



THE IMPACT OF INTRODUCING FORMAL CHILDCARE SERVICES ON LABOUR FORCE PARTICIPATION IN INUIT NUNANGAT

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Abstract

We study the labour force impact of introducing formal childcare services to 34 Inuit communities in Canada's North. We use geographic variation in the timing and intensity of the introduction of childcare services in the late 1990s and early 2000s to estimate the impact of increased access to childcare. We combine the 1996, 2001, and 2006 long-form census files with data on the number of childcare spaces in each of the 34 communities over time. We find that a one standard deviation increase in the number of childcare spaces per 100 children increases labour force participation in single-adult households by 3.6 percent. We find no impact in households with more than one adult present. We suggest plausible explanations for these findings and avenues for future research.

Keywords: Inuit, childcare labour force participation, First Nations and Inuit Child care Initiative, Aboriginal Head Start

JEL Classifications: J13, J15, J18

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1 Introduction

The engagement of Aboriginal peoples in the labour force is broadly recognized as an important aspect of Aboriginal well-being ([Barrington-Leigh and Sloman, 2016](#); [Gitter and Reagan, 2002](#); [Gordon and White, 2014](#); [Gray and Hunter, 2002](#); [Pauktuutit Inuit Women of Canada, 2016](#)).¹ In countries like Canada, where the Aboriginal population makes up a large, young, and rapidly growing proportion of the population, the engagement of Aboriginal peoples in the labour force is seen more broadly as important for economic growth ([Howard et al., 2012](#)). Many Aboriginal people currently participating in the labour force have had to overcome significant barriers, one of which is accessing reliable and affordable childcare services ([Pauktuutit Inuit Women of Canada, 2016](#)).

In this paper we investigate the extent to which increased access to formal childcare services during the late 1990s may have reduced the cost of work for Inuit parents and increased labour force participation among 34 Inuit communities in Canada. There was a substantial increase in licensed childcare facilities during the late 1990s and early 2000s as part of the First Nations and Inuit Childcare Initiative and the Aboriginal Head Start program. While these programs were designed with many objectives, it is plausible that they had a positive effect on the ability of parents to participate in the labour force given much of the previous evidence on labour supply and the availability of childcare ([Baker et al., 2008](#); [Berlinski and Galiani, 2007](#); [Brilli et al., 2016](#); [Goux and Maurin, 2010](#); [Nollenberger and Rodriguez-Planas, 2015](#)). However, family policies that increase the availability of childcare services can have different effects on labour supply depending on the context: for example, increasing the availability of childcare may have no impact on labour force participation if parents opt out of using childcare services for cultural or social reasons; if the childcare available is not affordable; or if other forms of non-parental care are simply crowded out ([Vuri, 2016](#)).

¹The term “Aboriginal” is usually not used in an international context, however we use it here for consistency with the Canadian context, and because of its use in the Canadian Constitution and in the programs we study ([Feir and Hancock, 2016](#)).

Traditionally, Inuit children are brought up by the entire community, with grandparents playing a key role in child rearing (Ekho and Ottokie, 2000; NCCAH, 2010). Inuit children are also more likely to live in households with extended family or with other families (Statistics Canada, 2014). For these reasons, we might expect that introducing childcare services into Inuit communities would have a limited impact on labour force participation, because both the cultural importance of extended family involvement in raising children and the availability of low cost childcare would result in parents not using formal services. Alternatively, the introduction of childcare services may simply crowd out previously used informal services, such as grandparents, resulting again in no change in labour force participation.

Even if extended family care has become less important, as implied by Collings (2000), it is not clear that Inuit and non-Aboriginal people would show similar responses to policy changes. Aside from the importance of grandparents in Inuit cultures, we might also expect responses to differ between these groups because the Inuit tend to live in remote, rural locations in Canada's north; have their own unique cultural, linguistic and political history (Bonesteel, 2006; Uribe, 2006); a significantly different economic environment (Duhaime and Caron, 2006); a complex, and often challenging, relationship with the Government of Canada (Bonesteel, 2006; Uribe, 2006); and, on average, worse socio-economic outcomes (NAEDB, 2012).²

To estimate the impact of introducing childcare in Inuit communities on labour force participation, we use a difference-in-differences framework, similar in spirit to Baker et al. (2008). However in our context the treatment is the number of years of exposure to childcare availability within communities multiplied by the number of childcare spaces per 100 children aged 0-5 years. We use repeated cross-sectional data from the 1996, 2001, and 2006 confidential long-form census files. Those individuals with children who were young enough to have access to the childcare services are the "treatment group," i.e.,

²For the same reasons, we cannot expect the three constitutionally recognized Aboriginal identity groups in Canada, namely the Indians (or First Nations), Inuit and Metis, to show similar responses to policy change (NAEDB, 2012, p. 3).

those potentially affected by policy. Those who are 18-45 years of age and have children who were too old to have access to the childcare services are the “control group,” i.e., individuals who could not have been affected by the policy. We adapt this estimation strategy to the Inuit context by focusing on households rather than nuclear families as has been done in non-Aboriginal contexts.

We find that the introduction of childcare services in Inuit communities increased labour force participation of single-adult households. In particular, a one standard deviation increase in the treatment increases labour force participation in single-adult households by 3.6 percent. In contrast, we find insignificant effects for households with more than one adult present. While the result for multi-adult households may point toward crowding out effects, we do not find any evidence of reduced hours spent in unpaid childcare. If anything, there is evidence that time spent in unpaid childcare increases in multi-adult households. This would be in line with research in non-Aboriginal communities where other head start programs were implemented ([Love et al., 2005](#); [Webster-Stratton, 1998](#)).

This paper will proceed as follows. Section 2 provides a brief background on the Inuit in Canada, and the Aboriginal early childhood education policies that led to the introduction of childcare in many northern communities. Section 3 discusses previous literature. Section 4 provides an overview of the data sources. Section 5 presents the empirical methodology and section 6 presents the results. Section 7 discusses some of the limitations in this work and directions for future research.

2 Background on the Inuit Peoples in Canada, and Childcare Provision in the North

2.1 Inuit Peoples in Canada

Canada’s Constitution recognizes three Aboriginal heritage groups: “Indians”, Inuit, and Metis. These are three distinct groups with unique cultural practices, languages, histories, and spiritual beliefs, as well as diverse economic conditions and developmental needs (NAEDB, 2012). There were 1,400,685 Aboriginal people in Canada in 2011, or about 4.3 percent of the total Canadian population. Of this, 851,560 people identified as First Nations, 451,795 as Metis, and 59,445 as Inuit.

This paper focuses on the Inuit context. The Inuit are descendants of the Aboriginal people of Inuit Nunangat, which is located in the Canadian arctic and subarctic, including northern Quebec and Labrador (Feir and Hancock, 2016). There are 53 Inuit communities recognized by the Canadian state in Inuit Nunangat (Bird, 2011). Inuit Nunangat is composed of four regions based on land claims agreements: Nunavik in northern Quebec, Nunatsiavut in Labrador, the Inuvialuit region in the Northwest Territories, and Nunavut. Figure 1 shows a map of the Inuit Nunangat regions of Canada.

We have received consent to use data on the number of childcare centres in Nunavik (northern Quebec) and Nunavut, and thus this work focuses explicitly on these regions. According to Statistics Canada data, these two regions comprise over 80 per cent of the population in Inuit Nunangat, with the Inuit representing more than 85 percent of their respective total populations.

The Inuit have traditionally lived in family groupings, and there continues to be a high share of multi-family and multi-generational households with as many as five generations in one home (Knotsch and Kinnon, 2011; Statistics Canada, 2014). In 2006, 18 percent of the Inuit lived in multi-family or multi-generational dwellings, compared with 4 percent of the non-Aboriginal population (Statistics Canada, 2014). Multi-generational households

Figure 1: Map of Inuit Nunangat Regions



Source: Geography Division, Statistics Canada.

are most common in Nunavik, where 21 percent of Inuit children less than 6 years of age lived in households that included their parents and grandparents (Statistics Canada, 2008).

Inuit families are also typically much larger than non-Aboriginal families. In 2006, 31 percent of Inuit children lived in families with at least three other children in the household, while only eight percent of non-Aboriginal children did (Statistics Canada, 2008).³

Finally, in traditional Inuit culture, extended family members, and often the entire community, participate in raising children, with grandparents playing a key role in their upbringing (Ekho and Ottokie, 2000; NCCAH, 2010). As Collings (2000) noted, there are forces playing against traditional Inuit culture. In particular, we might expect that settlement life has diminished the role of grandparents and the community in raising a child, and increased the importance of peers. Even if this is the case, the 2006 Aboriginal Peoples Survey suggests that there is still a significant amount of involvement from grandparents and the community, with 71 percent of Inuit children receiving focused attention from their grandparents at least once a week, and 35 percent receiving focused attention from Elders at least once a week (Statistics Canada, 2008).

For the reasons outlined above, it is unclear whether the introduction of childcare services will have an effect on labour force participation in Inuit communities. It is entirely possible that the services simply crowded out previous forms of childcare from grandparents, elder children, extended family members, or other household members. It is also entirely possible that the childcare services are not used widely because of the cultural importance of grandparents and Elders in raising children.

³This is relatively unsurprising given that Inuit women had significantly higher fertility rates than the Canadian average over the 1996-2001 period: 3.4 children per Inuit woman, compared to 1.5 children per average Canadian woman.

2.2 Aboriginal Early Childhood Education

The introduction of childcare services in Inuit communities in Canada can be traced back to two important federal programs concerning Aboriginal early childhood education, namely the First Nations and Inuit Childcare Initiative, and Aboriginal Head Start in Urban and Northern Communities.⁴ In this paper, we do not distinguish between the two programs. Future research that separately identifies the impact of each of these programs is a useful future area for research.

2.2.1 First Nations and Inuit Child Care Initiative

The federal government introduced the First Nations and Inuit Child Care Initiative (FNICCI) in 1995 to support labour market development in Aboriginal communities through licensed child care (ITK, 2014, p. 5). The main goal was to establish a level of childcare accessibility for First Nations and Inuit communities comparable to that of other Canadian children under the age of six. The FNICCI aimed to create 6,000 quality childcare spaces in Inuit and First Nations communities within a three-year transitional phase (between 1995 and 1998) by improving the quality of existing spaces, creating new spaces, and supporting the operation of these spaces. Of these 6,000 spaces, 625 were to be opened in Inuit communities. The initiative provided \$72 million dollars for the three-year transitional phase, and \$36 million per year afterward (Thomas, 2016, p. 61).

In 1999-2000 the FNICCI program gave support for childcare centres in 390 communities (Government of Canada, 2014). This fell slightly to 389 communities in 2000-2001 through 2002-2003, and then increased between 2003-2004 and 2005-2006 to 407 communities. Over this time frame, the total number of spaces offered increased from less than 7,000 in 1999-2000, to 7,000 in 2000-2001, and 7,500 in 2003-2004. By 2008-2009, the FNICCI program provided support to more than 450 childcare facilities located on-reserve or in Inuit communities across Canada amounting to 8,500 spaces or more, with

⁴There are other Aboriginal childcare programs offered at the provincial level in Ontario, Alberta and New Brunswick. However, these programs are not relevant for Inuit communities in Quebec and Nunavut.

most of these childcare spaces available to children under six years of age ([HRSDC, 2012](#)). One year later, in 2010, [Bird \(2011\)](#) states that the FNICCI program supported 462 sites for 8,538 children.

2.2.2 Aboriginal Head Start in Urban and Northern Communities

Aboriginal Head Start in Urban and Northern Communities (AHSUNC) launched in 1995 as a comprehensive early childhood development program for First Nations, Inuit, and Metis children and their families living in urban centers and large northern communities. The primary goal of the program is to mitigate inequities in health and developmental outcomes for Aboriginal children by supporting early intervention strategies that cultivate a positive sense of self, a desire for learning, and opportunities to develop successfully as young people. Sites typically offer the programming for Aboriginal children aged 2 to 6 years, focusing on Aboriginal culture and language, education and school readiness, health promotion, nutrition, social support, and parental involvement. There were 129 AHSUNC sites across Canada in 2008-2009 providing about 4,800 children with childcare services ([HRSDC, 2012](#)), while in 2010, there were 140 preschool programs ([Bird, 2011](#)). In 2017, there were 7 AHS programs in Nunavut.⁵ These may have been integrated with the introduction of new childcare centres that were constructed as part of FNICCI.

3 Literature Review of Childcare and Labour Force Participation

The current evidence is mixed concerning the impact of the availability of childcare on labour force participation and employment. In particular, some research finds that introducing childcare services simply crowded out previously used non-parental forms of childcare, resulting in no increase in labour force participation or employment, while

⁵These programs were in Arctic Bay, Arviat, Coral Harbour, Gjoa Haven, Igloodik, Kugluktuk, and Taloyoak.

other research finds increases in labour force participation in response to the introduction of childcare services. The prevailing consensus is that the impact depends highly on the existing labour market conditions, the institutional context, and the childcare characteristics (Vuri, 2016, p. 7).

For example, some studies find that the responses depend heavily on the marital status of the mother and the age of the children. Fitzpatrick (2012) used U.S. census data and found that single mothers with children enrolled in kindergarten did not increase their labour supply if they had children in other age groups. In contrast, single mothers with no other young children did increase their labour supply. Cascio (2009) also used U.S. data to show that an important policy experiment that expanded childcare availability in the United States in the mid-1960s to the late-1970s did not increase the labour supply of married mothers or of single mothers with children aged 5 years and younger, but did increase the labour supply of single mothers without children of this age. Using the implementation of a childcare policy in the mid-1990s in France, Goux and Maurin (2010) show that childcare availability had a significant impact on employment of single mothers, but not mothers in two-parent families. The impact on mothers with children aged 2 years was much smaller than that of mothers with children aged 3 years. They argue that this response is largely a function of the structure of eligibility for family benefits, which expire when children are 3 years of age.

In sharp contrast to these moderate results, Berlinski and Galiani (2007) showed that the Argentinian construction of free childcare facilities in the 1990s had a significant large positive effect on maternal employment. In addition, Chevalier and Viitanen (2002) use UK data from 1992-1999 and provides suggestive evidence that increases in childcare accessibility increases labour force participation.

Other authors have also found strong positive labour supply effects. For example, Nollenberger and Rodriguez-Planas (2015) use the introduction of universal full-time pre-primary school for children aged 3 years in the 1990s in Spain and find important implications for maternal employment without any evidence of crowding out of informal

care. In Italy, [Brilli et al. \(2016\)](#) use data on public childcare availability and find significant positive effects of childcare availability on maternal employment. In particular, a one percentage point change in public childcare coverage increases a mother's probability of working by 1.3 percentage points. Finally, in Canada, [Baker et al. \(2008\)](#) find that introducing universal childcare in Quebec increased maternal employment in Quebec relative to the rest of Canada.

In contradiction to the above results, [Kreyenfeld and Hank \(2000, p. 334\)](#) find no significant effect of the regional provision of public daycare on female labour force participation in Western Germany. In Japan, [Asai et al. \(2015\)](#) finds no significant effect of childcare availability on maternal employment. Instead, they find a crowding out effect, with grandparents providing less childcare services and families being less likely to live with their grandparents. [Havnes and Mogstad \(2011\)](#) find similar results in Norway. In particular, they find that despite the strong correlation between maternal employment and childcare, there is little, if any, causal effect of childcare on maternal employment. In fact, they find that instead of increasing mothers labour supply, the [new universal accessible childcare] mostly [crowded] out informal care arrangements ([Havnes and Mogstad, 2011, p. 2](#)).

The divergent responses to the introduction of childcare across countries suggest that contextual factors may play an important role in decision-making regarding childcare. In particular, the choice to use childcare services may not be solely determined by cost or availability. Instead, social norms may inform the choices of parents and guardians regarding childcare. For example, some countries and cultures may have strong traditional gender roles or may opt to use informal childcare, such as childcare provided by grandparents or relatives, instead of public or private childcare ([Vuri, 2016](#)).

Since contextual factors appear to play such a key role in determining policy responses to the introduction of childcare, we cannot expect that the response in communities in northern Canada, which have a unique cultural, social, and economic environment, can be easily mapped to non-Aboriginal responses *ex ante*. For this reason, this paper explores

whether or not the particular contextual factors in Inuit Nunangat, namely multi-family households and the importance of Elders in raising children, led to increases in labour supply in response to the introduction of childcare services, or whether there was no change in parental labour supply, either due to crowding out of informal childcare services or because of traditional cultural norms.

4 Data on Childcare Availability and Labour Force Participation

4.1 Childcare Centre Opening Dates and Childcare Spaces

For 26 communities in Nunavut, we obtained data on the opening dates of childcare centres, the type of program offered (e.g., AHS), and their respective number of childcare spaces from the Government of Nunavut.⁶ For each of the 14 Inuit communities in northern Quebec, we obtained the same data from the Government of Quebec.⁷

The data for both Nunavut and Quebec suggest that the introduction of childcare occurred in the late-1990s to early-2000s in the majority of communities, although there are five communities in Nunavut and one community in Quebec that had childcare prior to 1992 and four communities in Nunavut that still did not have childcare by 2011-2012.

There are also Inuit communities in the Northwest Territories and in Newfoundland and Labrador. This is not a large concern given that there are only 5 Inuit communities in Labrador and 7 Inuit communities in the Northwest Territories, compared to 14 communities in Quebec and about 30 communities in Nunavut.⁸

There are two main challenges with this data. First, the opening dates for the childcare centres and the number of childcare spaces are provided by single years in northern

⁶We corresponded with the Early Childhood Development Manager in the Department of Education.

⁷We corresponded with the Aboriginal Affairs Coordinator in the Accessibility and Quality of Child-care Branch of the Ministry of the Family.

⁸We only use data on 21 Inuit communities in Nunavut and 13 communities in Quebec. Some Inuit communities have been excluded because we either do not have data on the opening date of the first childcare centre, or because the earliest opening date is prior to our earliest census year.

Quebec (e.g., 1999), while the opening dates for childcare centres and the number of childcare spaces are provided by school years in Nunavut (e.g., 1997-1998). To convert school year data to single year data for both childcare opening dates and the number of childcare spaces, we chose to use the date the school year ends. Given that the census is conducted in May, the impact of the childcare centre will not be captured if we use the former year since the school year starts in September.

Second, we have information only on the number of childcare spaces for 2005 and 2017 in northern Quebec, while we have information on the number of childcare spaces in Nunavut by community for all relevant years (1992-2011). Thus, for northern Quebec, we assume that, for each community, the number of childcare spaces observed in 2005 applies to all years after the opening of a legal childcare center. For Nunavut, we simply calculated the average number of childcare spaces available from the opening date to the relevant census year.⁹

4.2 1996, 2001, and 2006 Census

For labour force participation and our covariates, we use repeated cross-sectional data from the 1996, 2001, and 2006 confidential long-form census files. Table 1 presents the average community size, and the community level means both before and after the introduction of childcare services for (1) labour force participation, (2) age, (3) the share of high school graduates, (4) the number of children per household, and (5) the number of adults per household.

While not reported here, we find that there are significant differences at the 10 percent level between labour force participation rates before and after the introduction of childcare for 15 of the 34 Inuit communities in our dataset. Some of these differences are negative, suggesting labour force participation decreased post-treatment. However, on average, as Table 1 shows, there is no change in labour force participation after the introduction of

⁹Again, we used the latter half of the school year to match our data to census years because the census is conducted in May.

Table 1: Descriptive Statistics

	Before	After	Difference
Participation Rate	0.638 (0.08)	0.637 (0.092)	-0.001 (0.021)
Age	33.78 (1.29)	34.39 (1.219)	0.615 (0.304)
Share of HS Grads	0.302 (0.069)	0.324 (0.074)	0.022 (0.017)
# of Kids	2.66 (0.269)	2.68 (0.368)	0.018 (0.079)
# of Adults	2.46 (0.389)	2.36 (0.444)	-0.094 (0.101)
Average Size		425 (349)	

Notes: In the first two columns the average community level mean or proportion is in the first row with its standard deviation in below in parenthesis. In the third column it is the difference between the means before and after the increase in the number of childcare spaces. There are 34 communities in total. In the computation for the proportion was computed by rounding the number in the numerator to the nearest 5 and then divided by the denominator which was also rounded to the nearest 5. Then the average was taken across communities. The average community population size was computed after population sizes in each community were rounded to 100.

childcare services for these communities.

For the other variables, we also find significant differences within individual communities. For example, the number of children per household changed significantly in 15 out of 34 communities, with some positive and some negative differences. However, again on average there is no change. In addition, the number of adults per household changed significantly in 13 out of 34 communities, with declines in the majority of cases, but the change on average is small. Finally, the share of high school graduates increased significantly in 10 out of 34 communities, declining significantly in one, but on average the increase in share of high school graduates is not statistically significant.

5 Method

We follow a common empirical strategy in the literature on the effect of childcare on female labour force participation known as difference-in-difference estimation ([Baker et al.](#),

2008). We estimate models of the form:

$$\begin{aligned}
Y_{ict} = & \alpha + \beta(EXPOSURE * SPACES)_{ict} + \gamma(EXPOSURE)_{ict} \\
& + \delta(SPACES)_{ct} + \theta(CSD)_c \\
& + \rho(NUMKIDS)_{ict} + \eta(AGE)_{ict} \\
& + \omega(YEAR)_t + \pi(HSGRAD)_{ict} + \varepsilon_{ict}
\end{aligned} \tag{1}$$

where i indexes the individual, c indexes the census subdivision, and t indexes time. In this specification, Y is the outcome variable (either an indicator for labour force participation or the number of adults in the household), $EXPOSURE$ measures the individual's number of years of exposure to childcare services,¹⁰ $SPACES$ is the number of childcare spaces per 100 children aged 0-5 years, $NUMKIDS$ is the number of children in the household, AGE is the individual's age, and $HSGRAD$ is an indicator variable for whether a respondent graduated high school. CSD and $YEAR$ capture year and census subdivision fixed effects. The observations are clustered at the community-level, resulting in 34 clusters. We estimate a linear probability model. In this model, we are interested in β , the coefficient on the interaction of exposure and the relative number of spaces.

For this strategy to estimate the effect of access to childcare on labour force participation, we need two assumptions to hold. First, it must be that in the absence of the roll-out of additional childcare centers, individuals with children young enough to have

¹⁰ We calculated our exposure variable as follows. We first noted that the maximum number of years of exposure is 6 years (0 to 5 years of age). Second, we calculated the number of years between the census date and the opening date of the childcare centre (cd_od). If the age of the household's youngest child was less than or equal to 6 years and less than or equal to cd_od , we coded exposure as the child's age. If the age of the household's youngest child was greater than 6 years but less than or equal to cd_od , we coded exposure as 6 years. If the age of the household's youngest child was equal to cd_od+1 , we coded exposure as 5 years; cd_od+2 , we coded exposure as 4 years; cd_od+3 , we coded exposure as 3 years; cd_od+4 , we coded exposure as 2 years; or cd_od+5 , we coded exposure as 1 year. If the age of the household's youngest child was any other age, we coded exposure as 0. This is our household-level treatment. We also created an exposure variable based on the age of the mother's youngest child. This is our individual-level treatment. These are not always identical since many households contain more than one family.

access to the childcare centers would have otherwise had similar trends in labour force participation as those with children too old to have had access to the childcare centers, once differences in age are accounted for. Second, only those with young enough children in our sample to attend the childcare centres are affected by the availability of the childcare centres. For example, if the introduction of childcare centres provides substantially more employment in a community than would have existed otherwise, then those without children or children in their households could be affected by the policy, and our estimation strategy would not provide an accurate estimate since the policy would also affect our control group.

6 Results

As noted above, there are often many families per household in these Inuit communities, so we focus on the results that are based on a household-level treatment variable.¹¹ In particular, an individual is treated if there are children in the household that are young enough to be exposed to childcare services, whether or not the children belong to that individual. By using this specification, we are trying to capture the effect of introducing childcare services on the labour force participation of parents, but also of relatives or roommates, who may have been constrained from participation because they were previously engaged in caring for children. For all of our results, we focus on individuals aged 18-45 years living in households with children under 18 years of age.

Column 1 in Table 2 shows that for all households, our treatment variable is insignificant. However, there are likely to be heterogeneous treatment effects according to household structure. In particular, we might expect no effect on households with more than one adult present because of the crowding out effect, while we might expect a strong effect on households with only a single adult present. Column 2 and Column 3 show that this is indeed the case: there is a significant and strong positive effect for households with

¹¹ For results that are based on an individual-level treatment variable, see Table A1.

only a single adult, while there is an insignificant effect for households with more than one adult present. This provides some evidence in favour of the crowding out effect for multi-adult households.

To understand the magnitude of this impact, we note that the standard deviation of our treatment is 37.0 for single-adult households, which implies that a one standard deviation increase in our treatment variable increases labour force participation among single-adult households by 3.6 percent.

Our model also returns the expected coefficients on the covariates. In particular, we find that the coefficient on the indicator for males is positive, the coefficient on the number of children is negative, the coefficient on age is positive, and the coefficient on the indicator for high school graduation is positive.

The concern with splitting the sample by household structure is that the number of adults in the household might be endogenous. For example, after the introduction of childcare, individuals may be able to move out of multi-family, multi-generational households because they obtain employment and they can afford to live in their own dwelling, or because they no longer need childcare services, or both. Column 4 provides evidence that, in fact, the number of adults in the household does not respond significantly to the introduction of childcare, so endogeneity of household structure is not a concern in our research design. This is likely because there is limited infrastructure and housing in northern Inuit communities.

Another concern with the results in Table 2 might be that individuals are choosing to migrate to communities that introduced childcare services. To determine whether this is a concern, we run the exact same regressions as in the previous table, but restrict our sample to those individuals who were living in a different census subdivision prior to the introduction of childcare services in their current census subdivision. For our subsample, we focus on those individuals who were living in a different census subdivision 5 years ago.¹² However, it is still possible that individuals could have moved to the census

¹² The census data also contain a variable indicating whether individuals were living in the same

Table 2: Impact of the Introduction of Childcare Services on Labour Force Participation in Inuit Communities

Dependent variable	Labour force participation			Number of adults
	(1)	(2)	(3)	(4)
Treatment: Exposure	0.0001	0.0010**	0.0001	0.0002
x Relative # of Spaces	(0.0001)	(0.0004)	(0.0001)	(0.0005)
Exposure	0.0041	-0.0281**	0.0059	-0.0495***
	(0.004)	(0.0122)	(0.0041)	(0.0141)
Relative # of spaces	-0.0005	0.0025	-0.0007	-0.0012
	(0.001)	(0.0024)	(0.001)	(0.0029)
Male	0.1004***	0.0801*	0.103***	0.2318***
	(0.0141)	(0.0448)	(0.0146)	(0.0207)
Number of children	-0.0131***	-0.0035	-0.0129***	0.1983***
	(0.0032)	(0.0161)	(0.0033)	(0.0154)
Age	0.012***	0.0046*	0.0122***	-0.0424***
	(0.0009)	(0.0024)	(0.0009)	(0.003)
High school graduate	0.1687***	0.1671***	0.1687***	-0.1526***
	(0.0105)	(0.0395)	(0.0102)	(0.0324)
Constant	0.2306***	0.3345**	0.2279***	3.3121***
	(0.0496)	(0.1385)	(0.0514)	(0.1639)
Rounded observations	11,800	700	11,200	11,800
R-squared	0.12	0.14	0.12	0.18
CSD fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Sample	All households	Single adults	Multi-adult	All households

*Note: These results are for individuals aged 18-45 years with children under the age of 18 years. The base category female and the base year is 1996. Exposure is the number of years of exposure to childcare services. For example, a woman with a child born shortly after the introduction of childcare services would have 6 years of exposure (ages 0-5 years), while a woman with a child 5 years of age at the time of the introduction would have only 1 year of exposure. The relative number of spaces measures the number of childcare spaces per 100 children aged 0-5 years in each community. The treatment, which is exposure multiplied by number of spaces, is coded at the household level: all individuals received the treatment if there was a child in the household that was eligible for childcare services, whether or not the child belonged to them. Columns 1 and 4 include all individuals in all households. Column 2 focuses on individuals in single-adult households. Column 3 focuses on individuals in multi-adult households. CSD is the census sub-division. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

subdivision prior to the introduction of the childcare centre. In particular, it is possible that the childcare centre was introduced one year prior to the census, while the individual moved to the census subdivision four years prior to the census. Nevertheless, we report the results for migrants from the last five years in Table 3. We find small, statistically insignificant coefficients across both single- and multi-adult households, which suggests that migration for the benefit of childcare services is not a major concern.¹³

The other concern with the results in Table 2 is that there may simply be general employment effects because of the introduction of childcare services in the community. In particular, in these small communities, the introduction of a childcare centre could create many new jobs both directly and indirectly, such that previously discouraged workers rejoin the labour force. To understand whether this effect is a concern, we run regressions on individuals aged 18-45 years without children using the absolute number of childcare spaces in the community as the treatment variable. We use the absolute number of spaces, as opposed to the relative number of spaces, since it is more relevant for measuring increases in employment opportunities.

The results in Table 4 do not provide strong evidence in favour of general equilibrium effects. In the case of households with more than one adult, but still no children, we actually find evidence that the introduction of childcare services led to a decrease in labour force participation. If this not a statistical anomaly, it could plausibly explain why we do not find an positive effect of childcare accessibly for multi-adult households and thus these results should be taken with a reasonable degree of caution.

Finally, in every difference-in-differences research design, there is always the concern that the assumption of parallel trends is violated. To determine whether this is a signifi-

census subdivision 1 year ago. In future research, it would be better to leverage both the 1-year and 5-year migrant status variables to ensure that our migrant sample is only capturing those individuals who moved to the census subdivision after the introduction of childcare. For example, from the point of view of the year 2000, if a childcare centre were introduced in 2000, it would be more appropriate to use the variable for census subdivision of residence 1 year ago, while if a childcare centre were introduced in 1997, it would be more appropriate to use the variable for 5 years ago.

¹³The estimated effect is half the size of the estimated effect for the full sample for single-adult households.

Table 3: Impact of the Introduction of Childcare Services on Labour Force Participation in Inuit Communities, Migrants to the Census Subdivision

Dependent variable	Labour force participation		
	(1)	(2)	(3)
Treatment: Exposure	0.0003	0.0005	0.0003
x Relative # of Spaces	(0.0003)	(0.0017)	(0.0003)
Exposure	-0.0126	-0.0053	-0.0128
	(0.0123)	(0.0853)	(0.0128)
Relative # of spaces	-0.0027**	0.0058	-0.0033**
	(0.0012)	(0.0077)	(0.0013)
Male	0.1589***	0.0215	0.1675***
	(0.0186)	(0.1459)	(0.0216)
Number of children	-0.0198**	0.0165	-0.0201***
	(0.0094)	(0.0692)	(0.0095)
Age	0.0078***	0.0114	0.0078***
	(0.0015)	(0.0073)	(0.0015)
High school graduate	0.1588***	0.207	0.1551***
	(0.0211)	(0.1254)	(0.0219)
Constant	0.4245***	-0.1544	0.439***
	(0.0818)	(0.3883)	(0.083)
Rounded observations	1,400	100	1,300
R-squared	0.15	0.37	0.15
CSD fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sample	All households	Single adults	Multi-adult

*Note: These results are for individuals aged 18-45 years with children under the age of 18 years who migrated to their current census subdivision (CSD) within the last five years. The base category female. The base category female and the base year is 1996. Exposure is the number of years of exposure to childcare services. For example, a woman with a child born shortly after the introduction of childcare services would have 6 years of exposure (ages 0-5 years), while a woman with a child 5 years of age at the time of the introduction would have only 1 year of exposure. The relative number of spaces measures the number of childcare spaces per 100 children aged 0-5 years in each community. The treatment, which is exposure multiplied by number of spaces, is coded at the household level: all individuals received the treatment if there was a child in the household that was eligible for childcare services, whether or not the child belonged to them. Column 1 includes all individuals in all households. Column 2 focuses on individuals in single-adult households. Column 3 focuses on individuals in multi-adult households. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 4: Impact of the Introduction of Childcare Services on Labour Force Participation in Inuit Communities, Individuals with No Children

Dependent variable	Labour force participation		
	(1)	(2)	(3)
Absolute number of spaces	-0.001 (0.001)	0.002 (0.002)	-0.002* (0.001)
Male	-0.014 (0.02)	-0.034* (0.02)	-0.009 (0.026)
Age	0.006*** (0.001)	0.002 (0.002)	0.007*** (0.002)
High school graduate	0.281*** (0.02)	0.212*** (0.03)	0.307*** (0.025)
Constant	0.449*** (0.043)	0.546*** (0.083)	0.416*** (0.059)
Rounded observations	2,400	900	1,500
R-squared	0.17	0.14	0.20
Census subdivision fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Sample	All households	Single adults	Multi-adult

*Note: These results are for individuals aged 18-45 years with no children. The base category female. The base category female and the base year is 1996. The absolute number of spaces measures the absolute number of childcare spaces in each community. Column 1 includes all individuals in all households. Column 2 focuses on individuals in single-adult households. Column 3 focuses on individuals in multi-adult households. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

cant concern in our research design, we follow the same strategy as Duflo (2001). The idea is that among subgroups of the non-affected cohorts (i.e. mothers with children above the eligible age), we should observe no differential trends in labour market decisions.

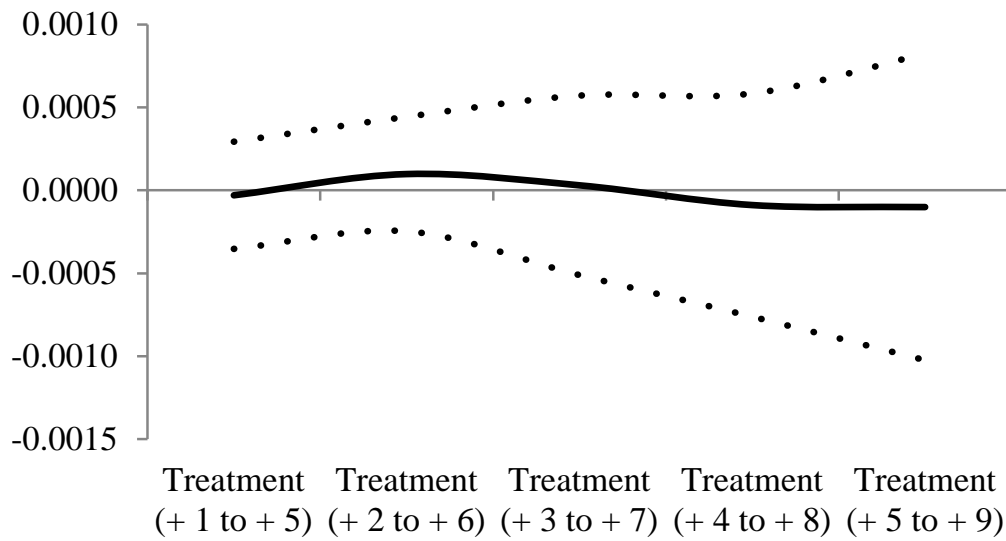
Our methodology is as follows. First, we create a cohort of individuals with children who are between one year and five years older than the eligible age and consider them as the treatment group. We also create a cohort of individuals with children who are between six years and ten years above the eligible age and consider them as our control group. Second, we run the exact same regressions as in Table 2. We repeat this same test five times adding one year to our cutoff brackets each time. If our coefficients are insignificant, close to zero, and relatively unchanged across all cohorts, then we have some support in favour of our research design.

We find that our results are insignificant at the 1 percent (Figure 2 through Figure 4) and the 5 percent level (Table A2). In addition, if we focus on the first two iterations (i.e., individuals with children who are one year to five years older than the eligible age and two years to six years older than the eligible age), we find that our coefficients are essentially unchanged and close to zero. We focus mainly on the first two iterations because these are our most reliable estimates. Our sample sizes shrink rapidly as we increase the age brackets for our treatment and control groups, and our estimates subsequently become extremely imprecise for all three regressions. This is likely because we are restricting our sample to individuals aged 18 to 45 years with children under the age of 18 years.

7 Extensions and Discussion

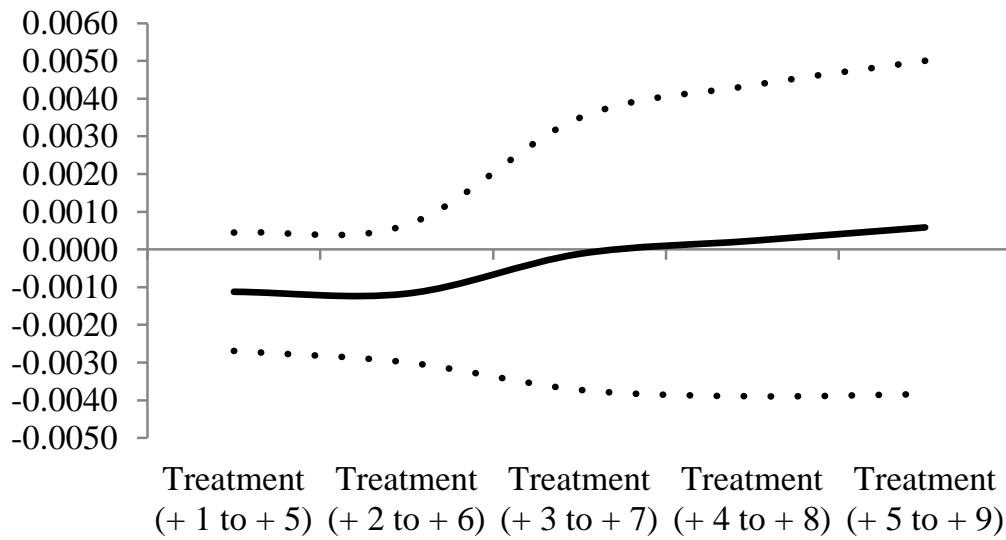
In order to better understand and contextualize the results presented above, we performed two extensions worth noting. First, above we raised the possibility that formal childcare services may be crowding out informal, extended family care. This would be in line with findings in the non-Aboriginal population where notable crowding out of informal childcare occurs (Asai et al., 2015; Baker et al., 2008; Havnes and Mogstad,

Figure 2: Non-Affected Cohorts as Treatment and Control Groups, All Households



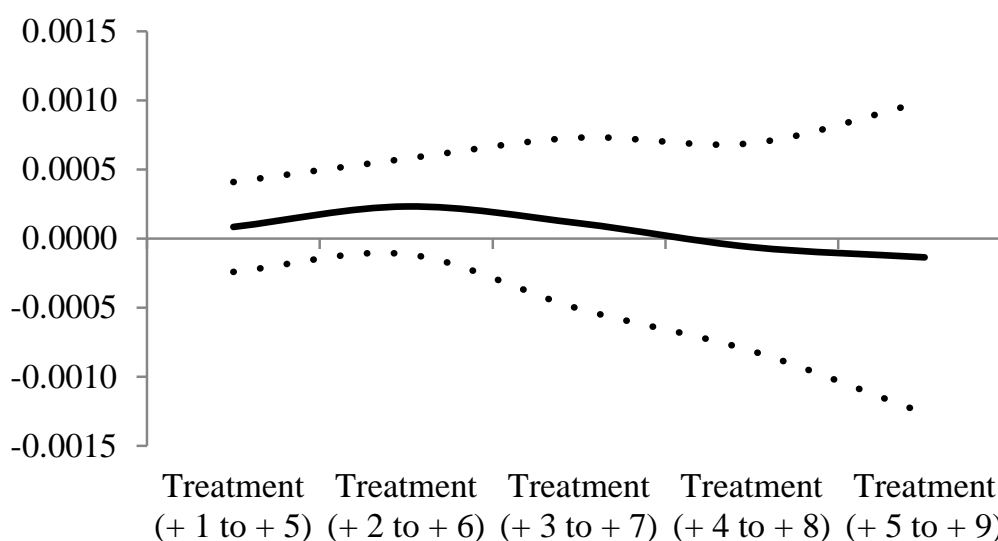
Note: these estimated coefficients are for individuals aged 18-45 years with children under the age of 18 years. See (Table A2 for detailed notes.

Figure 3: Non-Affected Cohorts as Treatment and Control Groups, Single-Adult Households



Note: these estimated coefficients are for individuals in single-adult households aged 18-45 years with children under the age of 18 years. See (Table A2 for detailed notes.

Figure 4: Non-Affected Cohorts as Treatment and Control Groups, Households with More than One Adult



Note: these estimated coefficients are for individuals in multi-adult households aged 18-45 years with children under the age of 18 years. See (Table A2 for detailed notes).

2011; Kreyenfeld and Hank, 2000). To analyze this possibility, we use information in the Census on the hours spent in informal childcare to determine whether they change within multi-person dwellings. Contrary to what we would have predicted if extended family care was being crowded out by formal childcare, there is no statistical evidence of household members spending less time in unpaid childcare. If anything, families are spending more time in childcare than previously (these results are presented in Table A3). One reason why we may see an increase in time spent with children among single adult households may be through programming in many childcare centres, like Head Start, which heavily encourages parental involvement (Aboriginal Head Start, 1998). Given that traditional forms of Inuit child rearing have been seen as providing a large degree of child autonomy and independence, more highly structured time with children through activities provided through the childcare centres may increase the perceived amount of active time in childcare among parents even if they engage in the labour force (Briggs, 1991). If there are

informational spillover effects on families that do not use the centres, then this could also more broadly increase the time spent in active play with children in communities. The finding that Head Start programming increases caregiver involvement with their children has been established in prior work, so these findings would not be unprecedented (Love et al., 2005; Webster-Stratton, 1998). However, further investigation of this in future qualitative work or more targeted surveys is worthwhile.

Second, since most of the previous work on the effect of the availability of childcare services has focused on the effects of maternal labour supply, we estimated our models separately for female and male members of the households. Most of the previous work motivated this in a non-Aboriginal context because of gender norms in childcare and relatively low female labour force participation rates (for example, labour force participation of women and men between the ages of 25 and 54 was roughly 76 percent and 93 percent respectively during the 1990s (Ferrao, 2011)). However, in the Inuit context, both male and female participation rates have significant margins for adjustment: the labour force participation rate of Inuit women and men between the ages of 25 and 54 was roughly 71 percent and 81 percent respectively. While the coefficient on the treatment variable was qualitatively larger for women, we find that there is no statistical difference in the effect of childcare accessibility on labour force participation between men and women. While this finding may be due to lack of statistical precision, it may be worth investigating in future qualitative work to see if lack of available childcare is also a major barrier to labour force participation for Inuit men.

This study has a number of limitations. First, it is strictly quantitative in nature, and given the currently available statistical information can only give broad insights that future community-engaged qualitative researchers may wish to investigate further. Second, the effect of childcare services will vary depending on several factors and our findings are specific to the context we study. For example, formal childcare costs vary by province and household structure, and we have averaged over these differences in this research. There may be important interactions between Quebec's low-fee childcare policy and the

introduction of childcare services in northern Quebec. This has not been addressed here. Third, there may have already existed unlicensed or documented childcare centres before the formal childcare centre was built in each community, and thus the effect of “formal” or “out of extended family” childcare may be underestimated. Finally, if either of our assumptions (i.e., no differences in trends between those families which had children young enough to be affected by childcare and those with children too old to be affected, and no spill-over effects in labour force participation rates) are violated, our findings cannot be interpreted as the causal effect of childcare on labour force participation. While we provide evidence that our assumptions hold, this evidence is only suggestive.

We believe there are many important areas for future research on the effect of the roll-out of the FNICCI and AHSUNC. Obviously, there are many important outcomes that may be affected by the roll-out of childcare services which we have not investigated. We have focused on labour force participation partially because of its importance, but also because it is consistently available. Other extremely important outcomes the roll-out of the FNICCI and AHSUNC may have influenced include children’s cognitive and non-cognitive abilities, language and cultural outcomes, and parental behaviors. These are the primary forces that motivated the creation of AHSUNC and should be studied more systematically in the future ([HRSDC, 2012](#)). Finally, we have only studied the Inuit context in selected communities in Inuit Nunangat. The increase in childcare availability from the FNICCI and AHSUNC affected many other Inuit and First Nations communities not included here. Future work should expand this analysis should the data become available.

8 Conclusion

We conclude that the introduction of formal childcare services through the FNICCI and the AHSUNC during the 1990s has increased the labour force participation of single-adult households in the Inuit communities for which data is available. However we do not find

obvious statistical evidence that the introduction of formal childcare services increased labour force participation in multi-adult households. Recent work by [Pauktuutit Inuit Women of Canada \(2016\)](#) that studied the barriers to labour force participation of Inuit women finds evidence that childcare accessibility is still a significant issue in Inuit Nunangat. While our findings suggest that there is hope for increases in childcare accessibility to have a significant effect on labour force participation, more still may need to be done.

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Table A1: Impact of the Introduction of Childcare Services on Labour Force Participation in Inuit Communities, Individual-Level Treatment

Dependent variable	Labour force participation			Number of adults
Treatment: Exposure	0.0002	0.001**	0.0001	-0.0008***
* Relative # of Spaces	(0.0002)	(0.0004)	(0.0002)	(0.0003)
Exposure	0.0028	-0.0285**	0.0047	-0.0437***
	(0.0046)	(0.0123)	(0.0048)	(0.0138)
Relative # of spaces	-0.0005	0.0024	-0.0008	-0.0009
	(0.001)	(0.0024)	(0.001)	(0.0029)
Male	0.1005***	0.0802*	0.1031***	0.2297***
	(0.014)	(0.0448)	(0.0146)	(0.02)
Number of children	-0.0131***	-0.0034	-0.0129***	0.1996***
	(0.0032)	(0.016)	(0.0033)	(0.0149)
Age	0.012***	0.0046*	0.0122***	-0.0425***
	(0.0009)	(0.0025)	(0.0009)	(0.003)
High school graduate	0.1686***	0.1672***	0.1687***	-0.149***
	(0.0105)	(0.0395)	(0.0102)	(0.0318)
Constant	0.2316***	0.3347**	0.2289***	3.3149***
	(0.0498)	(0.1384)	(0.0515)	(0.166)
Rounded observations	11,800	700	11,200	11,800
R-squared	0.12	0.14	0.12	0.19
CSD fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Sample	All households	Single adult	Multi-adult	All households

*Note: these results are for individuals aged 18-45 years with children under the age of 18 years. Exposure is the number of years of exposure to childcare services. For example, a woman with a child born shortly after the introduction of childcare services would have 6 years of exposure (ages 0-5 years), while a woman with a child 5 years of age at the time of the introduction would have only 1 year of exposure. The relative number of spaces measures the number of childcare spaces per 100 children aged 0-5 years in each community. The treatment, which is exposure multiplied by number of spaces, is coded at the individual level: individuals received the treatment if they had a child that was eligible for childcare services. Columns 1 and 4 include all individuals in all households. Column 2 focuses on individuals in single-adult households. Column 3 focuses on individuals in multi-adult households. CSD is census subdivision. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.*

Table A2: Appendix Table 5: Impact of the Introduction of Childcare Services on Labour Force Participation in Inuit Communities Coefficients on Treatment for Non-Affected Cohorts

	Labour force participation		
Treatment (+1 to +5)	-0.000030	-0.001122*	0.000084
Treatment (+2 to +6)	0.000098	-0.001171*	0.000232*
Treatment (+3 to +7)	0.000030	-0.000117	0.000111
Treatment (+4 to +8)	-0.000089	0.000230	-0.000062
Treatment (+5 to +9)	-0.000101	0.000584	-0.000136
Sample	All households	Single-adult	Multi-adult

*Note: these estimated coefficients are for individuals aged 18-45 years with children under the age of 18 years. We are focusing on non-affected cohorts. In other words, the treatment group in the first observation (treatment +1 to +5) is the cohort of individuals with children who were 1 year older than the eligible age for attending childcare services up to and including 5 years older than the eligible age. The remaining observations are defined similarly. The control group in each case is those individuals with children in the five-year age group above the corresponding treatment. For example, in the first observation, the control group includes those individuals with children who were 6 years older than the eligible age for attending childcare services, up to and including 10 years older than the eligible age. The treatment, which is exposure multiplied by number of spaces, is coded at the household level: all individuals received the treatment if there was a child in the household that was eligible for childcare services, whether or not the child belonged to them. Exposure is equal to six years for all individuals. The relative number of spaces measures the number of childcare spaces per 100 children aged 0-5 years in each community. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.*

Table A3: Impact of the Introduction of Childcare Services on Time Spent in Unpaid Childcare in Inuit Communities

Dependent variable	Unpaid Hours in Childcare	
	(1)	(2)
Treatment: Exposure	0.001	.0015**
* Relative #of Spaces	(0.002)	(.001)
Exposure	-0.068	0.0314
	(0.063)	(0.023)
Relative # of spaces	0.003	-0.0066394
	(0.014)	(0.005)
Male	-0.090	-1.210***
	(0.208)	(0.045)
Age	-0.043***	0.040***
	(0.011)	(0.003)
High school graduate	0.002	0.111***
	(0.145)	(0.036)
Rounded observations	700	11,200
R-squared	0.1494	0.1821
CSD fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Sample	Single adults	Multi-adult

*Note: These results are for individuals aged 18-45 years with children. The dependent variable is categorical and we use it as an index. The base category female. The base category female and the base year is 1996. We do not report the coefficients on community fixed effects or the base community because of concerns regarding confidentiality. Exposure is the number of years of exposure to childcare services. For example, a woman with a child born shortly after the introduction of childcare services would have 6 years of exposure (ages 0-5 years), while a woman with a child 5 years of age at the time of the introduction would have only 1 year of exposure. The relative number of spaces measures the number of childcare spaces per 100 children aged 0-5 years in each community. The treatment, which is exposure multiplied by number of spaces, is coded at the household level: all individuals received the treatment if there was a child in the household that was eligible for childcare services, whether or not the child belonged to them. Column 1 includes all individuals in all households. Column 2 focuses on individuals in single-adult households. Column 3 focuses on individuals in multi-adult households. CSD is census subdivision. The standard errors are clustered at the community-level, resulting in 34 clusters and are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*