The Social and Economic (Under)Development of Northern Manitoba Communities Over the Past Two and a Half Decades

By Leandro Freylejer

OCTOBER 2012

The Social and Economic (Under)Development of Northern Manitoba Communities Over the Past Two And a Half Decades

By Leandro Freylejer

This report is available free of charge from the CCPA website at **www.policyalternatives.ca**. Printed copies may be ordered through the Manitoba Office for a $10 fee.

Please make a donation… Help us continue to offer our publications free online.

We make most of our publications available free on our website. Making a donation or taking out a membership will help us continue to provide people with access to our ideas and research free of charge. You can make a donation or become a member on-line at www.policyalternatives.ca. Or you can contact the Manitoba office at 927-3200 for more information. Suggested donation for this publication: $10 or what you can afford.

CCPA
CANADIAN CENTRE
for POLICY ALTERNATIVES
MANITOBA OFFICE

309-323 Portage Avenue, Winnipeg, MB R3B 2C1
TEL 204-927-3200 FAX 204-927-3201
EMAIL ccpamb@policyalternatives.ca

CAW 567
OTTAWA

Manitoba Research Alliance
Transforming Inner-city and Aboriginal Communities

Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada

Table of Contents

List of Tables

List of Figures

Abstract

Northern Manitoba is the area defined within the four Statistics Canada census divisions: numbers 19, 21, 22 and 23. It is the biggest area of Manitoba and has a substantial population of Aboriginal descent. The poor living conditions of the communities situated within this area have been the subject of much controversy. This paper seeks to contribute to the discussion by exploring the social and economic changes that they have experienced over the past two and a half decades. To explore this issue, this research paper is separated into three parts. The first section uses social and economic statistics to provide a dynamic picture of these communities over the period of study. In addition, it explores the overarching topic of government investment in northern communities. The main conclusion of this dynamic picture is that their (under)development has changed little since 1985. The second section explores some of the causes for the lack of improvement in the standard of living in these communities, including empirical proof that Innis' Staple Theory is irrelevant for their long-term development. Watkin's (1963) Staple Trap Hypothesis is then proposed as a possible explanation for this result. The third section studies recent agreements between Manitoba Hydro and several Aboriginal communities. In addition, it provides a set of necessary requirements for this type of mega project to help solve the underdevelopment problem in these communities.

Introduction

Northern Manitoba is defined as the area that is situated within four Statistics Canada census divisions: numbers 19, 21, 22 and 23. It is the biggest area of Manitoba and has a substantial population base of Aboriginal ancestry. In 1985 there were approximately 111 communities within this area which were grouped according to one of three categories: Organized Communities (13 communities), Unorganized Communities (56 communities) and Indian Reserves, now called First Nations Reserves (42 communities). The Organized Communities are industrial towns that are organized in the same manner as southern Manitoba municipalities. The population is made up of a mixture of Aboriginal and non-Aboriginal people who are often migrant workers. The First Nations Reserves and Unorganized Communities, on the other hand, are composed predominantly of people of Aboriginal descent. A lack of modern infrastructure and low levels of social and economic development characterize these Communities.

The underdevelopment condition of the Aboriginal population in northern Manitoba in 1985 is reflected in economic indicators. While households in First Nations Reserves and Unorganized Communities had an average income 31.65 percent and 13.67 percent lower than the Manitoba average respectively, households located in Organized Communities had an average income 33 percent higher than the Manitoba average (NMEDC 1992). This higher percentage of average household income reflects the above-average income offered to southern migrant workers as an incentive to relocate to northern communities. However, the situation of Aboriginal people residing in these communities was similar to the one endured in the other two types of communities (NMEDC 1992). In terms of employment, only 25 percent of Aboriginal people of working age in First Nations Reserves, 37 percent in Unorganized Communities and 62 percent in Organized Communities were employed.

Nevertheless, monetary economic indicators by themselves are not enough proof of underdevelopment. This is particularly true in Aboriginal communities where the non-monetary informal sector plays a big role in sustaining individuals (NMEDC 1992). According to Loxley (1981) and the Northern Manitoba Economic Development Commission (NMEDC) (1992), the proof is complete when social, health, educational and envi-

ronmental statistics are brought into the equation. The economic and social gap between northern communities, especially Unorganized Communities and First Nations Reserves, and southern communities in Manitoba has long been abysmal.

Confronted with this reality, in the mid-1970s, all levels of government started to push forward new strategies and approaches to solve this problem. The mid-1970s to mid-1980s marked a cornerstone decade in that a mounting number of reports and policies attempted to modify the relations between Aboriginals and non-Aboriginals in Manitoba (see Fernandez 2006). One of such documents is the "Northern Manitoba Development Plan" (see Loxley 1981). Though it was never fully translated into policy, it adequately summarizes what the Province slowly started to realize: that the main cause of underdevelopment was the continuation of highly colonialist practices with northern Manitoba communities (Loxley 1981). As implied by Loxley (1981), understanding the cause is only the first step in modifying their underdeveloped condition. Further steps require actions by all levels of society that could sometimes antagonize non-Aboriginal political and economic interests in northern Manitoba.

The goal of this paper is to describe and evaluate the social and economic changes that these communities have experienced since 1985[1]. This research has three separate components. First, using the 1986, 1991, 1996, 2001 and 2006 Statistics Canada censuses, it presents a dynamic picture of northern Manitoba for the past twenty-five years. Second, it investigates the causes of underdevelopment, including an in-depth evaluation of the applicability of the Staple Theory of economic development for this region. Given their rich resource base, this theory of economic development is relevant for northern Manitoba communities. Finally, this research explores the impact that the Wuskawatim Generation Project—an example of a project with a very different underlying orientation than previous northern development initiatives—has had and will potentially have on the economic and social development of northern Manitoba communities.

A Dynamic Picture of Northern Manitoba Communities Over the Past Twenty-five Years

The main purpose of this section is to illustrate the evolution of key social and economic indicators. In addition, the last subsection analyzes the overarching topic of Provincial Government spending in northern Manitoba. Using a time series econometric model, this section shows that the provincial Aboriginal and Northern Affairs (ana) expenditure pattern has been conducive to neither economic growth nor development. Unless otherwise indicated, all the data series were obtained from Statistics Canada (2009).

A. Social Statistics

Table 1 shows the total and percentage changes in Aboriginal populations in the First Nations Reserves and Unorganized Communities of the four northern censuses, as well as in major urban centers within and outside northern Manitoba. As explained in the table's footnote, it is not possible to compare pre- and post-1996 values because Statistics Canada modified its method of recording Aboriginal ancestry (see Service Canada 2009 for more information). Therefore, to obtain a pattern, only the demographic changes from 1996 to 2001 and 2001 to 2006 are considered. Also excluded are the demographic changes that have taken place in the industrial towns of

census divisions 21 and 23. The main reason for this exclusion is that changes in total Aboriginal population in these divisions have been very volatile and small relative to those in other areas.

We can observe that during these two periods, the growth rate of the Aboriginal population in First Nations Reserves and Unorganized Communities (northern census divisions without industrial towns) has been less than that of the total Aboriginal population of Manitoba. On the other hand, the growth rate of the Aboriginal population in both periods in Winnipeg and from 1996 to 2001 in Brandon and Thompson has been above the total for Manitoba. This demographic characteristic could be the result of either of two forces or the combination of the two. First, it could be that birth rates are higher in urban centers than in First Nations Reserves and Unorganized Communities.

Second, there could be a migration of population from Aboriginal northern communities to urban centers. Burntwood Regional Health Authority (brha) (1997 and 2004) reported that the number of teen pregnancy cases in First Nations Reserves is much higher than in other parts of Canada. Teenagers and young adults constitute a large percentage of the Aboriginal population

TABLE 1 Total Aboriginal population (Percentage change)

Area/Census Year[a]	1986	1991	1996	2001	2006
Total Manitoba	55,410	74,340(.34)	128,680(.73)	150,045(.17)	173,395(.16)
Northern Census divisions without Industrial Towns:					
Census 19	9,125	12,475(.37)	14,722(.18)	15,805(.07)	16,321(.032)
Census 21	10,406	4,857(-.53)	6,173(.27)	6,679(.08)	6,797(.02)
Census 22	15, 843	17,124(.08)	21,199(.24)	21,821(.03)	24,975(.14)
Census 23	3,518	3,296(-.06)	4,513(.37)	4,840(.07)	4,867(.01)
Major Industrial Towns:[b]					
Census 21:					
Flin Flon	160	160(0)	775(3.8)	715(-.78)	905(.27)
Grand Rapids	290	225(-.22)	285(.27)	260(-.09)	200(-.23)
Snow Lake	35	40(.14)	70(.75)	155(1.2)	60(-.62)
The Pas	675	825(.4)	1675(1.03)	1780(.62)	2245(.26)
Kelsy LGD	520	545(.05)	1000(.83)	1100(.1)	1055(-.04)
Census 22:					
Thompson City	1960	2685(.37)	3600(.34)	4510(.25)	4910(.09)
Census 23:					
Churchill Town	315	350(.11)	500(.43)	485(-.03)	545(.12)
Gillam Town	0	290	400(.38)	395(-.02)	580(.47)
Leaf Rapids	215	220(.02)	275(.25)	295(.07)	360(.22)
Lynn Lake	170	215(.26)	480(1.23)	385(-.2)	350(-.09)
Other Major Urban Centres:					
Winnipeg	12,860	21,255(.65)	43,460(10.4)	52,415(0.21)	63,745(0.22)
Brandon	1,315	1,710(.30)	2,875(.68)	3,730(.3)	3,995(.07)

a: Note that the population statistics are not comparable before and after 1996 (the census changed the way of identifying people of Aboriginal ancestry). Therefire, the rate of change between 1991 and 1996 is meaningless.

b: Census 19 does not have any Major Industrial Town.

NOTE: Table compiled from data obtained from CANSIM II: www5.statcan.gc.ca/cansim

in Manitoba (Service Canada 2009). Therefore, it is much more likely that there has been a positive net migration of Aboriginal people to urban centers.

This migration, however, has not been large enough to support what Loxley and Lamb (2007) call an approach to economic development characterized by despair or defeatism. This approach theorizes that under certain circumstances large masses of people leave their underdeveloped home communities to look for better opportunities in large urban centers. This is also shown in Service Canada (2009), which states that if we consider all First Nations Reserves in Manitoba (including southern ones), there has been, on average, a positive net immigration of Aboriginals to both large urban centers and First Nations Reserves. Populations in Unorganized Communities and rural towns, on the other hand, have decreased.

One important sign of community under-development is when a large proportion of the community's inhabitants have less than a Grade 9 education. Table 2 shows the total number of people over fifteen years old with less than a Grade 9 education in different areas within northern Manitoba as well as the provincial total. It also shows this amount as a percentage of the population over fifteen years of age. There are several characteristics to observe here. Firstly, there is a marked difference between the percentage of

TABLE 2 Population over 15 years with less than grade 9 (as a percentage of the total pop. over 15 years)

Area/Census Year	1986	1991	1996	2001[ab] L. Boundary	2001[ab] U. Boundary
Division No. 19	2610(.46)	3155(.41)	3000(.32)	2340(.24)	3174(.32)
Division No. 21	3445(.20)	2665(.16)	2240(.13)	1635(.1)	2524(.15)
Division No. 22	5755(.3)	5135(.25)	5040(.22)	3640(.16)	5389(.24)
Division No. 23	1900(.29)	1445(.25)	1425(.23)	1095(.19)	1518(.26)
Total Manitoba	147925(.18)	124185(.15)	107685(.13)	86805(.1)	122520(.14)
Northern Census divisions without Industrial Towns:[c]					
Division No. 21	1300(.36)	1035(.29)	1015(.23)	780(.15)	1129(.21)
Division No. 22	4510(.49)	4165(.41)	4165(.33)	3065(.22)	4259(.31)
Division No. 23	1365(.49)	1130(.41)	1145(.34)	910(.24)	1238(.33)

a: The Census of 2001 does not provide this exact information. Appendix 1 shows how the upper and lower boundaries were constructed using information from this census.

b: The 2006 census does not provide enough information to even derive upper and lower boundaries to obtain an estimate of the population over 15 years with less than grade 9.

c: These Industrial Towns are the ones previously indicated in Table 1. Again, census division number 19 does not have any Industrial Town.

NOTE: Table compiled from data obtained from CANSIM II: www5.statcan.gc.ca/cansim

population with less than a Grade 9 education when we consider all regions within the northern census divisions and when we only consider First Nations Reserves and Unorganized Communities. We could observe this by comparing the percentages on the bottom half with those at the top half of the table. This comparison demonstrates one of the many signs of social and economic inequalities: the relatively poor educational performance of Aboriginal people living in First Nations Reserves and Unorganized Communities in northern Manitoba.

Secondly, the percentage of people over fifteen years old with less than a Grade 9 education has decreased over time in all areas. Most importantly, it has decreased faster in Unorganized Communities and First Nations Reserves. Though this faster decrease is an important step towards closing the gap between northern Aboriginal communities and non-Aboriginal communities, the gap is still unacceptably wide for a developed country.

Another important sign of underdevelopment is the poor physical health of individuals in northern Manitoba. This has been a recurrent theme in the literature on Aboriginal community economic development. Loxley (1981) shows

that in 1973 these populations suffered from high rates of infant mortality, tuberculosis, intestinal infections and other preventable diseases. The high prevalence of these diseases among northern Aboriginal populations is also recorded in the 1997 and 2004 BRHA reports. In addition, these two reports show the high proportion of mental diseases, addictions and Fetal Alcohol Spectrum Disorder (FASD) existing among them.

Notwithstanding the great improvements in the health of southern Manitobans, Roos et.al., (2001) states that the health of Aboriginal people in northern Manitoba communities declined between 1985 and 1998. Therefore, the already wide health gap between northern Aboriginal and southern non-Aboriginal communities has worsened over time. To understand the significance of this situation, one does not have to study the historical health data series, but just observe how much more common health complications are in First Nations Reserves in recent years. For instance, health data in 2001 showed that, compared to other Canadians, Status Indians living on reserves[2] are: 1.7 times more likely to be diagnosed with arthritis; 2.7 times with hypertension; 2.9 times with heart problems; 4.2 with diabetes; 6.5 times with tuberculosis; and 10.7 times with

TABLE 3 **Average number of persons per room[a]**

Area/Census Year	1986	1991	2001	2006
Division No. 19	0.9	0.7	0.7	0.6
Division No. 21	0.6	0.5	0.5	0.4
Division No. 22	0.8	0.7	0.6	0.6
Division No. 23	0.7	0.6	0.6	0.6
Manitoba Total	0.5	0.4	0.4	0.4

a: The 1996 census does not provide enough information to calculate this variable.

NOTE: Table compiled from data obtained from CANSIM II: www5.statcan.gc.ca/cansim

HIV (Service Canada 2009). In addition, suicide rates are 5 times the national average for males and 7 for females (Service Canada 2009).

The causes for the poor health conditions of these communities in Manitoba are manifold. First, Roos et al. (2001) shows that the main reasons for the increasing gap are the nursing station closures and the termination of community outreach programs that have occurred over the past twenty years. These changes to health care delivery have been the result of years of inadequate funding given to the three Northern Manitoba Health Authorities: NorMan, Burntwood and Churchill. Second, the high rate of addictions has been responsible for many mental and physical health problems. These addictions—alcoholism in particular—are a way in which a large number of northern residents cope with the lack of opportunities, isolation, unemployment and memories of residential schools (BRHA 1997 and 2004). In addition, the regulated price of alcohol province-wide make it more accessible than other food staples, whose prices are not regulated (for example, milk) (BRHA 1997 and 2004).

Third, the deplorable housing conditions on First Nations Reserves and in northern Unorganized Communities have contributed to the spread of diseases and other health problems (Service Canada 2009, BRHA 2004, Loxley 1981). Houses in these communities often lack running water and adequate sewage systems (Service Canada 2009, BRHA 2004, Loxley 1981). There is also a lack of affordable housing that has forced several families to occupy single dwellings. Overcrowded houses have resulted in an increase in infectious diseases and domestic violence and have also led to poor child development (BRHA 1997 and 2004). Table 3 shows the average number of persons per room as a proxy for house overcrowding. According to this table there has been a sizable improvement in census divisions 19 and 22 as well as a marginal one in 21 and 23. It is important to note that the averages in each census division other than census division 19 are likely to be deflated by the higher housing availability in the industrial towns that are located there.

An issue closely related to community health is that of the physical environment. Concentrations of pollution may cause as many health-related problems as the other variables outlined before. BRHA (1997) shows that by 1997 a large number of northern residents were already concerned with the level of pollution produced by the increase in primary product extraction and the growth of northern industrial towns. BRHA (1997 and 2004) report that there are three specific types of pollution affecting northern communities. First, there is air pollution that is concentrated around the Thompson area and Flin Flon. The smelter operated by INCO in Thompson has been releasing significant quantities of sulphur dioxide into the atmosphere. Besides affecting the air quality of the communities in the surrounding area, it has caused other environmental problems such as acid rain. After several years of complaints by Island Lake First

Nation, the community mostly affected by the smelter operations, INCO agreed in the mid-1990s to implement some measures to reduce the environmental impact (BRHA 1997). Despite these measures, air pollution still affects several communities in that area.

Second, northern communities suffer from water pollution caused by hydro projects and mining activity. BRHA (1997) states that active mining operations in the Birchtree and Thompson area as well as former mining sites in Lynn Lake and Gods Lake are responsible for the great increase of contaminants in some of the North's main rivers and lakes. In addition, hydro projects such as the Churchill River Diversion, the Lake Winnipeg Regulation Project and the Grand Rapids Hydro Dam have altered the water's natural flows, increasing erosion and the turbidity of drinking water (BRHA 1997, Kulchyski et al. 2007). Finally, improper discharge of household waste and heavy metal emissions from INCO's operations has affected soil quality (BRHA 1997). The result has been a decrease in the land's ability to produce food necessary for human and animal subsistence, in particular during spring and summer months.

B. Economic Statistics

Economic statistics also demonstrate the underdevelopment of northern Manitoba communities. Table 4 shows the average and median per household income for the four census divisions and the Manitoba total as well as the standard errors of average income. In addition, it displays the average per household income of the four northern census divisions without their respective industrial towns.[3] As was the case with social statistics, the economic information in this table helps us understand the great inequalities among different communities in Manitoba. The best descriptions of these inequalities are both the significant differences between Manitoba's average and median incomes as well as the considerably larger standard errors of average in-

come. Furthermore, this income inequality has increased through time. The gap between the average and median income for the province in 1986 was $7,928 (in 2006 dollars, see Appendix 2). Thereafter, it increased to $8,399 in 1991, $9008 in 1996, $10,037 in 2001 and $12,367 in 2006 (all of them in 2006 dollars, see Appendix 2). The standard error of the average income has increased in every census year except 1996.

Even more significant are the income inequalities within northern Manitoba. The standard errors of the average income for census divisions 21, 22 and 23 are much higher than those for the province as a whole.[4] Furthermore, there is a significant difference between the average incomes of these census divisions when industrial towns are included or excluded. For instance, while the average income of census divisions 21, 22 and 23 with industrial towns in 2006 was 100.2, 95 and 91 percent of the provincial average, it was a mere 86, 68 and 75 percent without them. Loxley (1981) states that if we take into consideration that prices on First Nations Reserves and northern rural communities are many times higher than in major urban areas, the real income differences are even greater.

To investigate the evolution of income through time, Figure 1 shows the average income of the four census divisions without industrial towns adjusted for inflation (see Appendix 2). While the average income has increased significantly for census division numbers 21 and 22, it has only increased marginally for 23 between 1986 and 2006. On the other hand, the per-household average income has decreased in census division 19. While census divisions 21 and 22 include the biggest northern and economically fastest growing industrial towns,[5] census divisions 23 and 19 do not include an industrial town with more than 1,500 individuals. Combining Table 4 and Figure 1, it seems that First Nations Reserves and Unorganized Communities in census 21 and 22 may have benefited from their proximity to large and relatively wealthy markets.

TABLE 4 Income satistics per household in dollars

	Average Income	Median Income	S.E.	Average Income w/Ind. Towns
1986				
Division No. 19	18,248	13,906	688	18,248
Division No. 21	32,612	30,618	515	26,268
Division No. 22	32,185	28,448	547	20,433
Division No. 23	35,616	34,990	857	25,211
Manitoba Total	31,262	26,587	87	N/A
1991				
Division No. 19	20,586	16,009	615	20,586
Division No. 21	44,474	39,792	1,029	33,440
Division No. 22	42,989	37,054	701	28,050
Division No. 23	45,351	40,568	1,265	31,629
Manitoba Total	40,179	33,990	114	N/A
1996				
Division No. 19	23,772	18,910	38	23,772
Division No. 21	47,168	41,146	546	41,257
Division No. 22	46,197	38,358	309	32,140
Division No. 23	50,811	45,205	412	36,131
Manitoba Total	43,404	36,045	108	N/A
2001				
Division No. 19	29,335	23,315	42	29,335
Division No. 21	52,716	45,727	567	45,504
Division No. 22	48,549	40,115	301	36,555
Division No. 23	50,262	42,089	298	38,720
Manitoba Total	50,756	41,661	144	N/A
2006				
Division No. 19	30,154	22,669	139	30,154
Division No. 21	60,366	49,805	759	51,814
Division No. 22	57,274	43,945	395	41,116
Division No. 23	54,738	43,527	878	45,398
Manitoba Total	60,242	47,875	186	N/A

NOTE: Table compiled from data obtained from CANSIM II: www5.statcan.gc.ca/cansim

We have so far investigated income inequalities in northern communities. It is also important to study the income sources as well as the sectors of the economy employing wage labourers. The remainder of this subsection explores these two variables. Table 5 indicates the total number and percentage of people employed by each economic sector in northern Manitoba in the 1986, 1991, 1996, 2001 and 2006 Canadian censuses. While the percentage of people employed by government services and the manufacturing sector remained roughly constant after 1996, it has fluctuated significantly for the non-government service and primary sectors. Following the pattern of the rest of the Canadian economy, Table 5 shows a significant increase in the size of the non-government service sector from 1991 to 2006 (see NMEDC 1992). Among the primary sector activities, according to the Mining Task Force (MTF) (2003), mining employs the most people (followed by oil).

FIGURE 1 **Average income in Northern Manitoba Aboriginal communities**
Average per-household income in 2006 dollars
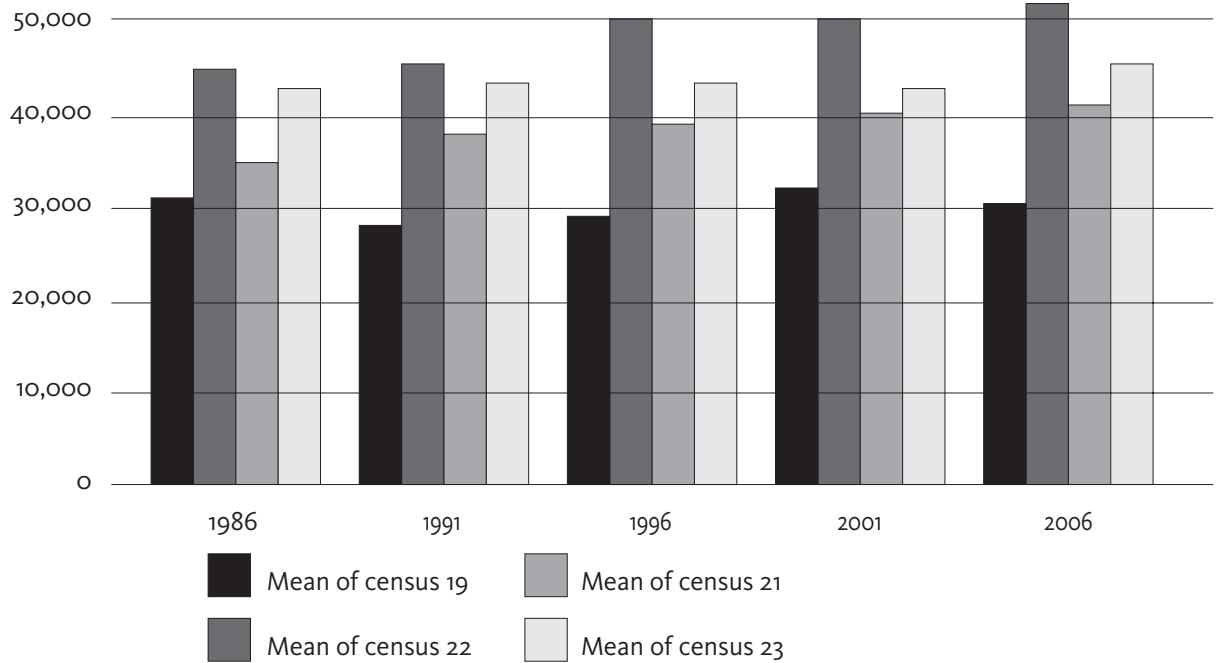
NOTE: Northern Manitoba census divisions, excluding major industrial towns

There is a very interesting characteristic of the northern Manitoba economy observed in this table. Both the Export-Led approach to economic development and the Staple Theory of economic growth theorize that the exportation of primary commodities leads to industrial development (see Lamb 2007, Loxley and Lamb 2007). However, the surge of primary product extraction in 1991 did not result in an increase in the size of the manufacturing sector. Contrary to these theories, the manufacturing sector size was greatly reduced and remained a small part of the northern Manitoba economy thereafter. The explanation for this phenomenon can be found in Loxley and Lamb (2007). The authors explain that one of the main problems with these two theories is that they fail to recognize that most of the export sector developments are undertaken by external companies. These companies are reluctant to reinvest their profits into these communities, preventing them from diversify-

ing their economic base. Therefore, they have not been able to develop a strong manufacturing sector. It is important to note the limitations of this simplistic aggregate approach to test these theories. The next section provides a more formal model that uses panel data to evaluate Innis' Staple Theory of economic development. The result of the lack of both economic diversity and a solid domestic market has been a very unstable economy highly dependent on external factors. This is observed in the percentage of employment income figures shown in Figure 2, which are quite volatile. For instance, during the economic recession of the early to mid-1990s, the percentage of employment income fell in all northern census divisions. This is also illustrated by the dependence on government transfers by northern Manitoba communities. Figures 2 and 3 show that the proportion of income from government transfers is significant.[6] This dependency on external sources of income

TABLE 5 Quantity of people employed per economic sector in Northern Manitoba

Census Year/Sector	Primary	Manufacturing	Non-gov. Services	Gov. Services
1986				
No. of people	4,820	2,845	17,315	3,040
Percentage	17%	10%	62%	11%
1991				
No. of people	5,765	1,495	17,885	5,160
Percentage	19%	5%	59%	17%
1996				
No. of people	4,540	2,020	20,745	4,130
Percentage	15%	6%	66%	13%
2001				
No. of people	3,750	1,910	21,620	3,915
Percentage	12%	6%	69%	13%
2006				
No. of people	3,295	1,675	22,285	3,935
Percentage	11%	5%	71%	13%

NOTE: Table compiled from data obtained from CANSIM II: www5.statcan.gc.ca/cansim

has not decreased over time. On the contrary, in census division 23, for instance, the proportion of income from government transfers has rapidly increased since 1986. This, in combination with the significant size of the government service sector (see Table 5), demonstrates that northern Manitoba communities are highly dependent on Provincial and Federal Government expenditures. Because of this dependency, swings in government expenditure patterns could have serious effects on their economies. The next subsection is aimed at investigating these patterns.

C. Provincial Government Expenditure Patterns in Northern Manitoba

The best instrument to measure government spending in northern Manitoba is the total spending of Manitoba Aboriginal and Northern Affairs (ANA). Though the federal government also funds several programs in these communities through Indian and Northern Affairs Canada (INAC), Industry Canada and other institutions, there are two problems in measuring these expenditures. First, the Federal Government National Accounts (FGNA) does not provide government spending figures disaggregated by province (see FGNA 1985-2008). Neither do the INAC and Industry Canada annual reports. Second, there are several programs that are funded by the federal government but administered through the ANA (see Fernandez 2006, Loughran 1996). These programs are already included in ANA's total expenditure accounts (see ANA annual reports 1984-2008). Therefore, ANA total spending would appear to be an adequate proxy for total government spending in northern Manitoba communities.

Figure 4 shows the rate of change of ANA total spending from 1985 to 2008. It also shows the rate of change of both Manitoba nominal GDP (MGDP) from 1985 to 2008 as well as the provincial and local governments' total spending from 1990 to 2008.[7] There are several characteristics to observe from these time series. First, it is evident that the rate of change of ANA spending is much more volatile than that of the total provincial government spending. Second, the big drop in ANA spending in 1990 indicates that there was a structural break in ANA's spending time series.

FIGURE 2 Employment income in Northern Manitoba
Census divisions 19, 21, 22, 23
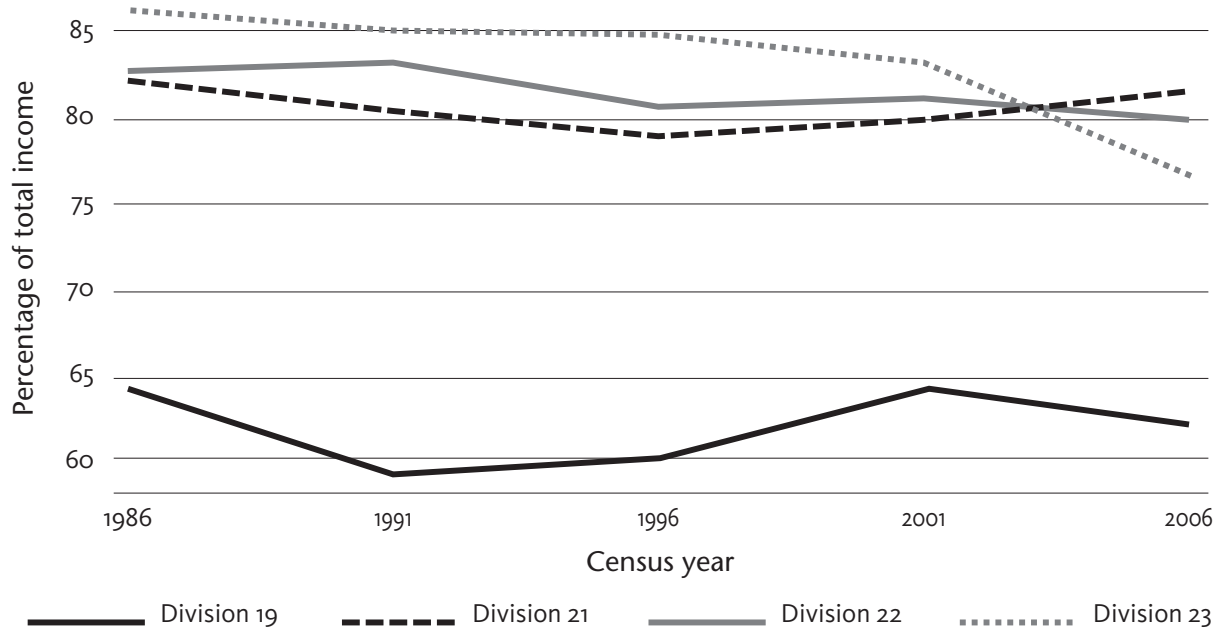
SOURCES: 1986, 1991, 1996, 2001, 2006 Canada census available at www.statcan.gc.ca

FIGURE 3 Government transfers in Northern Manitoba
Census divisions 19, 21, 22, 23

SOURCES: 1986, 1991, 1996, 2001, 2006 Canada census available at www.statcan.gc.ca

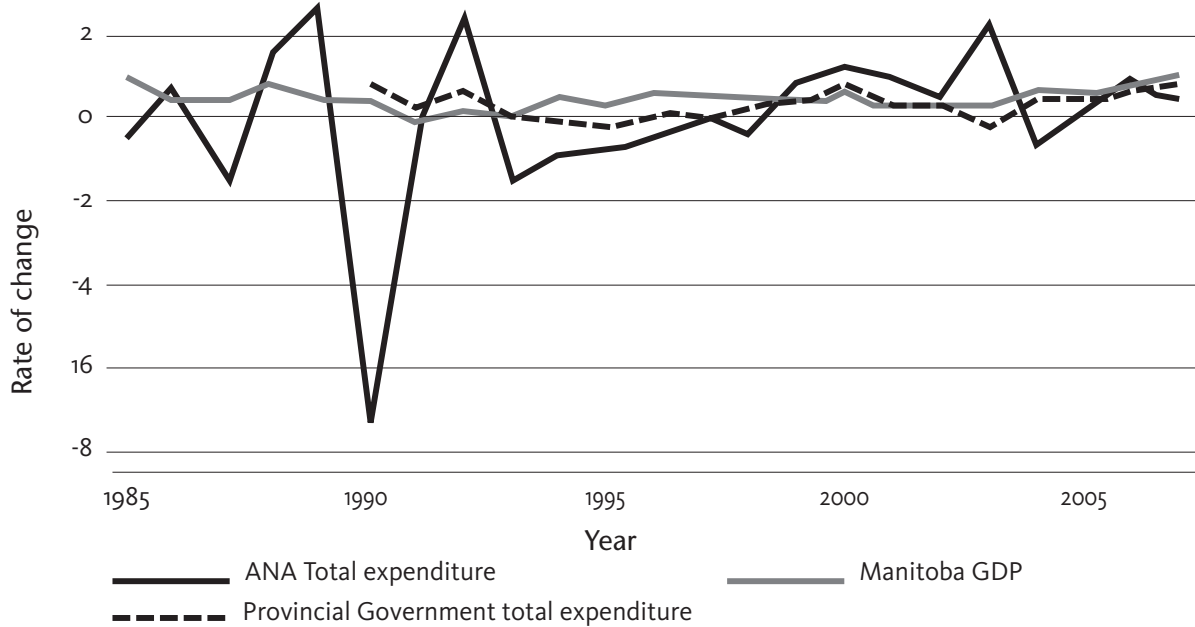THE SOCIAL AND ECONOMIC (UNDER)DEVELOPMENT OF NORTHERN MANITOBA COMMUNITIES   11

Provincial Economic Data: Manitoba macroeconomic data
Annual data: 1984 to 2008

ANA Total expenditure   Manitoba GDP

Provincial Government total expenditure

SOURCES: ANA Annual Reports, CANSIM II Tables

Placing this time series in an historical context confirms what the structural break in Figure 4 suggests. Before 1990, ANA was responsible for administering the provincial Special Agricultural and Rural Development Agreement (SARDA) program. This was a federally funded program in which financial resources were allocated to Aboriginal-based business initiatives[8] (see Loughran 1996, Fernandez 2006, ANA Annual Report 1989). After the program was terminated in 1989, the federal funding previously allocated to SARDA abruptly stopped, which made ANA spending drop significantly. Though not as clearly suggested by Figure 4 as the structural break in 1990, there may also be another break in 1999 when the Department of Manitoba Northern Affairs became ANA (see ANA annual report 2000). Appendix 3 formally tests for these two structural breaks and their potential impact on the estimates reported below.

Third, a close inspection of this figure reveals that the pattern of ANA expenditure's rate of change time series is not connected to the pattern of the MGDP's rate of change time series. This suggests that ANA spending is neither counter-cyclical nor pro-cyclical. To formally test for the acyclical characteristic of this time series, I will employ three variations of the following model specification (see Appendix 3 for model selection)

$$Y_t = \beta_0 + \beta_1 E_{t-1}[MGDP_t] + \beta_2[INAC_t] + D\beta_3 + \varepsilon_t \quad (1)$$

Where $E_{t-1}[MGDP_t]$ is the expected rate of change of the Manitoba GDP at time t, $INAC_t$ is the rate of change of the Indian and Northern Affairs Canada total expenditure, D is an interaction term whose value is zero from 1985 to 1989 and one otherwise, Y_t is the rate of change of ANA total expenditure and ε is an idiosyncratic error term.

The variations of this model specification are based on three different assumptions of the way the government predicts the following year's MGDP when announcing its budget. The variations are as follows:

TABLE 6 Model Specifications

	Backward looking		Perfect foresight		Updating formula	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
$E_{t\text{-}1}[MGDP_t]$	0.34	0.87	0.4	0.98	0.32	0.86
$INAC_t$	-0.38	0.53	-0.62	0.28	-0.42	0.51
D	0.09	0.49	0.11	0.37	0.11	0.39
cons	≈0	0.99	0.12	0.9	0.01	0.91
AIC	-2.8		-4		-3.2	
BIC	1.74		0.59		1.15	

$$E_{t-1}^{bl}[MGDP_t] = MGDP_{t-1} \qquad (2)$$

$$E_{t-1}^{pf}[MGDP_t] = MGDP_t \qquad (3)$$

$$E_{t-1}^{uf}[MGDP_t] = Average(MGDP_{t-1}) + \mu_{t-1} \qquad (4)$$

The government could base its prediction solely on what happened the previous period as in Equation 2 (backward looking). Alternatively, it could have complete information about the functioning of the economy in the following period as in Equation 3 (perfect foresight). Or, it could make predictions according to a backward looking updating formula that includes an average of all past observations which is regularly updated after each observation becomes available ($Average(MGDP_{t-1})$) and last period's idiosyncratic error term (μ_{t-1}) as in Equation 4 (updating formula).[9]

Before reporting the results of the regression analysis, it is important to note that from Figure 4 we can observe that all of these series seem to show mean reversion (or convergence toward the average). In addition, the partial autocorrelation and autocorrelation functions of Y demonstrate no sign of non-stationarity (see Appendix 3). Formal proof of stationarity is not necessary in this case because, as shown by Stock (1988), most macroeconomic variables are either integrated of order 0 or 1 (except for nominal interest and exchange rates). These series are already in first difference. Therefore, we can conclude that all series are stationary and proceed to estimate the models.

Table 6 shows the result of the different model specifications. The signs of all coefficients are equal to our expectations: funding to northern Mani-

toba is increased when the provincial economy is growing (positive MGDP coefficient); when INAC increases its funding, ANA decreases it (negative INAC coefficient); ANA allocates more money to northern communities with SARDA than without it (positive D coefficient); the constant term is close to zero because we are studying rate of changes. Nevertheless, none of the coefficients in any specification is statistically significant at the ten percent level of significance.

There are two implications of this result for the northern Manitoba economy. First, Loxley and Lamb (2007) and Fernandez (2006) show that economic and social development is a long process that requires long-term planning. The results of this study demonstrate that it is very difficult to make long-term plans because of the highly volatile nature of government funding in northern Manitoba. The Standing Senate Committee on Aboriginal Peoples (SSCAP) (2007) highlights this point in their report where they comment on the inability to make long-term development plans because government spending is highly bureaucratic and unpredictable.

Second, Fernandez (2006) states that the government does not want to create long-term development plans, but rather concentrate on narrower goals such as business growth. It is interesting to note that though there are businesses starts-up funded by the government, northern Manitoba has a much higher rate of business bankruptcy than any other region in Manitoba (Loughran 1996). The statistically insignificant coefficient in

the MGDP variable shows one of the main reasons for this. The problem is that the government does not implement policies to help businesses weather economic storms such as counter-cyclical fiscal policy. The government could allocate more money to business loans and direct purchases from Aboriginal-run businesses and increase welfare transfers when the economy falls into a recession. These are all common practices that are applied to other regions of Canada to help businesses survive economic downturns; however, they are not used in northern Manitoba.

The last section demonstrated that there have not been significant improvements in the overall social and economic condition of northern Manitoba communities over the past two and a half decades. Small achievements in their wage economy, education and, to a lesser extent, in infrastructure have been more than offset by a sharp decrease in their physical, mental and environmental health. The last part of this section also demonstrated that ANA's expenditure pattern has not been conducive to either long-term development or economic growth. The next section investigates some of the causes for the lack of significant improvement, including a statistical analysis of the applicability of Innis' Staple Theory to northern Manitoba.

CED and Underdevelopment
in Northern Manitoba

Recent literature on the underdevelopment of northern Manitoba highlights several reasons for the lack of improvement in living conditions. SSCAP (2007), Loughran (1996) and Fernandez (2006) identify problems with government institutions dealing with the social and economic development of these communities. These problems include: too much emphasis on short-term profitable economic initiatives over long-term social and economic planning; rigid bureaucracies unable to solve dynamically changing challenges; and a lack of funding and paternalistic policies trying to impose development from 'the top down.' Kulchyski et al. (2007) highlights marginalization and the inequalities created by the existence of a dual economy as the main causes of underdevelopment. In addition, BRHA (1997 and 2004), Roos et al. (2001) and Kulchyski et al. (2007) indicate the lack of government funding in health and infrastructure, as well as a lack of clear environmental regulations as the major causes of the deteriorating physical, mental and environmental health of northern Manitoba communities.

All of these problems have a common origin. They are the remnants of the juxtaposition of social and economic forces that formed part of the process of capitalist development in modern Canada. These forces, in particular the marginalization, alienation and assimilation forces, have resulted in the high dependence of these communities on external institutions for obtaining their basic needs (Loxley 1981). A useful framework to evaluate the causes of the persistent underdevelopment of these communities must consider this historical characteristic. Community Economic Development (CED) offers such a framework.

CED is a theoretical and policy framework that understands underdevelopment as a historically dynamic process. Unlike other static theories, CED considers the self-perpetuating lack of economic and social independence a crucial factor of community impoverishment (Fernandez 2006). Loxley (2007a and 2007b; Loxley and Silver 2007; Loxley and Lamb 2007) states that CED is a process in which communities, in the most idealized sense of the word (horizontal and egalitarian institutions whose members have common geographical, cultural and/or economic ties), are the main participants in the planning and implementation stage of their own development strategy. Therefore, in empowering communities, CED seeks to eliminate externally

imposed forces that are the root cause of under-development such as those inflicted on northern Manitoba communities. This and the following sections use this approach to evaluate some of the development processes that have taken place in these communities.

Lamb (2007) argues that although there is no economic theory of CED, it borrows and adapts ideas from a variety of economic and regional development theories. Among these theories, there are: Import Substitution (see Prebisch 1950, Lamb 2007); Staple Theory of Economic Growth (see Choi 1983:120-143, Watkins 1963, Lamb 2007); Location and Attraction models (see Lamb 2007); and Thomas' Convergence Strategy (see Loxley 1981, 2007a and 2007b; Lamb 2007). Among all of these theories, the Staple Theory of Economic Growth is particularly important for northern Manitoba because of its rich natural resource base. This theory is based on the idea that exporting primary products could potentially lead to economic development (Watkins 1963). This theory belongs to a more general kind of development theory called Export-Led Development Theory.

According to Choi (1983:120-143), there are three roles that exports play in the economic development literature. Exports could lead to economic growth, balance the economy or retard economic development. Proponents of Export-Led Theories argue that export-based economies are able to form economic linkages between the export sector and other sectors of the economy (see Lamb 2007, Choi 1983:120-143). Through these linkages, underdeveloped economies are, in the medium to long run, able to diversify the economic base around this export sector and develop. Advocates of autarky, on the other hand, theorize that exports only retard economic growth. The reason for this is that underdeveloped export economies become too reliant on external investment sources and markets. CED takes a middle ground between these two extreme propositions. CED theory as-

signs an important role to exports inasmuch as they act to balance the economic development process and not to lead it. Loxley (2007a) and Lamb (2007) describe this role as complementary. It is based on helping small communities achieve efficiency in production (economies of scale) after fulfilling all local demand.

Table 1 in Mining Task Force (2003) shows that the northern Manitoba economy has significantly relied on the exportation of primary metals. This, coupled with new gas developments and increasing explorations for oil and gas (see ANA annual reports), as well as an expansion in commercial fishing and trapping, demonstrate that there have been some attempts to follow a staple export approach to development. Unlike what CED theorizes, this approach has not been complementary to an inward-looking development process. It has been, on the other hand, the main approach to community development.

Section 3(1) uses a linear statistical model to formally prove that this approach has not led to economic and social development in northern Manitoba. In particular it shows that the northern local economies have been unable to form economic linkages. The result of this failure has been to render exports of staple commodities irrelevant in creating economic opportunities in other sectors for residents of First Nations Reserves and Unorganized Communities. Moreover, it has retarded opportunities in industrial towns. To prove this, it employs panel data from the 1986, 1991, 1996 and 2001 Canadian censuses for a sample of fifty northern Manitoba communities.[10] Subsection B explores some of the causes for these results.

A. The Staple Theory of Economic Growth: An Empirical Exercise

To test for the relevance of the Staple Theory in developing northern Manitoba communities, we need to determine whether participation (or total labour force) in the primary export sector has increased participation in other sectors of

the economy. This causation would be the direct result of properly working economic linkages that would allow an economy to diversify around its export base. There are several reasons to use participation as opposed to other measures of sectorial economic activity such as employment or value added incomes.[11] First, we want to investigate the structure of the economy in the medium term (five years or longer). We are not interested, however, in job creation and job destruction caused by cyclical movements in the economy. Participation rates (see the linear transformation below), unlike employment rates, show us how people react to economic opportunities (or a lack thereof). An economy with a structural problem will force people to remain unemployed for long periods of time. When this happens people get discouraged and they either turn to the informal economy to fulfill their needs or leave their communities, decreasing participation. Second, the data were collected through Statistics Canada over a five-year period. While individuals may be unemployed at the time the census questionnaires are distributed due to a slowdown in economic activity, the odds that an actively participating individual has been unemployed during the past five years are slim. Therefore, the participation rates variable is measuring whether individuals have been employed at some point during the interval in which the variables of the model are measured.

Third, value-added income as opposed to total participation allocates a higher weight to high paying jobs. This measure of sectorial activity is very useful to compare developed economies or economies in the process of development. However, in northern Manitoba communities these jobs are usually performed by southern migrant workers because of the lack of training available to local residents. The use of participation rates (see the linear transformation below) in the linear statistical model aims at allocating a higher weight to economic opportunities for local residents of these communities.

In order to test for the Staple Theory, we need to also include other variables in the statistical model. Therefore, we obtain the following linear model:[12]

$$Pmn_{it} = \beta_0 + \beta_1 Prs_{it} + \beta_2 D_i Prs_{it} + B_3 Edu_{it} +$$
$$\beta_4 D_i Edu_{it} + \beta_5 Gov_{it} + \beta_6 D_i Gov_{it} + \beta_7 D_i +$$
$$\beta_8 \Sigma_{j=1}^{P_{it}} \sqrt{(Y_{it} - Average(Y_{it}))^2} \, (P_{it})^{\frac{1}{2}} + \varepsilon_{it} \qquad (5)$$

Where Pmn_{it} is the amount of people participating in the manufacturing and non-government service sectors, Prs_{it} is the amount of people participating in the primary sector, Edu_{it} is the amount of people with more than a Grade 9 education, Gov_{it} is the amount of people employed in the public sector, P_{it} is the amount of people aged fifteen and older, $\Sigma_{i=1}^{P_{it}} \sqrt{(Y_{it} - Average(Y_{it}))^2} \, (P_{it})^{\frac{1}{2}}$ is a measure of income inequality and ε_{it} is an idiosyncratic error term in the ith community at time t (for industry classification please refer to Statistics Canada Census 2009).[13]

Although the coefficient of the second last term is not statistically significant (see Table 7), its importance as part of the linear model should not be underestimated. According to Watkins (1963), Innis' Staple Theory of Economic Growth relies heavily on relatively equally distributed per-capita incomes. This is the defining characteristic of incomes that allows an economy to create a stable domestic market. The creation of a strong and stable domestic market is the final step in the economic diversification process. None of the other variables in the model measure income inequalities either directly or indirectly. Hence, we need to include this variable as part of the model.

In addition, D_i is a dummy variable that takes the value of one if the ith community is an industrialized town and zero if otherwise. The slope and intercept interaction terms were added because there is a different institutional framework in industrial towns than in First Nations Reserves and Unorganized Communities. This difference in the institutional framework could lead

to different slope and intercept coefficients. For instance, in the case of the primary sector variable, the institutional arrangement in industrial towns could allow linkages to be created between sectors leading to a positive coefficient. The lack of these institutions, in particular the absence of private ownership of land, in the other two types of communities may transform exports into a retardant factor of economic development.

A similar difference in coefficients could occur with participation in the government sector variable. This variable was added to the model as a proxy for investment in infrastructure. In First Nations Reserves and Unorganized Communities a higher level of participation in the public sector indicates that a community has nursing stations and that other basic services are provided there. The availability of these services also makes a community more likely to have all-weather roads, sewer and water systems and hydro landlines. All of these factors contribute to increased economic opportunities for residents of those communities (a positive coefficient). However, this may not be the case in industrial towns. These towns already possess all of these services and a higher level of public sector participation could signify that the public sector is crowding out the private provision of services. This situation would cause the coefficient to be negative.

Even after correcting for the potential variations in coefficients, there are still several problems with the data used for the statistical model. First, the proxy I use for participation in the primary sector does not isolate the export sector from the one aimed at the domestic market. Second, the proxy I use for human capital — more than a Grade 9 — education, is endogenous, causing its coefficient estimator to be biased. The reason for this endogeneity is that these two variables have a two-way causation. The first causation runs from more than a Grade 9 education to more participation. The more educated the labour force is in a community, the more likely

that community is to offer various economic opportunities to its residents (for example, by attracting investment). It is also common practice among companies exploiting the rich resource base of northern Manitoba to bring migrant workers to work in communities that lack well-trained individuals (see, for instance, Kulchyski 2007). This practice reduces the cost of training individuals that in most cases lack basic education (see previous section). When the employment of these migrant skilled workers increases, there is an increase in the total number of people with more than a Grade 9 education in those communities.[14] Therefore, there is also a causation that runs in the opposite direction. The last problem is closely related to the previous one. Through the statistical model we would like to measure the impact of the explanatory variables on employment opportunities for residents of these communities. The existence of a high level of migrant workers in those communities affects our estimates because employment opportunities could be directed to them and not to the residents of those communities. An ideal model for testing the Staple Theory would disaggregate these two separate effects.

The existence of a relatively large informal sector helps to mitigate the impact of the first data problem (see Fernandez 2006, Statistics Canada censuses). Total participation in the primary sector accounted for in the economic statistics is in commercial fishing and trapping as well as in the extraction and exploration of natural resources. All of these activities produce commodities that are usually exported to other markets in Canada and around the world. The local use of natural resources usually takes place in the informal economy and does not appear in these statistics. Therefore, almost all the data series in the Statistics Canada censuses on participation in the primary sector are in the staple export sector. It is important to note that because we are dealing with a regional theory of export-led growth, I refer to all commodities that

Scatter Plots 1 & 2: N. Manitoba Communities Labour Force as a percentage of total population over 15, 1986, 1991, 2001 Canada Censuses
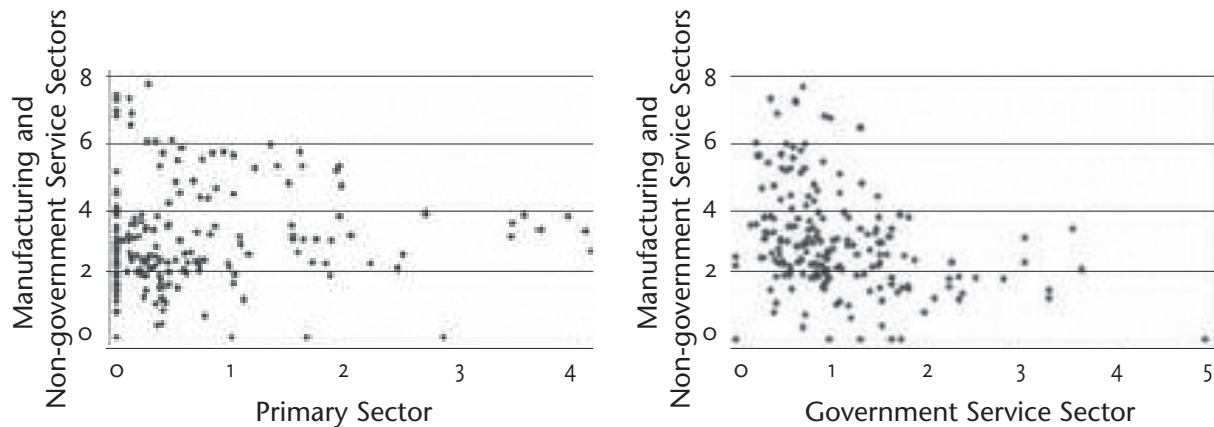
are sold in markets outside northern Manitoba as exports. These markets need not be outside Canada or even outside Manitoba.
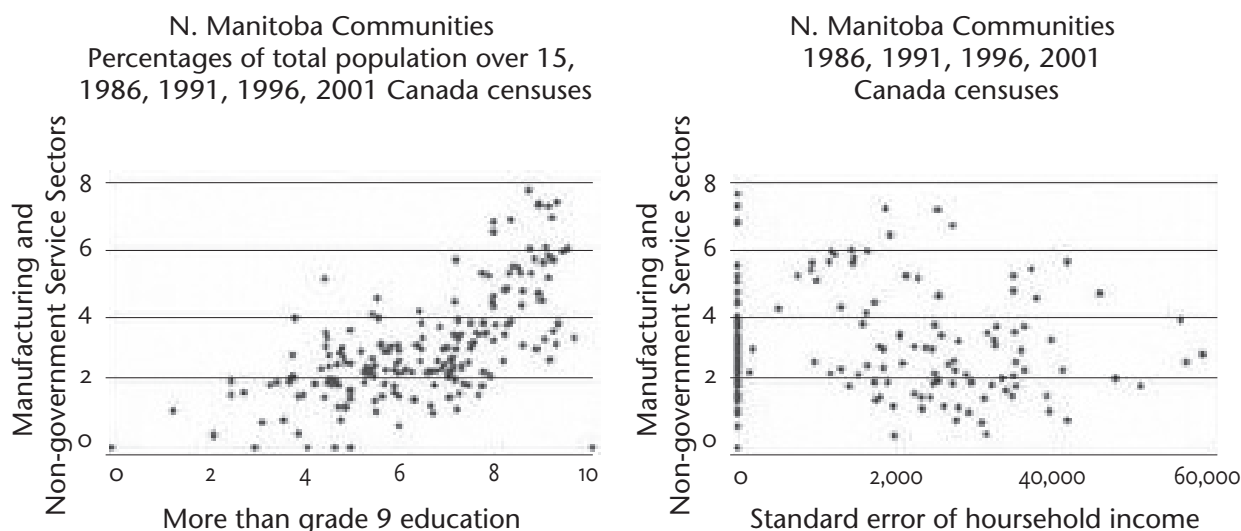
In applying a small and simple algebraic transformation to the linear model, the other two problems are also mitigated. This transformation consists in dividing both sides of Equation 5 by the total number of individuals over fifteen years of age in each community at time $t (P_{it})$. This division transforms all the variables of the statistical model into percentages over all population above working age. Moreover, it transforms the measure of inequality into the standard error of household income. Because the dummy variable is free to take any value at any given observation, it is adjusted to still take the value of one if the observation belongs to an industrial town and zero if otherwise. This small transformation solves both problems by approximation. Consider, for instance, the case in which skilled workers are brought into a community to work in the manufacturing sector. Though the level of total participation in the manufacturing sector changes, the change in its percentage is insignificant (both numerator and denominator increases). In addition, the percentage of individuals with more than a Grade 9 education

also changes insignificantly. This indicates that there was no economic opportunity created for local residents and that there was no increase in human capital among the local population.[15] Table 7 refers to these transformed variables with lower case letters.

These figures show the results of four different panel data estimation processes: pooled estimation, random effects, fixed effects and between estimations (for information about the differences among them see Appendix 4 or Kennedy 2003: 301-318). Figures 5, 6, 7 and 8 reveal that the regressions may suffer from heteroskedasticity. Therefore, all models in Table 7 use heteroskedasticity consistent covariance matrices (see Barro 1991, Greene 2003: 215-235). I do not employ, however, autocorrelation consistent covariance matrices. Neither do I assume that the models contain any lagged dependent or independent variable. The reason for not including these dynamics is the period in which the data were collected. Because the data were collected every five years, there is no reason to believe that the effects of either the error term or the included variables stay in the system for that long.

The most important result of the table is that the coefficients for the primary sector variable

N. Manitoba Communities
Percentages of total population over 15,
1986, 1991, 1996, 2001 Canada censuses

N. Manitoba Communities
1986, 1991, 1996, 2001
Canada censuses

DATA SOURCE: Statistics Canada www.statcan.gc.ca

are never positive. In some cases they are significantly negative and in other situations they are insignificant. This indicates that the results are robust in showing that participation in the export staple sector is at best irrelevant, if not detrimental for the creation of employment opportunities in the manufacturing and non-government service sectors. The coefficients for human capital (proxied by more than a Grade 9 education) are, on the other hand, always positive and significant.

The sign of the coefficients for the government service sector variable varies between the two types of communities in the between estimation at the ten percent level of significance and they are significantly negative for all other estimation processes. In addition, the coefficient for the standard error of household income is always close to zero and statistically insignificant.

Appendix 4 shows that fixed effects is the most appropriate estimation method in this case. Therefore, it is important to interpret its results and their relevance for the economic development of northern Manitoba communities. The statistically insignificant coefficient of the top

prs variable in the first row indicates that a one percentage increase in the percentage of people participating in the primary exporting sector does not lead to an increase in the percentage of people participating in the other two sectors in First Nations Reserves and Unorganized Communities. The second coefficient in that same row shows that it reduces this percentage by 0.42 percentage points at the ten percent level of significance in industrial towns. On the other hand, a one percent increase in the amount of residents with more than a Grade 9 education increases the dependent variable by 0.31 percentage points for all communities (second row) (see Barro 1991 who further discusses the properties of a similar result). These results apply to a length of time of five years and, therefore, it is considered the medium term.

An increase in the *gov* variable has a negative effect on participation in the non-government, non-primary sectors. This negative effect is even greater in absolute terms for the industrial towns than for the other northern communities at the ten percent level of significance. The negative effect on industrial towns could be the result

TABLE 7 **Panel Data Models (Pooled, Fixed Effects, Random Effects, Between)[a]**

Variable	Pooled		Fixed Eff.		Random Eff.		Between	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff	P-value
prs	-.481	.009	-.161	.432	-.385	.05	-.801	.002
Dprs	-.515	.007	-.423	.085	-.585	.004	-.274	.337
edu	.415	.000	.307	.000	.371	.000	.614	.000
Dedu	.145	.331	.087	.391	.307	.000	1.272	.001
gov	-.478	.000	-.354	.005	-.438	.000	-.577	.023
Dgov	.167	.540	-.644	.098	.02	.956	2.291	0.85
s.e.	≈ 0	.147	≈ 0	.712	≈ 0	.385	≈ 0	.113
cons	.06	.017	.146	.000	.079	.004	-.01	.851
D	.115	.36	—	—	—	—	-.719	.033

a: See Kennedy (2003), Greene (2003)

of the crowding out effect discussed above. The main reason for the negative coefficient in First Nations Reserves and Unorganized Communities could be that a bigger government presence leads to more paternalistic policies (see Fernandez 2006) and/or to more complex bureaucracies (see Loughran 1998, SSACP 2007). These two potential problems seem to more than offset the benefits of the infrastructure effect already discussed.

The statistically insignificant coefficient of the standard error of household income is surprising. According to Watkins (1963) and Hayter et al. (1990), this coefficient should be negative. A close look at the Statistics Canada censuses reveals that the unexpected coefficient could be the result of an error in measuring this variable. It is unlikely that this measurement error could bias any of the other variables of the model. The reason for this is a low theoretical correlation between this and the other variables. In addition, regressions excluding this variable (not shown in this paper) showed insignificant differences in estimators when compared to those presented in Table 7.

The policy implications of the results are clear. The development of northern Manitoba communities relies heavily, in the medium to long term, on the human capital of their populations.

Also, it relies on creating good local institutions of self-governance, in particular in communities with substantial Aboriginal populations. All of these contribute to make these communities less dependent on externally imposed factors. It does not, however, rely on increasing the community's dependency on external markets, capital and governments by adopting staple export-led economic policies. The next subsection explores some of the causes for this result.

B. The Staple Trap

Watkins (1963) states that Innis' Staple Theory is not a theory of economic development but that it is a recipe for economic and social development. It is, on the other hand, an historical explanation of the main reasons why areas are either able or unable to exploit their natural resource base and expand their economic growth. Consequently, it could hold some of the answers as to why northern Manitoba communities have been unable to develop around their primary export sector.

A non-historical and linear view of these communities reveals that their conditions are optimal to grow around the staple sector. They have a favorable land-to-man ratio (see Watkins 1963) and vast resources to diversify the staple export responding to cyclical changes in

demand. However, as Hayter et al. (1990) illustrate, the success of Innis' Staple Theory requires more than just linear pre-conditions. It requires a set of geographically, institutionally, economically and socially dynamic factors that are able to evolve alongside the growth in the primary export sector. From the previous analysis, it is clear that these factors have failed to evolve, so that these communities have not been able to form economic linkages between the staple and other sectors. The question remains: what are the rigidities that constrain the formation of these linkages?

From the demand side, the previous section demonstrated that there is a dual economy in northern Manitoba (see also Kulchyski 2007). On the one hand, there is a relatively wealthy class of workers that mostly reside in industrial towns. These skilled workers have no long-term ties to the local economy and they usually stay in these towns only temporarily. On the other hand, the local residents live in very poor conditions, sometimes turning to the informal sector to fulfill their needs. As well, these communities are scarcely populated, with no physical or institutional connections to one another. These two factors make the creation of a stable domestic market (that is, final demand linkages) almost impossible. Intermediate linkages are also very difficult to create. The reason for this is that the lack of a skilled labour force and infrastructure, as well as the high levels of political interference (see sscap 2007) make it more cost effective to

export raw material than to further process it in these communities.

A supply side led economic diversification and expansion is also very difficult. The lack of entrepreneurial skills among the local population combined with the migratory nature of skilled labour makes ventures into new economic sectors highly unlikely. In addition, the lack of further processing of raw materials does not allow the exportation of complementary manufactured commodities.

This inability to form linkages indicates that northern Manitoba communities suffer from what Watkins (1963) calls a `staple trap' (see also Hayer et al.1990). This is a situation in which the growth of the primary export sector only creates more dependency on external forces beyond the communities' control. Such a situation exacerbates their underdevelopment. This is not to suggest that the conditions to avoid the `staple trap' should be artificially imposed upon these communities. Contrarily, the previous analysis is suggesting that although a staple export approach has led to development in some cases, this approach does not work everywhere. That is, there is no 'one size fits all' approach to development. Northern Manitoba communities should seek social and economical development by means of a different approach. This approach must respect their social, political, cultural and environmental heritage. In addition, export should be taken as a complementary process of development and not the main one. This approach is the one proposed by ced.

Wuskwatim Generation Project: Hope or Hype for a New Way Forward

The previous section formally proved that primary product exports are ineffective as a central development approach. In addition, it provided an explanation for the causes of this result. There are various activities in northern Manitoba communities that belong to the group of staple exports. One of such activities is the export of electric power generated by hydro developments. In the previous analysis, hydro developments were not included in the primary export sector participation variable. The reason for not including them within this group was a problem of disaggregation of data. The Statistics Canada censuses of 2001 and 2006 utilize an industry classification that considers utilities as a different economic sector. Previous censuses, on the other hand, include this sector as part of the non-government service sector (see Statistics Canada 2009). In order to have consistent data through time, I was forced to include this sector as part of the private service sector for the whole period. A quick glance at the economic statistics of the few places that have hydro developments is enough to observe that had I included them in the staple export sector, the main result of the model would have been strengthened from this change. The reason for this is that most hydro developments are located in areas where there is no other important economic activity. Examples of this include the Grand Rapids Generation Station located next to the Grand Rapids town and First Nation Reserve, Jenpeg Generation Station located near the Cross Lake First Nation and Long Spruce Station located near the town of Gillam (see Manitoba Hydro 2009, Hultin 2004, Statistics Canada 2009).

In recent years hydro developments have taken on a predominant role in northern Manitoba. There have been talks about constructing two and possibly three hydro generation stations of significant size. The construction of one of them, the Wuskwatim Generation Project, has already started. As it was demonstrated in the previous section, this hydro project would be irrelevant for the development of the northern communities involved with it. However, there have been some significant changes in the planning and implementation processes of this project. These changes could potentially influence the development of these communities in a way not observed before for a project with these characteristics. The first subsection provides an overview of the history of the Wuskwatim Generation Project. The second subsection investigates some of the

project's characteristics that are important for CED. In investigating these characteristics, however, this subsection will not overlook the findings of the previous section.

A. A Project Overview

In October 2003 a Summary of Understanding between Nisichawayasihk Cree Nation (NCN) and the Province of Manitoba was signed. After a process of community consultation, this pre-agreement was approved by a majority of NCN members. The approval of this agreement led to the signing of a Project Development Agreement (PDA) in June 2006 between these two parties (see PDA 2006). The PDA is a binding document outlining the rules and regulations for the construction of a 1.3 billion dollar, 200 megawatt hydroelectric generating station located at Taskinigahp Falls (PDA at a Glance 2006, Hydro 2009). The Taskinigahp Falls are situated within the Nelson House Resource Management (NHRM) area. This area is governed by the NCN whose on-reserve members are located in three First Nations Reserves surrounding this area: Southern Indian Lake, Nelson House 170 and Nelson House 170B (INAC 2009). In addition to the PDA, Manitoba Hydro has signed smaller business agreements with five other Cree Nations, the Manitoba Metis Federation and the Manitoba Keewatinook Ininew Okimowin. The goal of these agreements is to also benefit other First Nations not directly affected by this Project from the construction and operations of the dam (Styrchak 2009, WKTC 2009).

The PDA is a direct result of the signing of two documents: the Northern Flood Agreement in 1997 and the Comprehensive Implementation Agreement in 1992. Hultin (2004) states that these two documents legalized previous pre-agreements to settle the dispute over the Churchill River Diversion (CRD). The CRD is a river diversion that was constructed in the late 1960s. This diversion caused a significant environmental impact that affected the livelihoods of several northern communities. The NCN communities were particularly affected (Hydro 2009, Hultin 2004). In these two documents, Manitoba Hydro agreed to become partners with the Aboriginal communities affected by the CRD in future projects (Hultin 2004).

The PDA has recently received a great deal of attention from both Aboriginal and non-Aboriginal groups. Advocates of this project state that the PDA is unique in that it proposes for the first time a business partnership between Manitoba Hydro and an Aboriginal Nation (see Hydro 2009, NCN 2009). Under the PDA, the NCN has the option to purchase up to thirty-three percent of the Wuskwatim Generation Project. This has allowed NCN to become an active party in the planning and implementation of the dam's operations. The input of NCN has already been reflected in some of the project's unique architectural characteristics. Most of these characteristics are focused on reducing the environmental impact of the dam. Among these we find: a low head dam; a minimal flooding area; a road from Thompson to the site that minimizes the impact on woodland caribou; measures to minimize its impact on the water quality; and the use of traditional alongside scientific knowledge in the planning stage of the project (NCN 2009, PDA at a Glance 2009). Other benefits from the project to northern communities signed in the PDA include the preferential treatment of NCN businesses. As a matter of fact, NCN businesses or joint ventures have already negotiated more than 100 million dollars in direct contracts (PDA at a Glance 2009). Additional benefits include the preferential treatment of Aboriginal workers and an investment in education and training through the Hydro Northern Training and Employment Initiative (HNTEI).

The manner in which this project deals with the need to train workers is also unique. The Hydro Northern Training Initiative (the arm of HNTEI that is concerned with training workers) funds the training of Aboriginal workers to pre-

pare them for working in the Wuskwatim and Keeyask Generation Projects (Styrchak 2009).[16] HNTI is a multi-year, 60.26 million dollar initiative funded as follows: 20 million dollars from Manitoba Hydro; 10 million dollars from the Province of Manitoba; 22 million dollars from Human Resources and Development Canada; 5 million dollars from Western Economic Diversification; and 3.26 million dollars from Indian and Northern Affairs Canada (HNTI 2009). To administer the funding of HNTI and comply with Hydro requirements, Hydro partnered with several Aboriginal communities to establish the Wuskwatim and Keeyask Training Consortium Incorporated (WKTC 2009). This is a legal entity designed with the sole purpose of managing HNTI funds (Styrchak 2009). Hydro, through WKTC, only sets standards and job projections for the two hydroelectric projects. The delivery of training is then the responsibility of the Aboriginal partners (Styrchak 2009).

Under the HNTI, Aboriginal partners provide a variety of training that they consider necessary to integrate their members in the labour market. As noted by Styrchak (2009), the major goal is to give people transferable skills that they could use beyond these two hydroelectric projects. These skills include life skills, adult education, designated and non-designated trades training, professional training and business training. Aboriginal partners have already reaped some of the benefits from the HNTI funding. For instance, NCN opened in 2006 the Atoskiwin Training Center, which is a 8.6 million dollar education center partly funded by HNTI (see News Release 2006). Moreover, using HNTI funds, Split Lake, York Factory and Fox Lake First Nations have been able to update and expand their educational centers (Styrchak 2009).

Notwithstanding the benefits that northern Aboriginal communities have been able to obtain from this project, there are several detractors. Kulchyski (2004) is wary of the community consultation process because he thinks that

it was not a particularly transparent process. He also highlights the fact that there are no set targets for employment levels and that most of the Aboriginal workers are set to perform the most menial tasks in the construction process. In addition, he points out that because NCN is a partner in the business project there is a great risk involved. In the case that this project is not as profitable as first projected, NCN members will face a large amount of debt for generations to come. At the community level, Hultin (2004) states that individuals are distrustful of a project that will likely affect their traditional way of living, the environment and impose debt.

Looking at the economic and social statistics of NCN communities (see Stats Canada 2009, INAC 2009, Hultin 2004), it is easy to observe why the majority of NCN members were eager to sign the PDA. This project gives them, in the short term, some benefits in terms of employment and training. The medium- to long-term impact on their CED is less clear.

B. The CED of the Wuskwatim Generation Project

The Wuskwatim Generation Project addresses the NCN communities' need to become self-sufficient. First, under the PDA, NCN became a business partner with Manitoba Hydro. This means that NCN members have been able to participate in the planning stage and will, though in a limited role (see Kulchyski 2004), participate in the day-to-day operations of the project. In addition, the flow of money to the project will be tied to economic profit and not to an arbitrary allocation of damage compensation. Manitoba Hydro has not always treated Aboriginal partners as equal partners. Instead they provided monetary compensation for the upheaval they imposed on their communities after the damage was done. The Summary of Understanding gave NCN members an opportunity to review the project and participate in deciding their own future. Though not without problems that biased

the decision towards accepting the project (see Kulchyski 2004), this is a step in the right direction to address what nationwide Aboriginal institutions have been claiming: "A Hand Up, Not a Handout" (SSCAP 2007).

The education and training component of the project are also very important for the development of the northern communities involved in agreements with Manitoba Hydro. The linear statistical model in section two showed that education is an important factor in creating economic opportunities in the medium to long term. The educational centers that have been either updated or created as a result of the HNTI funding and on-the-job training that Wukwatim and Keeyask Generation Projects offer Aboriginal workers will likely have an impact on their CED.

Nevertheless, HNTI, through the WKTC, provides most of the funding for training for jobs that are only necessary for the generation projects. Hydro's (2009) job statistics and projections show that most of these jobs have been in relatively low level activities. One of the main reasons for this is that WKTC was only signed about eight years before the start of the construction phase and, therefore, there was simply no time to prepare individuals who, in many cases, lacked basic education for high levels of employment.

The success of the HNTI in contributing to the CED of these communities then relies on two specific factors. First, it relies on the ability of NCN and the other communities to secure the continuation of this funding after the construction phase of these projects is finalized. Styrchak (2009) expressed some concern about this point. She commented on the difficulty that on-reserve educational centers face when seeking government funding. The reason for this is that neither the Provincial Government nor INAC are directly responsible for providing financial resources to their day-to-day operations. However, she mentioned that Aboriginal communities seeking funding for training were asked to submit plans for the continuation of funding to

educational facilities. For instance, a possible source of funding for the NCN multi-million dollar educational facility could be the income flow from their share of the dam's profits.

Second, it depends on the Aboriginal communities' ability to channel this funding to managerial- and business-related training. The training for this hydroelectric project will generate a readily available semi-skilled labour force. To take full advantage of this labour force, Aboriginal communities need to educate managers and entrepreneurs that would be capable of attracting private and public capital for local economic initiatives. Otherwise, the employment of this labour force will always depend on the continuation of externally imposed economic projects that will only increase their dependence on external forces.

The success of these projects in developing these communities also depends on their ability to control various other factors. First, Kulchyski (2004) states that Wuskwatim will likely exacerbate inequalities within these communities by creating two-tier economies. As explained before, two-tier economies are particularly damaging for CED because they hinder any possibility of creating a strong domestic market. To avoid this, they must put in place a mechanism to equally divide the benefits of the projects. This includes compensation for externalities such as the impact on individuals whose traditional activities of subsistence will likely be affected by these Hydro projects. Second, NCN in particular must secure a small share of the power generated for domestic use at relatively low prices. This will contribute to local infrastructure for future economic projects. Finally, NCN must reinvest all profits within their communities with the goal of addressing the CED of their members.

All of these measures are aimed at shifting the attention from staple exports to community needs. Initially, these projects provide short-term economic and social opportunities to these communities. As these opportunities

are exploited, the attention must be shifted towards the communities' needs. Secondly, all the resources initially obtained must be allocated to solve key problems of community development. Hydroelectric exports at this stage should become a secondary activity and the means to gain resources to address local goals. Earlier in this paper, it was mentioned that the theory of CED takes a middle ground between autarky and Export-Led Theories. This middle ground is based on employing exports as a subsidiary or secondary economic activity. In Loxley and Lamb (2007) and Loxley (2007), exports are important to help domestic industries achieve economies of scale after all local demand has been met. In this case, their importance lies in leading development by making resources available to start an inward development process. In either case, it is clear that exports have a relative importance and that the achievement of long-term CED eventually requires an inward-looking development approach.

Conclusion

This research is concerned with the description and evaluation of the social and economic condition of northern Manitoba communities over the past twenty-five years. This investigation is separated into three parts. The first section uses social and economic statistics to provide a dynamic picture of these communities over the period of study. The main conclusion of this dynamic picture is that their development has changed little since 1985. In addition, this section explored, through a times series econometric model, the ANA's expenditure pattern. The acyclical and irregular characteristics of this pattern led me to conclude that it is conducive to neither long-term development nor short-term economic growth.

The second section explores some of the causes for the lack of improvement in the standard of living in these communities. The main component of this section is empirical proof that Innis' Staple Theory, so important for northern communities, is at best irrelevant for their development. Wat-kin's (1963) Staple Trap Hypothesis is then proposed as a possible explanation for this result.

In recent years, staple export-led power generation projects have taken center stage in these communities. Manitoba Hydro has announced the construction of two and possibly three power generation dams. Though section two demonstrates the irrelevancy for community development of projects like these, the impact of their unique characteristics on CED is worth exploring. The third section is a comprehensive study of these projects. It combines an exploration of the short-term benefits with some hypothesis as to how these communities could employ them for long-term development.

As is usually the case with a research constrained by space and time, there are topics worth exploring that have been left out of the analysis. A study of important development approaches other than the Staple Theory as well as an investigation of other economic projects in these communities is left for future research papers.

Bibliography

Aboriginal and Northern Affairs Annual Reports (1984-2008). Available at www.gov.mb.ca/ana. Accessed several time during April.

Barro, R.(1991). Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, vol.106, No.2 (May, 1991), pp.407-443.

Burntwood Regional Health Authority (2004). *BRHA Community Health Assessment 2004.* Available at www.thompson.ca/dbs/brha. Accessed on Monday, March 16th, 2009.

Burntwood Regional Health Authority (1997). *BRHA Community Health Assessment 1997.* Available at www.thompson.ca/dbs/brha. Accessed on Monday, March 9th, 2009.

Choi, K.(1983). *Theories of Comparative Economic Growth*. Iowa, US: The Iowa State University Press

Federal Government National Accounts (1985-2008). Available upon request at the Dafoe Library, University of Manitoba, Winnipeg Manitoba

Fernandez, L.P. (2006). *Government Policy towards Community Economic Development in Manitoba*. A Thesis presented to the University of Manitoba, Economic Department.

Available at the University of Manitoba Library, call number: Thesis F39043.

Greene, W. (2003). *Econometric Analysis.* Fifth Edition. New Jersey, US: Prentice Hall.

Griffiths, W., Hill,C. Judge, G.(1993). *Learning and Practicing Econometrics.* US: John Wiley and Sons, INC.

Hayter, R., Barnes, T. (1990). Innis' Staple Theory, Exports, and Recession: British Columbia, 1981-85. *Economic Geography*, vol. 66, No.2 (Apr. 1990), pp.156-173.

Hsiao, C.(2003). *Analysis of Panel Data*. Second Edition. U.S: Econometric Society Monographs.

Hultin, D. (2004). *New Partnerships in Hydro Development*. Submitted to the Manitona Research Alliance on CED in the New Economy. Available at www.manitobaresearchalliance-tiac.ca.

Hydro (2009). Manitoba Hydro web-site. Availiable at www.hydro.mb.ca. Accessed several times between May and June, 2009.

Hydro Northern Training Initiaitve (2009). HNTI web-site. Availaible at www.gov.mb.ca. Accessed several times between April and June, 2009.

Indian and Northern Affairs Canada (2009). Community Profiles. Available at www.ainc-inac.gc.ca. Accessed several times during May, 2009.

Kennedy, P. (2003). *A Guide to Econometrics.* Fifth Edition. Cambridge, Massachusetts, US: The MIT Press.

Kulchisky, P. & Neckoway, R. (2007). The Town that lost its Name: The Impact of Hydroelectric Development on Grand Rapids, Manitoba. In Loxley, J., Silver J., Sexsmith, K. (eds.), *Doing Community Economic Development.* Halifax: Fernwood Publishing.

Kulchisky, P. (2004). *È-nakàskakowaàhk (A Step Back): Nisichawayasihk Cree Nation and The Wuskwatim Project. Canadian Centre For Policy Alternatives Review.* May 2004.

Lamb, L. (2007). Towards an Economic Theory of Community Economic Development. In Loxley (ed.), *Transforming or Reforming Capitalism: Towards a Theory of Community Economic Development.* Halifax: Fernwood Publishing.

Loughran, N.E. (1996). *A Study of Three Federal Government Programs that Financed Economic and Business Development Projects in Communities of Northern Manitoba with Substantial Aboriginal Populations.* A Thesis presented to the University of Manitoba, Economics Department, Sociology Department and Political Studies Department. Available at the University of Manitoba Library, call number: Thesis L9298.

Loxley, J. (2007[1]). Elements of a Theory of Community Economic Development. In Loxley (ed.), *Transforming or Reforming Capitalism: Towards a Theory of Community Economic Development.* Halifax: Fernwood Publishing.

———- (2007[2]). Some Remaining Theoretical Challenges. In Loxley (ed.), *Transforming or Reforming Capitalism: Towards a Theory of Community Economic Development.* Halifax: Fernwood Publishing.

——— (1981). The 'Great Northern Plan'. *Studies in Political Economy*, No.6, Autumn 1981, pp.151-182.

——— & Lamb, L. (2007). Economics for CED Practitioners. In Loxley, J., Silver J., Sexsmith, K. (eds.), *Doing Community Economic Development.* Halifax: Fernwood Publishing.

——— & Silver, J. (2007). Introduction. In Loxley, J., Silver J., Sexsmith, K. (eds.), *Doing Community Economic Development.* Halifax: Fernwood Publishing.

Mining Task Force (2003). *MTF Final Report and Recommendations.* Delivered to the Manitoba Government. Availiable at www.gov.mb.ca

News Realeases (2006). *Conversation With the Chief.* Nisichawayasihk Cree Nation. Available at www.ncncree.com. Retrieved on May 3rd, 2009

Nisichawayasihk Cree Nation (2009). NCN website. Available at www.ncncree.com. Accessed several times between April and June, 2009

Northern Manitoba Economic Development Commission (NMEDC)(1992). *Northern Manitoba a Benchmark Report.* Thompson, Manitoba: N.M.E.D.C

Prebisch (1950). The economic development of Latin America and its principal problems. *United Nations Dept. of Economic Affairs.*

Project Development Agreement (2006). Manitoba Hydro. Available at www.hydro.mb.ca. Retrieved on April 26th, 2009

Project Development Agreement at a Glance (2006). Nisichawayasihk Cree Nation. Available at www.ncncree.com. Retrieved on April 23rd, 2009

Roos, NP., Shapiro E., Bond R., Black C., Finlayson G., Newburn-Cook C., MacWilliam L., Steinbach C., Yogendran M., Walld R. (2001). *Changes in Health and Health Care Use of Manitobans: 1985-1998.* Delivered to the University of Manitoba: Manitoba Cent-

er for Health Policy. Available at www.mchp-appserv.cpe.umanitoba.ca

Service Canada (2009). Service Canada web-site. Available at www.servicecanada.gc.ca. Accessed several times in April, 2009.

Standing Senate Committee on Aboriginal Peoples (SSCAP)(2007). *Sharing Canada's Prosperity- a Hand up, not a Handout. Final Report: Special Study on the Involvement of Aboriginal Communities and Business in Economic Development Activities in Canada*. Available on the Parliamentary Internet: www.parl.gc.ca (Committee Business - Senate - 39th Parliament, 1st Session).

Statistics Canada (2009). Statistics Canada Censuses. Available at www.statcan.gc.ca. Accessed several times between February and June, 2009.

Stock, J; Watson, M. (1988). Variables Trend in Economic Time Series. *The Journal of Economic Perspectives*. Vol.2, No.3, pp.147-174

Styrchak, J. (2009).[Personal Interview]. Ms. Styrchak is the Executive Director of the Hydro Northern Training Initiative. May 29th, 2009. Winnipeg, Manitoba.

Watkins, M.(1963). A Staple Theory of Economic Growth. *The Canadian Journal of Economics and Political Science*, vol.29, No.2(May, 1963), pp.141-158.

Wuskwatim and Keeyask Training Consortium INC. (2009). WKTC Web-page. Available at www.wktc.ca. Accessed several times during May, 2009

Appendix 1: Education Levels Upper and Lower Boundaries

The upper boundary is determined as follows: $(\frac{X}{X+Y} Z) + H$.[17] Where X is the total population between 15 and 19, Y is the population between 20 and 24, Z is the population between 15 and 24 not attending school and H is the population over 20 years of age with less than grade nine. There are two important assumptions to note from this definition of the upper bound. First, it assumes that Z is randomly distributed between X and Y. Then, $(\frac{X}{X+Y} Z)$ is the expected population age 15 to 19 not attending school. The second assumption is even more restrictive. This definition also assumes that all individuals whose age is between 15 and 19 not attending school have less than grade nine education.

The lower bound is just H.[18]

Appendix 2: Adjusting Household Income for Inflation

To compare different incomes through time, we need to adjust them by inflation. For instance, there is a big difference between the real value of 10 dollars today and 10 dollars in 1986. In this case, I am converting all incomes to 2006 dollars as follows: $Y_i^{2006} = Y_i^i \dfrac{CPI_{2006}}{CPI_i}$

Where Y^i_{2006} is the income of the ith year in 2006 dollars, Y_i^i is the income of the ith year in i dollars and CPI_{2006} and CPI_i are the consumer price indexes of 2006 and i respectively for all $i = 1986, 1991, 1996, 2001.$[19]

Appendix 3: ANA Expenditure Time Series Model Selection

There are three different parts to this appendix. The first part shows the selection of the order of the moving average and autocorrelation terms. The second part test for the structural breaks mentioned in subsection 2.3 of this paper. Finally, the third part explores potential problems of the data and their solution.

- Figures 9 and 10 show that the best model specification includes no lags of either the dependent variable (AR(0)) or the error term (MA(0)). The reason for this is that neither the autocorrelation function nor the partial autocorrelation functions are statistically significant (for more information see Greene 2003; Griffiths, et.al 1993).

- Table 7 shows that the only statistically significant structural break is the one created by the termination of SARDA in 1989.

- There two potential problems with the variables that the model specification solves:

i. Though it is difficult to have heteroskedasticity in time series econometric analysis, it is not impossible. From figure 4, the only problem seems to be before and after 1989. This is solved by the inclusion of the dummy variable (see Kennedy 2003)\\

ii. There could be a problem of endogeneity in the perfect foresight model specification. This is because may be determined by MGDP and vice-versa (an increase in government spending increases the GDP). Nevertheless, is just a small component of the Manitoba economy. Therefore, we could ignore its effect on the provincial GDP.

TABLE 8 **Chow Test for Structual Break**[ab]

Year of Structural Break	F-Statistic[c]
Termination of SARDA (1989)	5.67*
MNA ➥ ANA (1999)	0.28
Both (1989 and 1999)	3.18

a: See Studenmund 2001, pp. 239-243
b: The F-statistics for the backward looking model specificationare only shown on this table. Results for the other two specifications are similar.
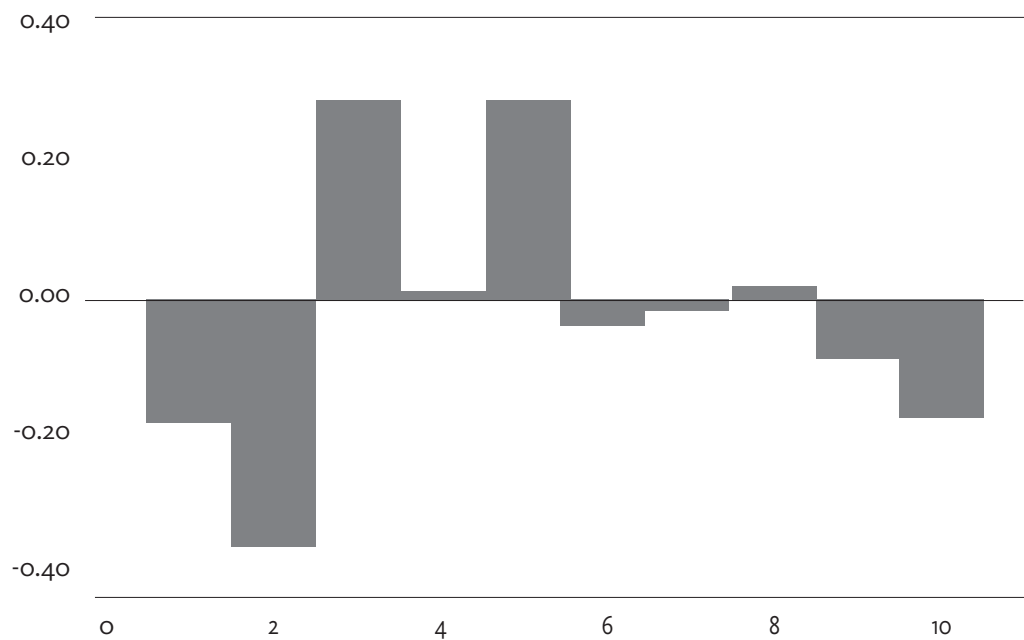**c:** H_o = There are no structural breaks; H_a = There is a structural break. * indicates that the computed F-statistic is greater than 95 percent critical value.

FIGURE 9 Autcorrelation Function
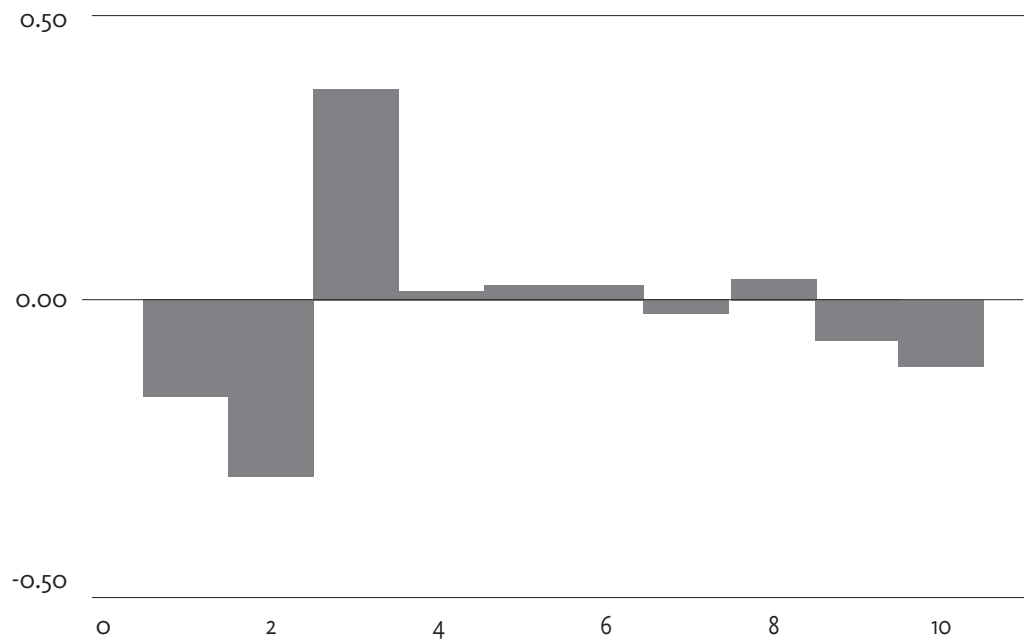
NOTE: Statistics formula for NA confidence bands

FIGURE 10 Partial Autocorrelation Function

NOTE: OBN Confidence bands

Appendix 4: Staple Theory of Economic Development Panel Data Estimation Process Selection

This appendix selects the best estimation process to test Inis' Staple Theory using panel data for fifty communities in northern Manitoba over four years (1986, 1991, 1996, 2001). Choosing the best estimation process requires to first rule out processes that are not adequate for estimating this model. Statements 1 to 4 are aimed at ruling these inadequate processes out. Then, by a process of elimination we conclude that the fixed effects process is the best one to test this model.

1. The LM Multiplier test studies whether the intercept term is different in each of the cross sectional units (in this case in each northern community) (see Greene 2003,pp.223-225). The method employed to test this is by analyzing the variance of the random effects error term. It is worth noting that though this test is applied to the random effect estimation process, it is not testing for the adequacy of this estimation model per se. The goal of this test is to investigate whether a pooled model or either of the other three models that allow for different intercepts should be employed. Given the high observed Chi-square statistic (row 1, column 2), we reject the null of no difference in the intercept term. Therefore, we conclude that the pooled model is not adequate.

2. The Hauseman specification test statistic analyzes whether the random effect estimator is unbiased (see Kennedy 2003, pp.311-312). The method employed for testing this hypothesis is to test for correlation between the variables of the model and the random effect error term. Given the high-observed Chi-square statistic (row 2, column 2), we reject the null of no correlation. Therefore, we conclude that the random effect estimation process yields biased estimators. So, it is not an adequate model for this particular case.

3. The between estimator or sometimes called the long-term estimator, compares the average over time of each cross-sectional unit. In comparing these averages, it yields an estimator of the long-run impact of the independent variables on the dependent variable (see Kennedy 2003 for more on this). This estimator though very useful in cases where the different cross-sectional units have similar characterstics that in the long run tend to converge, it is not useful

TABLE 9 Test Statistics for Model Selection

Test	X_{obs}	DF	P=value
LM Multiplier Test[a]	9.85	1	.002
Hauseman Specification[b]	991.89	7	.000

a: H_o: Variance of the random effect error term is zero (i.e. the cross sectional intercepts are all the same), H_a: Otherwise. See Greene (2003, pp. 223-225) for a general exposition; Kennedy (2003, pp. 311-312) for applications to panel data.

b: H_o: There is no correlation between explanatory variables and the random effect error term, H_a: Otherwise. See Griffiths, *et al.* (1993, pp. 311-312) and Greene (2003, pp. 301) for application to panel data.

for our model. The reason for this is that in this case the units are very different in nature. Some of these differences, such as geographical location, are not likely to ever change or converge in the longer term.

4. There are also some models that allow the slope coefficient to be different over all the cross-sectional units (see Hsiao 2003, pp.141-175). These models only add complications and the interpretation of the slope coefficients are usually very obscure and complicated. In this case there is no reason to believe that coefficients among First Nations and Unorganized Communities are different. Neither is there any reason to believe that it will be different among Industrial Towns. This is because the institutional composition of communities within both of these groups is not very different. The difference in the interception term coefficient is different. Most of the effect of unobservable variables is added to the interception term. There are a lot of variables that are not observed and thus not included in the previous model. Among these variables we have: cultural and religious practices, amount of corruption in local governments, institutional relationships with other communities and so on. Therefore, there is a need to allow for different intercepts.

Because of 1, 2, 3 and 4 we conclude that fixed effects is the most adequate estimation process.

Endnotes

1 1985 is the earliest year for which comparable data are available.

2 It is important to note that these statistics are for Canada and not just for Manitoba.

3 These northern industrial towns are defined in Table 1.

4 Census division number 19 has a lower standard error because there are no industrial towns there. The communities located in this census division are very poor. For instance, Table 4 shows that its average income in 2006 was only 50 percent of the provincial average.

5 Flin Flon (5,594 individuals in 2006) and The Pas (5,589 individuals in 2006) are part of census division 21. Thompson (13,446 individuals in 2006) is part of census division 22.

6 Because they are percentages and the only two possible sources of income accounted in the censuses, these two figures are almost the mirror image of each other.

7 Data for previous years were not readily available.

8 There were also two other programs that ended in 1989 but they were not as big as SARDA.

9 This updating formula is largely used in forecasting models which assume that although people make mistakes in forecasting, they are not as naive as to think that the next period's values will be equal to the last period's.

10 Only fifty communities that existed over the four periods of time considered were chosen to avoid the complications of having unbalanced panels.

11 For the rest of this section, it is important to remember that the definition of participation includes individuals who are employed and those who are unemployed but actively looking for employment.

12 Though there is no reason to believe the model is strictly linear, I use a linear model for various reasons. First, the impact of participation in the primary sector and government sectors as well as the impact of the measurement of income inequality on manufacturing and non-government services seem to be linear (see scatter plots in Figures 5, 6 and 8). Second, the scatter plot for the relation between more than a Grade 9 education and employment in the manufacturing and non-government services does not seem to be linear (see Figure 7). However, the development literature theorizes that the relationship between GDP and human capital is linear (see Barro 1991). In order to compare my model to other models in the development literature, it is then necessary to use a linear model. Third, we are only interested in the impact of one variable at time on participation in the manufacturing and service sectors. Last but not least, this simple model specification allows me to use various panel data techniques to test for the main hypothesis.

13 The last term of the measure of income inequality is just a weight that increases in a decreasing manner as the population above working age increases in a community (this term was added as it is useful for the linear transformation, see below).

14 Increase in the employment of migrant workers leads to an increase in the participation.

15 This transformation works best when migration over time is insignificant compared to the total population over working age in each community and when we compare the dynamics of each panel. The transformation does not entirely solve these problems when migration is significantly large and when we compare different cross-sections. The only estimation process that compares cross-sectional units is the between estimation in Table 7. However, as appendix 4 shows, we need to exercise a lot of caution in interpreting and using the result of this process.

16 The construction of Keeyask Generation Project had yet to be approved as of May 29, 2009.

17 Note: $\frac{X}{X+Y}Z \leq \frac{X}{X+Y}(X+Y) = X$ (i.e. the quantity of individuals age 15 to 19 that do not attend school cannot be greater than the total amount of individuals in that age group)

18 The underlying assumption is that all Z's have attained at least grade nine education.

19 The CPI was obtained from Table 326-0021, Consumer Price Index, 2005 basket, annual (2002=100), available at CANSIM (accesses through: estat.statcan.gc.ca, on March 10th, 2009).}