5973)	4.6586***	(0.5522)	-0.8000	(0.8579)	-1.3429**	(0.5969)
Constant	51.0038***	(9.1939)	63.7063***	(12.2839)	8.6881	(13.4067)	103.4147***	(19.2558)	28.1695**	(13.0699)
Prob > F	0.0000		0.0000		0.0000		0.0004		0.0000	
corr(u_i, Xb) (Note 2)	-0.5302		-0.3043		-0.5279		-0.0922		-0.6734	
Clusters' size	245		245		245		245		245	
Sample size	735		735		735		735		735	

NOTES: Standard errors are in parentheses. Standard errors were adjusted for cluster variable Census Subdivision Code (CSD) with the total 245 clusters. The reference (omitted) variables consists of Saskatchewan Province (dummy), time fixed data for 2001. *significant at 10% two-tailed t test, **significant at 5% two-tailed t test, ***significant at 1% two-tailed t test. Note 1: Aboriginal identity population was converted to log values for better comparability with the data components. Note 2: Significant corr (u_i, Xb) could mean that the choice of Fixed-effects model may be right in comparison with panel OLS regression.