



From the Food Mail Program to Nutrition North Canada: The Impact on Food Insecurity among Indigenous and non-Indigenous Families with Children

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Abstract

The federal government subsidizes the shipping of necessities to remote Northern communities, initially through the Food Mail Program and then Nutrition North Canada. Using the Canadian Community Health Survey and a difference-in-differences model, we find this change increased the probability of marginal and moderate/severe food insecurity by 8.9 and 7.1 points, on average. Additionally, it increased severe food insecurity among Indigenous families by 7.3 points. There was, however, variation across regions (those in Inuit Nunangat were inordinately impacted) and among families with children (the effects were larger, especially with respect to severe food insecurity among Indigenous families with young children).

Keywords

Northern Canada, Indigenous Peoples, Food Insecurity, Cost of Living, Policy, Subsidies

1. Introduction

Food insecurity is prevalent in Northern Canada, especially among Indigenous Peoples (Burton, Daley, and Phipps 2015; Egeland et al. 2010; Findlay, Langlois, and Kohen 2013). This has been attributed to a high cost of living, poverty, environmental change and contaminants, and diminished self-determination (Inuit Tapiriit Kanatami 2021). As one approach to address these issues, the federal government subsidizes the shipping of necessities to Northern communities that do not have access to year-round surface transportation, initially through the Food Mail Program and then Nutrition North Canada as of April 2011. Nutrition North Canada has been criticized for: (1) excluding goods that are important to Northern families (e.g., bottled water, diapers, equipment and supplies to harvest country foods) (Burnett, Skinner, and LeBlanc 2015; Galloway 2017); and (2) subpar monitoring as compliance reviews have not been conducted on a regular basis and they do not contain information needed to verify whether retailers are relaying subsidies to consumers (Galloway 2017; Office of the Auditor General of Canada 2014).

To our knowledge, there is just one quantitative analysis of how the policy change affected food insecurity; Fafard St-Germain, Galloway, and Tarasuk (2019) use an interrupted time series model to assess the impact on marginal food insecurity in Nunavut. We build on this study using a difference-in-differences model to estimate the impact of the policy change from the Food Mail Program to Nutrition North Canada on food insecurity across Northern communities. Three measures of food insecurity are considered, reflecting different degrees of severity, and we test for heterogeneity in the impact of the policy change between Indigenous and non-Indigenous families. Moreover, in addition to estimating the impact of the policy change on food insecurity across Northern Canada as a whole, we examine regional subsamples (i.e., the territories,

northern parts of the provinces, Inuit Nunangat) and subsamples of families with children of different ages.

On average, we find that moving from the Food Mail Program to Nutrition North Canada increased the probability of marginal and moderate/severe food insecurity in Northern communities. Indigenous families experienced an increase in severe food insecurity. There was, however, regional variation in our findings; the policy change reduced the likelihood of moderate/severe food insecurity among Indigenous families in the northern parts of the provinces (as discussed in section 3.1, our data do not include reserve-based First Nations communities), whereas there were sizeable increases in all measures of food insecurity among families in Inuit Nunangat. Finally, relative to the full sample, the detrimental impact of the policy change was heightened in the presence of children, especially among Indigenous families with young children (i.e., aged zero to five).

In what follows, we provide information about Northern Canada, including that related to economic well-being, food insecurity, and the policy setting. We then describe our contributions (section 2), followed by the data and methods used to achieve them (sections 3 and 4). Our results are presented in section 5. In section 6, we discuss and conclude.

1.1 Northern Canada

Northern Canada can be defined as the three territories (i.e., Yukon, Northwest Territories, Nunavut) and the northern parts of seven provinces above 50 degrees latitude (i.e., Newfoundland and Labrador, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British

Columbia) (Natural Resources Canada 2017).¹ In general, Northern communities are remote and sparsely populated. For example, the three territories comprise 40 percent of the Canadian landmass (this rises to almost two thirds when the northern parts of the provinces are included) and only 0.3 percent of the population (Natural Resources Canada 2017; Statistics Canada 2021). Moreover, there are notable demographic differences between Northern Canada and the rest of the country, especially in terms of age and Indigenous identity. In the territories, for example, 24 percent of the population is younger than 15, compared to 17 percent in the rest of Canada (Statistics Canada 2021). Moreover, Indigenous Peoples represent a large share of the population in the territories, ranging from 23 percent in Yukon to 86 percent in Nunavut, compared to five percent in the rest of Canada (Statistics Canada 2021).²

Northern Canada consists of both arctic and subarctic terrain, with limited access to year-round surface transportation. For example, only one percent of Canada's road network and 0.2 percent of the rail network are located in the territories. "The cold climate as well as the great distances and . . . small populations, make the construction and maintenance of road or rail infrastructure difficult" (Dunlavy, Lipai, and Baldwin 2009, 6). As a result, Northern communities tend to be reliant on marine and air transportation. Many communities receive non-perishable goods via sealift once per year when ice conditions allow. Perishable goods are shipped via air, as are non-perishable goods when sealift inventories are depleted (Simonsen 2016; Worden 2014).

¹ Some studies have used narrower definitions, focusing on the three territories (Burton, Daley, and Phipps 2015; Daley, Burton, and Phipps 2015) or northern parts of the provinces (Burnett et al. 2017; Burnett, Skinner, and LeBlanc 2015). Alternatively, some studies have focused on Inuit Nunangat, which consists of 51 Inuit communities in the Inuvialuit Settlement Region (Northwest Territories), Nunavut, Nunatsiavut (Northern Labrador), and Nunavik (Northern Quebec) (Duhaime and Édouard 2015; Findlay, Langlois, and Kohen 2013; Tait 2008).

² There are three Indigenous groups in Canada: First Nations, Métis, and Inuit.

1.2 Economic Well-Being in Northern Canada

The limited transportation infrastructure in Northern Canada contributes to a high cost of living.³ This has important implications for economic well-being and disparities relative to the rest of Canada. For example, Daley, Burton, and Phipps (2015) find that cost of living is 46 percent higher in the territories, and the poverty rate increases by 13 points when this is considered (i.e., from 14 to 27 percent). This is much higher than the poverty rate in the rest of Canada, which they estimate to be ten percent. Similarly, Duhaime and Édouard (2015) find that cost of living is 66 percent higher in Inuit Nunangat, and the poverty rate increases by 25 points when this is considered (i.e., from 19 to 44 percent).

It should be noted, however, that both studies use income-based measures of poverty, which do not accurately reflect economic well-being insofar as people procure goods and services through non-market activities, such as harvesting country foods and sharing. These activities are relatively common in Northern communities, especially among Indigenous Peoples. For example, approximately 70 percent of adults in Inuit Nunangat harvest country foods (e.g., caribou, seal, fish, berries) and 80 percent share them with others (Tait 2008). This would suggest that income-based measures of poverty understate economic well-being. On the other hand, harvesting activities require time and financial resources. For example, it is costly to buy and maintain snowmobiles and boats, as well as other equipment and supplies to harvest country foods (Chan et al. 2006; Tait 2008; Wakegijig et al. 2013). Moreover, harvesting activities have

³ It also reduces the availability of fresh produce and dairy products, and it contributes to poor food quality. For example, 82 percent of consumers in Northern communities report that retailers ‘sometimes’ or ‘often’ sell expired food. “More often than not, they [perishable goods] are close to rotten or rotten when they arrive” (Burnett et al. 2017, 337). These issues are exacerbated by limited competition; 54 percent of Northern communities have one full-service grocery store (Burnett et al. 2017), and a single retailer often provides grocery, pharmacy, fuel, and banking services (Galloway 2014).

been affected by changes in the environment (e.g., wildlife migration patterns, shorter ice and longer open water seasons, unpredictable weather), as well as changes in lifestyle and cultural practices (e.g., limited time for harvesting activities while engaged in paid work, increased consumption of market foods among younger generations) (Chan et al. 2006; Wakegijig et al. 2013). Thus, in the presence of harvesting activities and sharing, and changes therein, alternate measures of economic well-being may add context to income-based poverty estimates – such as access to health care, life expectancy, educational attainment, household crowding, and food insecurity (Inuit Tapiriit Kanatami 2018).

1.3 Food Insecurity in Northern Canada

In this study, we focus on food insecurity, which is defined as “the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so” (Health Canada 2020, para. 1). It is particularly prevalent among families in Northern Canada, especially Indigenous Peoples. For example, Burton, Daley, and Phipps (2015) find that 37 percent of Indigenous families in the territories ‘sometimes’ or ‘often’ worry about food, compared to ten percent of non-Indigenous families in Canada. Focusing on Nunavut, Egeland et al. (2010) find that 70 percent of Inuit preschoolers reside in households that are food insecure, about half of which are severely food insecure. This is consistent with Findlay, Langlois, and Kohen (2013), who find that find 33 percent of Inuit preschoolers in Nunavut (and 32 percent of those in Inuit Nunangat more broadly) have experienced hunger, which is often equated with severe food insecurity.

Food insecurity among Indigenous Peoples in Northern Canada is an important policy concern. In addition to reflecting disparities in economic well-being relative to the rest of the country, there are negative implications for physical and mental health (Che and Chen 2001; Willows et

al. 2011). Moreover, when considering child food insecurity, the impact is persistent and it extends to behavioural, cognitive, and social development (Ke and Ford-Jones 2015).⁴

Thus, policies and programs that reduce food insecurity in Northern Canada, especially among Indigenous Peoples, may mitigate broader disparities in health and economic well-being. There are many such efforts at the community, regional, provincial/territorial, and national levels (Council of Canadian Academies 2014).⁵ For example, the Northern Healthy Foods Initiative supports community-based initiatives to address food insecurity in Manitoba, including school programs, nutrition education, backyard greenhouses and poultry production, and efforts to stimulate harvesting activities (Northern Association of Community Councils 2020). Similarly, the Nuluq Project provides an interactive map of community-based initiatives to address food insecurity in Inuit Nunangat, including school programs, food banks, nutrition education, hunter support programs, and community freezers to facilitate sharing (Inuit Tapiriit Kanatami 2022). The evaluation of policies and programs aimed at reducing food insecurity in Northern Canada remains a priority area for research (Inuit Tapiriit Kanatami 2021).

1.4 Food Mail Program and Nutrition North Canada

In this study, we evaluate the impact of a national policy change – from the Food Mail Program to Nutrition North Canada – which affected subsidies intended to address the high cost of living

⁴More generally, there is evidence that low parental socioeconomic status is associated with poor child health (Case, Lubotsky, and Paxson 2002; Currie 2009; Currie and Moretti 2003; Currie and Stabile 2003). Moreover, poor child health perpetuates throughout the lifecycle, and it is associated with low socioeconomic status in later life (Almond 2006; Case and Paxson 2009; Currie 2009).

⁵While not specific to Northern Canada, past studies have examined the impact of income-based policies on food insecurity, focusing on vulnerable families. For example, there is evidence that an increase in social assistance benefits reduced food insecurity among recipients in British Columbia (Li, Dachner, and Tarasuk 2016) and Newfoundland and Labrador (Loopstra, Dachner, and Tarasuk 2015). Likewise, the Ontario Child Benefit reduced food insecurity among families that received the transfer (Tarasuk et al. 2019), as did the Universal Child Care Benefit at the national level (Ionescu-Ittu, Glymour, and Kaufman 2015). The latter had a larger impact on low-income families and lone parents. Also at the national level, McIntyre et al. (2016) find that food insecurity is lower among older low-income adults who are eligible for public pensions, compared to those who are not yet eligible.

and food insecurity in Northern communities. In what follows, we provide an overview of these programs, focusing on aspects that are most relevant to our study; refer to the appendix of Fafard St-Germain, Galloway, and Tarasuk (2019) for a comparison of these programs in tabular form.

From the late 1960s to March 2011, the Food Mail Program subsidized the shipping of eligible goods to communities that did not have access to year-round surface transportation.⁶ Facilitated by Canada Post, eligible goods were shipped via air such that nutritious perishable foods (e.g., fruits, vegetables, bread, milk, eggs) were subsidized at a higher rate than non-perishable foods (e.g., bottled water, pasta, rice, cereal, baking supplies, canned goods) and non-food necessities (e.g., diapers, personal hygiene products, equipment and supplies to harvest country foods).⁷ Non-nutritious foods were not subsidized.

In principle, families could place direct orders for eligible goods from approved suppliers, but the Food Mail Program was largely used by retailers. Compliance was reviewed annually by monitoring the prices of eligible goods and by visiting retailers unannounced (Burnett, Skinner, and LeBlanc 2015). There is evidence that retailers relayed 62 percent of subsidies to consumers, and the Food Mail Program reduced the prices of eligible goods by 15 to 20 percent, on average (Indian and Northern Affairs Canada 2009a). Of course, this varied across communities depending on the degree of remoteness and the range of goods offered by retailers. For example, the Food Mail Program reduced the price of a ten-pound bag of potatoes from \$14.99 to \$13.79 (eight percent) in the community of Kuujjuaraapik, Nunavik (Northern Quebec) and from \$37.59

⁶ There were 135 communities that met this criterion, located in the territories and northern parts of Newfoundland and Labrador, Quebec, Ontario, Manitoba, Saskatchewan, and Alberta. However, some communities opted out of the Food Mail Program because they received better shipping rates from independent carriers (Dargo 2008).

⁷ Nutritious perishable foods were shipped for \$0.80 per kilogram, plus \$0.75 per parcel. Non-perishable foods and non-food necessities were shipped for \$2.15 per kilogram in the territories and \$1.00 per kilogram in the northern parts of the provinces, plus \$0.75 per parcel (Dargo 2008).

to \$21.39 (43 percent) in the community of Gjoa Haven, Nunavut (Dargo 2008). Despite price reductions, an evaluation of the Food Mail Program concluded that eligible goods continued to be unaffordable for vulnerable families. Moreover, without a credit card, such families could not place direct orders, which would have reduced prices by an additional 25 percent compared to buying from retailers (Indian and Northern Affairs Canada 2009b). The evaluation also indicated that the cost of administering the Food Mail Program escalated from 1999 to 2009, likely due to increases in the demand for eligible goods and the price of fuel.

The Food Mail Program was replaced by Nutrition North Canada in April 2011, although an interim list of eligible goods was used until the end of September 2012.⁸ During our study period, Nutrition North Canada was available to communities that used the Food Mail Program in its final year – a total of 103 communities in the three territories and northern parts of Newfoundland and Labrador, Quebec, Ontario, Manitoba, and Saskatchewan.⁹ A full subsidy was available to 84 communities that shipped at least 15,000 kilograms in the final year of the Food Mail Program, whereas a partial subsidy was available to 19 communities that shipped between 100 and 14,999 kilograms (Fafard St-Germain, Galloway, and Tarasuk 2019; Galloway 2017). Nutritious perishable foods and commercially processed country foods were subsidized at a higher rate than non-perishable foods and non-prescription drugs, and subsidies varied across communities depending on the degree of remoteness.¹⁰ However, relative to the Food Mail

⁸ In anticipation of the policy change, many non-perishable foods and non-food necessities were excluded from the Food Mail Program as of October 2010.

⁹ This requirement was removed and additional communities were added to Nutrition North Canada in October 2016 (Fafard St-Germain, Galloway, and Tarasuk 2019).

¹⁰ The full subsidy ranged from \$1.20 to \$16.00 per kilogram for nutritious perishable foods, and from \$0.05 to \$14.20 per kilogram for non-perishable foods. The partial subsidy was \$0.05 per kilogram for all eligible goods and communities (Burnett, Skinner, and LeBlanc 2015; Fafard St-Germain, Galloway, and Tarasuk 2019). Notably, the partial subsidy was eliminated in October 2016, such that all communities now receive the full subsidy. Moreover, in January 2019, a higher subsidy was introduced for frozen fruits and vegetables, milk, and infant foods and formulas (Fafard St-Germain, Galloway, and Tarasuk 2019).

Program, there were considerable changes to the list of eligible goods (hence the use of an interim list during the transition period). For example, bottled water was no longer subsidized, even though many Indigenous communities in Northern Canada are regularly affected by ‘boil water’ or ‘do not drink’ advisories (Burnett, Skinner, and LeBlanc 2015; Inuit Tapiriit Kanatami 2020). Moreover, some dried foods were no longer subsidized (e.g., pasta, rice), even though they are “convenient and affordable complements to traditional cooking practices” (Galloway 2017, 7). Non-food necessities were also excluded, such as diapers and personal hygiene products, as well as equipment and supplies to harvest country foods (Galloway 2017).¹¹ This was not offset by subsidies on commercially processed country foods, which accounted for less than 0.1 percent of subsidies (Galloway 2017), with only three approved food processing facilities in Northern Canada (Burnett, Skinner, and LeBlanc 2015).

Like the Food Mail Program, Nutrition North Canada is largely used by retailers. They submit claims after receiving eligible goods, and they are expected to relay subsidies to consumers. Retailers are subject to compliance reviews, but they have not been conducted on a regular basis (Galloway 2017) and they do not include information needed to verify whether retailers are relaying subsidies to consumers, such as profit margins (Office of the Auditor General of Canada 2014). Retailers also participate in food price surveys to monitor the weekly cost of a nutritious diet for a family of four (i.e., the Revised Northern Food Basket). However, the prices of individual goods are not reported, and the surveys do not include the prices of all eligible goods (Galloway 2014). Moreover, survey results are not available for all participating communities in

¹¹ The list of eligible goods was expanded to additional non-perishable foods and diapers in January 2019 (Bell 2018). In August 2019, it was further expanded to a subset of non-perishable foods and diapers shipped via seasonal surface transportation (not just those shipped via air), as well as feminine hygiene products (Frizzell 2019). Since then, the list of eligible goods has continued to evolve, and the federal government now provides support for harvesting activities (i.e., Harvesters Support Grant administered through Nutrition North Canada).

all time periods (Government of Canada 2022). Based on results that are available, food prices remain too high for families in participating communities, most of whom can afford less than 40 percent of the Revised Northern Food Basket (Inuit Tapiriit Kanatami 2021). There are also “persistent inequities in food pricing between regions and communities” (Galloway 2017, 13). In Nunavut, for example, food prices were ten percent higher in Igloolik versus Hall Beach. These communities are very similar (e.g., population size, location, transportation infrastructure, subsidy rates, volume of shipments under Nutrition North Canada, retail environment), except median income is ten to 15 percent higher in Igloolik (Galloway 2017). Consistent with high food prices, Fafard St-Germain, Galloway, and Tarasuk (2019) find that food insecurity increased by approximately 13 points (43 percent) in Nunavut after full implementation of Nutrition North Canada. They attribute this finding to the exclusion of many non-perishable foods and non-food necessities, and thus an increase in the prices of these goods.

2. Our Contributions

In this study, we evaluate the impact of the policy change – from the Food Mail Program to Nutrition North Canada – on food insecurity in Northern communities. In doing so, we build on Fafard St-Germain, Galloway, and Tarasuk (2019) in several important ways. First, they focus on Nunavut, which has a predominately Inuit population (Statistics Canada 2021) and receives a large share of subsidies under Nutrition North Canada. For these reasons, Nunavut warrants special consideration, but it is also important to assess the impact of the policy change on other Northern communities and populations (Burnett, Skinner, and LeBlanc 2015). Thus, our sample spans Northern Canada. Notably, we also consider regional subsamples (i.e., the territories, northern parts of the provinces, and Inuit Nunangat). In addition to capturing regional variation, this allows us to estimate the impact of the policy change on Inuit in Northern Canada (i.e., Inuit

Nunangat), versus the full sample in which we aggregate First Nations, Métis, and Inuit families to maximize sample size.

This brings us to the second contribution of our study: we assess the differential impact of the policy change on Indigenous families. We do so because, as noted in the introduction, food insecurity is prevalent among Indigenous Peoples in Northern Canada. Moreover, the determinants of food insecurity differ between Indigenous and non-Indigenous families in ways that are related to the policy change (e.g., equipment and supplies to harvest country foods were excluded from Nutrition North Canada, resulting in an increase in the prices of these goods).

A third contribution of this study is that we evaluate the impact of the policy change on families with children, considering differences by age group. Such families have different needs and resources, some of which intersect with the policy change. For example, non-food necessities including diapers were excluded from Nutrition North Canada during our study period.

Finally, we build on Fafard St-Germain, Galloway, and Tarasuk (2019) by considering three measures of food insecurity, which reflect different degrees of severity (the former study only considered marginal food insecurity). Likewise, we try to address some of the methodological limitations of the former study as identified by Ford, Clark, and Naylor (2019). Specifically, our difference-in-differences model includes a counterfactual to account for unobserved factors that impact food insecurity across time, such as changes in the environment, lifestyle, and cultural practices.¹² We also condition on household size as a proxy for crowding and population growth, both of which are associated with food insecurity (we cannot directly control for crowding

¹²This may include the commercialization of country foods (e.g., pop-up markets, sales through social media), which is thought to disrupt sharing (Ford, Clark, and Naylor 2019).

because we do not observe the number of bedrooms in all years of data). Temporal changes in crowding and population growth are also captured by year fixed effects.

3. Data

3.1 Canadian Community Health Survey

We use cross-sectional microdata from the master files of the Canadian Community Health Survey (CCHS), ranging from 2007 to 2016.¹³ An objective of the CCHS is to enable “health research on small populations and rare characteristics” (Statistics Canada 2016, Description, para. 3). This is important for our purposes because we focus on families in sparsely populated Northern communities, differentiating between Indigenous and non-Indigenous populations. Another advantage of the CCHS is that it includes the territories, unlike many other national surveys. Specifically, the CCHS covers 92 percent of the targeted population in Yukon and 96 percent in Northwest Territories. Prior to 2013, the CCHS only covered 71 percent of the targeted population in Nunavut (i.e., the ten largest communities), but it has since been expanded to cover 92 percent (Statistics Canada 2016). The CCHS covers more than 97 percent of the targeted population in Canada overall, and we use sampling weights in all analyses to ensure that estimates are representative.

While the CCHS is generally representative of the Canadian population aged 12 and older, it excludes those who live in Nunavik (Northern Quebec) and reserve-based First Nations communities in all provinces/territories.¹⁴ Therefore, we likely understate the prevalence of food

¹³ Statistics Canada (2016) urges caution when comparing estimates before and after a major redesign of the CCHS in 2015. Available upon request, our key estimates are robust to excluding data from 2015 and 2016.

¹⁴ The CCHS also excludes those who live in Terres-Criées-de-la-Baie-James in Northern Quebec (communities therein did not participate in the Food Mail Program or Nutrition North Canada), as well as full-time members of the Canadian Armed Forces, the institutionalized population, and children aged 12 to 17 who live in foster care.

insecurity among Indigenous Peoples in this study, as it is particularly high among Inuit families in Nunavik (Findlay, Langlois, and Kohen 2013) and First Nations families in reserve-based communities (Batal et al. 2021). It should also be noted that 17 percent of communities that received a full subsidy under Nutrition North Canada are located in Nunavik (i.e., all 14 communities in the region) and about 25 percent are reserve-based First Nations communities. Thus, our estimates do not reflect the impact of the policy change on such families.

Another limitation of the CCHS is that questions about food insecurity are ‘optional content’ in some years and not selected by all health regions.¹⁵ Consequently, we do observe food insecurity in Prince Edward Island or New Brunswick in 2009 or 2010 (though they were not impacted by the policy change). Of more concern, we do not observe food insecurity in Newfoundland and Labrador, Manitoba, British Columbia, or Yukon in 2013 or 2014. Likewise, we do not observe food insecurity in Newfoundland and Labrador, Ontario, or Yukon in 2015 or 2016. Thus, our estimates should be interpreted as the impact of the policy change on Northern families, excluding those in Newfoundland and Labrador and Yukon, which are not observed after implementation of Nutrition North Canada (as well as families in Nunavik and reserve-based First Nations communities due to CCHS exclusions).¹⁶ This is particularly important when considering the impact of the policy change across regional subsamples. In Inuit Nunangat, for example, our estimates reflect the impact of the policy change in two of four regions therein; our data are representative of families in the Inuvialuit Settlement Region (Northwest Territories) and Nunavut, but we do not observe Nunatsiavut (Northern Labrador) after the policy change and the CCHS does not include Nunavik (Northern Quebec).

¹⁵ Questions about food insecurity are asked to all respondents in 2007, 2008, 2011, and 2012.

¹⁶ The exclusion of Yukon is of less concern because only one community was impacted by the policy change (i.e., Old Crow), and it was considered to be a ‘special case’ with an expanded list of eligible goods (Galloway 2017).

3.2 Sample

Our sample consists of Indigenous and non-Indigenous respondents aged 18 and older who, in addition to their own health interview, provide information about food insecurity and other household-level characteristics. We define an Indigenous family as one in which the respondent identifies as First Nations, Métis, or Inuit. We aggregate these groups to maximize sample size. However, we are able to estimate the impact of the policy change on Inuit families when considering regional subsamples, specifically Inuit Nunangat.

We further refine our sample by dropping observations that are temporally inappropriate, as well as those that are not assigned to the treatment or control group. First, recall that Nutrition North Canada was implemented in April 2011, but an interim list of eligible goods was used until the end of September 2012. To exclude this period, we drop observations from April 2011 until the end of September 2013 because questions about food insecurity refer to the past 12 months. We also drop observations from October 2016 onward because of major changes to Nutrition North Canada (i.e., refer to footnotes 9 and 10). Thus, our pre-policy period ranges from January 2007 to March 2011 inclusive, and our post-policy period ranges from October 2013 to September 2016 inclusive.¹⁷

Next, we construct the treatment group, which consists of families in communities that received a full subsidy under Nutrition North Canada during our study period. We drop observations from communities that received a partial subsidy. This is rationalized by their limited use of the Food Mail program during its final year and thus much smaller subsidy under Nutrition North Canada.

¹⁷ Many non-perishable foods and non-food necessities were excluded from the Food Mail Program as of October 2010. Available upon request, our key estimates are robust to dropping observations such that our pre-policy period ranges from January 2007 to September 2010 inclusive.

It should also be noted that that almost 80 percent of communities that received a partial subsidy are reserve-based First Nations communities, which are not included in the CCHS.

Finally, to construct the control group, we merge our sample with a community-level remoteness index, which is available for all populated census subdivisions in Canada (Statistics Canada 2022a). The remoteness index is based on distance to population centres (to proxy for physical accessibility to services) and population size (Alasia et al. 2017). It is a continuous measure ranging from zero to one, such that higher values indicate a greater degree of remoteness.

Among families that were not impacted by the policy change, our control group consists of those in remote and sparsely populated communities across Canada, as identified by a remoteness index of 0.45 or higher.¹⁸ This threshold reflects the top decile of the remoteness index, and it encompasses all communities in the treatment group. Thus, we argue that families in other communities with a remoteness index of 0.45 or higher provide a reasonable counterfactual to account for unobserved factors that impact food insecurity across time, such as changes in the environment, lifestyle, and cultural practices.

3.3 Dependent Variables

We consider three measures of food insecurity based on 18 questions from the Household Food Security Survey Module of the CCHS (Health Canada 2007).¹⁹ First, consistent with other Canadian studies (e.g., Fafard St-Germain, Galloway, and Tarasuk 2019; Li, Dachner, and

¹⁸ As a robustness check, we provide estimates in which the control group consists of families in communities with a remoteness index of 0.45 or higher in the same provinces/territories that were impacted by the policy change, instead of across Canada. We also provide estimates in which the control group consists of families in rural communities as defined by the CCHS – both across Canada and in the same provinces/territories that were impacted by the policy change, respectively.

¹⁹ As shown in Appendix A, ten questions pertain to adults and eight questions pertain to children. For polar questions, ‘yes’ is an affirmative response (versus ‘no’). For questions about frequency, ‘often’ and ‘sometimes’ are affirmative responses (versus ‘never’). Likewise, ‘almost every month’ and ‘some months but not every month’ are affirmative responses (versus ‘only 1 or 2 months’).

Tarasuk 2016), we create a dichotomous dependent variable that equals one if the household has any affirmative responses to the questions (it equals zero otherwise). This indicates whether the household experienced marginal food insecurity in the past 12 months. Then, following Health Canada (2007), we consider a more conservative measure of food insecurity in which the dependent variable equals one if the household has two or more affirmative responses (it equals zero otherwise). This indicates whether the household experienced moderate/severe food insecurity in the past 12 months. Finally, in light of evidence that severe food insecurity is prevalent in Northern Canada (Egeland et al. 2010; Findlay, Langlois, and Kohen 2013) and to be consistent with other Canadian studies (e.g., Li, Dachner, and Tarasuk 2016), we consider a third dependent variable that equals one if the household experiences severe food insecurity and zero otherwise. Severe food insecurity is delineated by six or more affirmative responses on the adult questions, or five or more affirmative responses on the child questions (Health Canada 2007).

3.4 Covariates

The CCHS contains several individual- and household-level characteristics that are related to food insecurity. In particular, we control for the respondent's age and quadratic thereof, sex (female versus male), and marital status (single versus married).²⁰ We also condition on household size, highest level of education in the household (less than high school and post-secondary versus high school), and the natural logarithm of annual household income. We adjust income to 2006 dollars using the all-items Consumer Price Index by province/territory (Statistics Canada 2022b), and we divide by the square root of household size to account for economies of

²⁰ 'Single' includes those who are widowed, separated, divorced, or never married. 'Married' includes those who are married or living common law.

scale in consumption. Unfortunately, we do not observe the presence of an elder in the household, which may be correlated with harvesting activities and thus food insecurity (Chan et al. 2006).

In terms of the local area, we condition on the remoteness index described above (Statistics Canada 2022a), the regional unemployment rate and quadratic thereof (Statistics Canada 2022c), and province/territory fixed effects; we cannot include community fixed effects due to the loss in degrees of freedom. Finally, we include month and year fixed effects to account for temporal changes at these scales (e.g., harvesting activities, price of fuel, population growth).

4. Methods

4.1 Main Specification

We use a difference-in-differences model to estimate the impact of the policy change – from the Food Mail Program to Nutrition North Canada – on food insecurity, testing for differences between Indigenous and non-Indigenous families.

$$\begin{aligned}
 Y_{iat} = & \beta_0 + \beta_1 Treatment_a + \beta_2 Post_t + \beta_3 (Treatment_a \times Post_t) + \beta_4 Indigenous_i + \\
 & \beta_5 (Indigenous_i \times Treatment_a) + \beta_6 (Indigenous_i \times Post_t) + \beta_7 (Indigenous_i \times Treatment_a \times Post_t) + \\
 & \gamma X_{it} + \delta Z_{at} + \varphi Province/Territory_a + \theta Month_t + \pi Year_t + \varepsilon_{iat}
 \end{aligned} \tag{1}$$

Y_{iat} denotes food insecurity for household i in area a and period t . $Treatment_a$ indicates whether the household was located in a community that received the full subsidy under Nutrition North Canada, relative to those in other remote and sparsely populated communities across the country. $Post_t$ reflects whether the household was observed after the change from the Food Mail Program to Nutrition North Canada (i.e., the post-policy period) relative to the pre-policy period.

$Indigenous_i$ indicates whether the respondent identifies as First Nations, Métis, or Inuit, and X_{it}

is a vector of other individual- and household-level characteristics. Similarly, Z_{at} is a vector of characteristics pertaining to the respondent's local area. $Province/Territory_a$, $Month_t$, and $Year_t$ are fixed effects. β , γ , δ , φ , θ , and π are parameters to be estimated, and ε_{iat} is the error term. The key coefficients are β_3 (the difference-in-differences estimator, which indicates the average effect of the policy change on food insecurity in Northern Canada) and β_7 (the differential impact on Indigenous families).

We estimate Equation 1 using ordinary least squares regressions with robust standard errors clustered at the community level (i.e., by census subdivision).²¹ This is done for the full sample, as well as relevant subsamples. Specifically, we consider regional subsamples (i.e., the territories, northern parts of the provinces, and Inuit Nunangat) because Northern Canada is vast and heterogeneous, with considerable variation in cost of living, poverty, and food insecurity (refer to the introduction). This also allows us to estimate the impact of the policy change on Inuit in Northern Canada (i.e., Inuit Nunangat), versus the full sample in which we aggregate First Nations, Métis, and Inuit families. In addition to regional subsamples, we consider families with children – overall (i.e., those with at least one child aged zero to 17) and by age group (i.e., those with at least one child aged zero to five, six to 11, and 12 to 17, respectively). We do so because Northern families with children are vulnerable (refer to the introduction), and they have distinct needs and resources that vary by age. For example, those with young children may need diapers, which were excluded from Nutrition North Canada, whereas older children may have access to school food programs. Moreover, childcare responsibilities, school attendance, and the presence of youth affect harvesting activities among Indigenous Peoples (Kumar et al. 2019).

²¹ We use ordinary least squares regressions, despite having dichotomous dependent variables, due to the challenges associated with estimating treatment effects in non-linear difference-in-differences models (Puhani 2012).

4.2 Robustness Checks

We assess whether our key estimates are sensitive to the choice of counterfactual using three alternate control groups: (1) families in communities with a remoteness index of 0.45 or higher in the same provinces/territories that were impacted by the policy change, instead of across Canada; (2) families in rural communities across Canada, where rural is defined by the CCHS; and (3) families in rural communities in the same provinces/territories that were impacted by the policy change, where rural is defined by the CCHS. In the next iteration of this paper, we will assess the validity of the parallel trends assumption in our difference-in-differences model (i.e., the assumption that food insecurity would have evolved similarly for the treatment and control groups in absence of the policy change).

Similarly, we argue that food insecurity was not affected by other shocks or policy changes during our study period, particularly those with a differential impact on the treatment and control groups. Fafard St-Germain, Galloway, and Tarasuk (2019) find no evidence of macroeconomic shocks coinciding with the implementation of Nutrition North Canada in Nunavut (based on the Consumer Price Index, social assistance caseloads, gross domestic product, poverty rates, and unemployment rates), and we are not aware of coincidental policy changes. The above-mentioned Northern Healthy Foods Initiative (Manitoba) started prior to our study period, and the Nuluaq Project (Inuit Nunangat) was launched in late June 2016, about three months prior to the end of our study period. With such a brief overlap, it is unlikely that the Nuluaq Project affected our key estimates. Indeed, they are robust to excluding data from 2015 and 2016 (available upon request).

Notwithstanding these robustness checks, we acknowledge that “the composition of [treatment and control] groups may change over time and be affected by the intervention” (Blundell and

Costa Dias 2000, 443). Unfortunately, we do not observe migration in the CCHS, but we argue that selection into the treatment and control groups is unlikely given the limited transportation infrastructure and high poverty rate in Northern Canada (refer to the introduction). Moreover, migration induced by the policy change may be limited by the lack of affordable housing, such that people are constrained to communities in which they have family or friends with whom they can live (Palesch 2016).

5. Results

5.1 Estimates from the Main Specification

The first panel of Table 1 contains key estimates from ordinary least squares regressions of the difference-in-differences model for the full sample (parameter estimates for the full set of covariates are available in Appendix B). We find that the policy change – from the Food Mail Program to Nutrition North Canada – increased the likelihood of marginal insecurity by 8.9 points. It also increased the probability of moderate/severe food insecurity by 7.1 points. These effects are similar for Indigenous and non-Indigenous families. However, the policy change had a distinct impact on severe food insecurity among Indigenous families; it increased by 7.3 points.

[Table 1]

In subsequent panels of Table 1, we examine the impact of the policy change across regional subsamples (i.e., northern parts of the provinces and Inuit Nunangat; estimates for the territories will be provided in the next iteration of this paper). In the northern parts of the provinces, the average impact of the policy change mirrors that of the full sample; it increased the probability of marginal and moderate/severe food insecurity (the latter is not statistically significant at conventional levels). However, considering the differential impact on Indigenous families, we

find that the policy change reduced the likelihood of moderate/severe food insecurity by 13.2 points. The narrative is very different for Inuit families in Northern Canada (i.e., Inuit Nunangat), among whom food insecurity increased across all measures. Specifically, the policy change increased the probability of marginal, moderate/severe, and severe food insecurity by 15.2 points, 18.5 points, and 10.8 points, respectively.

In Table 2, we assess the impact of the policy change on families with children; for ease of comparison, key estimates for the full sample are repeated in the first panel. Relative to the full sample, the difference-in-differences estimators are generally larger in subsamples of families with children, both overall (i.e., aged zero to 17) and those with school-aged children and youth (i.e., aged six to 11 and 12 to 17, respectively). This suggests that the detrimental impact of the policy change was heightened in the presence of children. Of particular concern are the estimates pertaining to Indigenous families with young children (i.e., aged zero to five), among whom severe food insecurity increased by 14.7 points, combined with a small reduction on average.

[Table 2]

5.2 Estimates from Robustness Checks

In Table 3, we assess the robustness of our key estimates to the choice of counterfactual; estimates from the main specification are repeated in the first panel for ease of comparison. We find that the size, sign, and statistical significance of our key estimates are generally unchanged when using the three alternate control groups (although the estimates are marginally smaller).

[Table 3]

6. Discussion and Conclusions

In this study, we use a difference-in-differences model to estimate the impact of a policy change – from the Food Mail Program to Nutrition North Canada – on three measures of food insecurity, testing for differences between Indigenous and non-Indigenous families. On average, we find that the policy change increased the probability of both marginal food insecurity (8.9 points) and moderate/severe food insecurity (7.1 points). In addition, Indigenous families experienced an increase in the likelihood of severe food insecurity (7.3 points). These estimates withstand our robustness checks.

In the context of past literature, Fafard St-Germain, Galloway, and Tarasuk (2019) find that the policy change increased marginal food insecurity by 13 points in Nunavut. Our results are similar when considering communities across Northern Canada; adding the difference-in-differences estimator and differential impact on Indigenous families, we find that the policy change increased the probability of marginal food insecurity by 14.8 points (Table 1).²² Thus, our study extends the literature by showing that, while Nunavut receives a large share of subsidies under Nutrition North Canada, other Northern communities and populations experienced a similar increase in food insecurity, on average.

It should be noted, however, that we find variation in the impact of the policy change across regions. For instance, it reduced moderate/severe food insecurity among Indigenous families in the northern parts of the provinces by 13.2 points. Although, we do not observe families in Nunatsiavut (Northern Labrador), Nunavik (Northern Quebec), or reserve-based First Nations

²² The impact on marginal food insecurity is similar when we estimate our model without Indigenous interactions. It is also robust to excluding Nunavut from the sample, although the impact is marginally smaller. These estimates are available upon request.

communities, among whom the prevalence of food insecurity is particularly high (Batal et al. 2021; Findlay, Langlois, and Kohen 2013). In contrast to the northern parts of the provinces, the policy change increased the probability of marginal, moderate/severe, and severe food insecurity among Indigenous families in Inuit Nunangat by 15.2 points, 18.5 points, and 10.8 points, respectively. This suggests that the detrimental impact of the policy change was particularly salient among Inuit in Northern Canada. However, we only observe two of four regions in Inuit Nunangat: the Inuvialuit Settlement Region (Northwest Territories) and Nunavut. The external validity of our study would be enhanced by an expansion of the CCHS to Nunavik (Northern Quebec) and reserve-based First Nations communities. That said, we acknowledge and respect the importance of First Nations data sovereignty and information governance through ownership, control, access, and possession. Likewise, the external validity of our study would be enhanced by the inclusion of the Household Food Security Survey Module in all years of the CCHS, which would have allowed us to observe families in Nunatsiavut (Northern Labrador) after the policy change.

In addition to the regional analysis, we estimate the impact of the policy change across subsamples of families with children, overall and by age group. On average, we find that the detrimental effect of the policy change was larger among families with children compared to the full sample. Of note, the probability of severe food insecurity increased by 14.7 points among Indigenous families with young children, combined with a small reduction on average. This is concerning given the negative implications of food insecurity for health and development (Che and Chen 2001; Ke and Ford-Jones 2015; Willows et al. 2011), as well as disparities therein (Burton, Daley, and Phipps 2015; Young et al. 2020).

To rationalize our findings through an economic lens, we would expect a reduction in the consumption of eligible goods to the extent that the policy change resulted in broad price increases due to subpar monitoring and compliance by retailers (Galloway 2017; Office of the Auditor General of Canada 2014). Moreover, the prices of goods that were included in the Food Mail Program but excluded from Nutrition North Canada may have increased to a greater extent (e.g., bottled water, some dried foods, diapers, personal hygiene products, equipment and supplies to harvest country foods). In this case, the income and substitution effects reinforce each other; the income effect would suggest that the reduction in purchasing power led families to consume less of these (normal) goods, and the substitution effect would suggest that families reduced their consumption of these goods in favor of cheaper substitutes. These effects are consistent with our finding that the policy change increased food insecurity in Northern Canada, especially since our measures are derived from questions about food quantity and quality (e.g., eating balanced meals, relying on low-cost food). Moreover, the impact of the policy change may have been particularly salient among Indigenous families due to the nature of goods excluded from Nutrition North Canada, including bottled water (recall that many Indigenous communities are regularly affected by ‘boil water’ or ‘do not drink’ advisories), some dried foods (recall that pasta and rice are complements to traditional cooking practices), and equipment and supplies to harvest country foods. The latter may have reduced the ability of Indigenous families to acquire or consume food in ‘socially acceptable ways’. Likewise, it may have limited the ability to compensate for higher prices through harvesting activities.²³ We postulate that Indigenous families with young children faced additional challenges in this regard. For example, it is plausible that such families had to reduce their food quantity and/or quality to be able to

²³ Similarly, families that were reliant on harvesting activities likely faced challenges in substituting toward market goods due to coinciding price increases.

provide for young children when faced with broad price increases and the exclusion of diapers from Nutrition North Canada. At the same time, the policy change may have limited the ability to compensate through harvesting activities, perhaps combined with fewer public resources compared to families with older children (e.g., school food programs). As noted above, the list of eligible goods under Nutrition North Canada has changed since our study period, including the addition of diapers and support for harvesting activities. The impact of these changes should be assessed in future work.

With respect to the above interpretation, it should be noted that we do not represent the perspectives of Indigenous Peoples in Northern Canada. In future work, we recommend collaboration with Indigenous stakeholders, from the development of research questions to the interpretation and dissemination of results. Similarly, interviews with families that were impacted by the policy change would enrich the interpretation of our estimates. In terms of future quantitative analyses, researchers may build on our study by examining the mechanisms through which the policy change impacted food insecurity (e.g., higher prices due to changes in the list of eligible goods and/or monitoring and compliance by retailers) and the ways in which Northern families coped (e.g., substitution between country foods and market foods, substitution across market foods, changes in food quantity and/or quality).

In addition to mechanisms and coping, we recommend that future work assess the impact of the policy change on different measures of food insecurity and related outcomes. Specifically, the Household Food Security Survey Module of the CCHS pertains to income-related food insecurity (Appendix A). Thus, it does not necessarily reflect Indigenous knowledge and values; “standardized surveys have been critiqued for lacking cultural appropriateness” (Ford, Clark, and Naylor 2019, E550). Moreover, to better understand broader impacts, future research should

consider the effect of the policy change on other measures of health and well-being – such as birthweight, child growth and development, body weight, physical and mental health, stress, and life satisfaction.

Finally, with respect to future policy development, our results indicate that the change from the Food Mail Program to Nutrition North Canada generally increased food insecurity, especially among Indigenous families. This is consistent with the argument that “subsidization is just one of many actions needed to tackle the complex problem of food insecurity” (Ford, Clark, and Naylor 2019, E551). Indeed, Inuit Tapiriit Kanatami (2021) advocates for a more coordinated set of policies to address the underlying drivers of food insecurity, including high cost of living, poverty, environmental change and contaminants, and diminished self-determination. Such policies should be driven by Indigenous Peoples and ingrained in traditional knowledge and values, unlike the implementation of Nutrition North Canada (Council of Canadian Academies 2014; Galloway 2017; Inuit Tapiriit Kanatami 2021).

Appendix A

The following questions comprise the Household Food Security Survey Module of the CCHS (Health Canada 2007).

1. You and other household members worried that food would run out before you got money to buy more. Was that often true, sometimes true, or never true in the past 12 months?
2. The food that you and other household members bought just didn't last, and there wasn't any money to get more. Was that often true, sometimes true, or never true in the past 12 months?
3. You and other household members couldn't afford to eat balanced meals. In the past 12 months was that often true, sometimes true, or never true?
4. You or other adults in your household relied on only a few kinds of low-cost food to feed the children because you were running out of money to buy food. Was that often true, sometimes true, or never true in the past 12 months?
5. You or other adults in your household couldn't feed the children a balanced meal, because you couldn't afford it. Was that often true, sometimes true, or never true in the past 12 months?
6. The children were not eating enough because you or other adults in your household just couldn't afford enough food. Was that often, sometimes, or never true in the past 12 months?
7. In the past 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?
8. How often – almost every month, some months but not every month, or in only 1 or 2 months?
9. In the past 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?
10. In the past 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?
11. In the past 12 months, did you lose weight because you didn't have enough money for food?
12. In the past 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?
13. How often – almost every month, some months but not every month, or in only 1 or 2 months?
14. In the past 12 months, did you or other adults in your household ever cut the size of any of the children's meals because there wasn't enough money for food?
15. In the past 12 months, did any children ever skip meals because there wasn't enough money for food?
16. How often – almost every month, some months but not every month, or in only 1 or 2 months?
17. In the past 12 months, were any of the children ever hungry but you just couldn't afford more food?
18. In the past 12 months, did any children ever not eat for a whole day because there wasn't enough money for food?

Appendix B

Full Sample
 Parameter Estimates for Full Set of Covariates from Ordinary Least Squares Regressions of
 Difference-in-Differences Model

| | Marginal Food Insecurity | Moderate/Severe Food Insecurity | Severe Food Insecurity |
|--|-----------------------------|------------------------------------|---------------------------|
| <i>Treatment</i> | -0.0320* (0.0188) | -0.0206* (0.0109) | -0.0058 (0.0089) |
| <i>Post</i> | 0.0182 (0.0163) | 0.0319** (0.0131) | 0.0365*** (0.0090) |
| <i>Treatment × Post</i> | 0.0893** (0.0430) | 0.0712* (0.0428) | -0.0050 (0.0046) |
| <i>Indigenous</i> | 0.0587*** (0.0175) | 0.0406** (0.0173) | 0.0068 (0.0077) |
| <i>Indigenous × Treatment</i> | 0.1219*** (0.0415) | 0.1339*** (0.0471) | 0.0293 (0.0258) |
| <i>Indigenous × Post</i> | -0.0033 (0.0215) | -0.0322 (0.0214) | 0.0007 (0.0099) |
| <i>Indigenous × Treatment × Post</i> | 0.0582 (0.0745) | 0.0580 (0.0718) | 0.0732** (0.0329) |
| <i>Age</i> | 0.0030*** (0.0011) | 0.0027*** (0.0010) | 0.0026*** (0.0006) |
| <i>Age-Squared</i> | -0.0001*** (0.0000) | -0.0001*** (0.0000) | -0.0000*** (0.0000) |
| <i>Female</i> | 0.0231*** (0.0066) | 0.0106* (0.0057) | 0.0009 (0.0028) |
| <i>Single</i> | 0.0366*** (0.0094) | 0.0264*** (0.0075) | 0.0164*** (0.0043) |
| <i>Household Size</i> | -0.0015 (0.0043) | -0.0034 (0.0038) | -0.0048*** (0.0015) |
| <i>Less than High School Education</i> | 0.0252** (0.0127) | 0.0201* (0.0120) | 0.0067 (0.0071) |
| <i>Post-Secondary Education</i> | -0.0457*** (0.0116) | -0.0333*** (0.0119) | -0.0086 (0.0058) |
| <i>Log of Real Equivalent Income</i> | -0.1134*** (0.0074) | -0.0882*** (0.0063) | -0.0341*** (0.0037) |
| <i>Remoteness</i> | -0.0854 (0.0564) | -0.0329 (0.0518) | 0.0204 (0.0312) |

Appendix B (Continued)

Full Sample

Parameter Estimates for Full Set of Covariates from Ordinary Least Squares Regressions of Difference-in-Differences Model

| | Marginal Food Insecurity | Moderate/Severe Food Insecurity | Severe Food Insecurity |
|----------------------------------|-----------------------------|------------------------------------|---------------------------|
| <i>Unemployment Rate</i> | 0.0164** (0.0081) | 0.0110 (0.0070) | -0.0064* (0.0038) |
| <i>Unemployment Rate-Squared</i> | -0.0013*** (0.0005) | -0.0008** (0.0004) | 0.0003 (0.0002) |
| Observations | 24,785 | 24,785 | 24,785 |

For comparison, we provide the sample mean/proportion for each measure of food insecurity. Sampling weights are used in all analyses. We include province/territory, month, and year fixed effects in all regressions. Robust standard errors are clustered at the community level and reported in parentheses.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source: Authors' Calculations

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Table 1

Full Sample and Regional Subsamples
 Key Estimates from Ordinary Least Squares Regressions of Difference-in-Differences Model

| | Marginal Food Insecurity | Moderate/Severe Food Insecurity | Severe Food Insecurity |
|---|-----------------------------|------------------------------------|---------------------------|
| Full Sample (n = 24,785) | | | |
| <i>Treatment × Post</i> | 0.0893** (0.0430) | 0.0712* (0.0428) | -0.0050 (0.0046) |
| <i>Indigenous × Treatment × Post</i> | 0.0582 (0.0745) | 0.0580 (0.0718) | 0.0732** (0.0329) |
| Northern Parts of Provinces (n = 21,287) | | | |
| <i>Treatment × Post</i> | 0.0959** (0.0483) | 0.0764 (0.0472) | -0.0070 (0.0044) |
| <i>Indigenous × Treatment × Post</i> | -0.1014 (0.1481) | -0.1315** (0.0639) | -0.0204 (0.0286) |
| Inuit Nunangat (n = 23,402) | | | |
| <i>Treatment × Post</i> | 0.0180 (0.0175) | -0.0108 (0.0255) | -0.0147 (0.0126) |
| <i>Indigenous × Treatment × Post</i> | 0.1523*** (0.0536) | 0.1851*** (0.0642) | 0.1075*** (0.0411) |

For comparison, we provide the mean/proportion for each sample and measure of food insecurity. Sampling weights are used in all analyses. We include a full set of covariates in all regressions; parameter estimates for the full sample are available in Appendix B. Robust standard errors are clustered at the community level and reported in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source: Authors' Calculations

Table 2

Full Sample and Subsamples of Families with Children
 Key Estimates from Ordinary Least Squares Regressions of Difference-in-Differences Model

| | Marginal Food Insecurity | Moderate/Severe Food Insecurity | Severe Food Insecurity |
|---|-----------------------------|------------------------------------|---------------------------|
| Full Sample (n = 24,785) | | | |
| <i>Treatment × Post</i> | 0.0893** (0.0430) | 0.0712* (0.0428) | -0.0050 (0.0046) |
| <i>Indigenous × Treatment × Post</i> | 0.0582 (0.0745) | 0.0580 (0.0718) | 0.0732** (0.0329) |
| Children Aged 0 to 17 (n = 6,340) | | | |
| <i>Treatment × Post</i> | 0.1273* (0.0678) | 0.1158 (0.0803) | -0.0043 (0.0131) |
| <i>Indigenous × Treatment × Post</i> | 0.0506 (0.0998) | 0.0124 (0.1009) | 0.0901** (0.0367) |
| Children Aged 0 to 5 (n = 3,460) | | | |
| <i>Treatment × Post</i> | 0.0613 (0.0915) | 0.0781 (0.0857) | -0.0359** (0.0147) |
| <i>Indigenous × Treatment × Post</i> | 0.1561 (0.1231) | 0.0920 (0.1118) | 0.1466*** (0.0540) |
| Children Aged 6 to 11 (n = 3,291) | | | |
| <i>Treatment × Post</i> | 0.1271*** (0.0309) | 0.0648* (0.0381) | 0.0141 (0.0309) |
| <i>Indigenous × Treatment × Post</i> | -0.0323 (0.0894) | 0.0487 (0.0839) | 0.1036** (0.0468) |
| Children Aged 12 to 17 (n = 1,993) | | | |
| <i>Treatment × Post</i> | 0.1108*** (0.0372) | 0.0687* (0.0375) | -0.0067 (0.0113) |
| <i>Indigenous × Treatment × Post</i> | 0.1352 (0.0981) | 0.1250 (0.0989) | 0.1261** (0.0516) |

For comparison, we provide the mean/proportion for each sample and measure of food insecurity. Sampling weights are used in all analyses. We include a full set of covariates in all regressions; parameter estimates for the full sample are available in Appendix B. Robust standard errors are clustered at the community level and reported in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source: Authors' Calculations

Table 3

Full Sample (Main Specification) and Robustness Checks
 Key Estimates from Ordinary Least Squares Regressions of Difference-in-Differences Model

| | Marginal Food Insecurity | Moderate/Severe Food Insecurity | Severe Food Insecurity |
|--|-----------------------------|------------------------------------|---------------------------|
| Full Sample (n = 24,785) | | | |
| <i>Treatment × Post</i> | 0.0893** (0.0430) | 0.0712* (0.0428) | -0.0050 (0.0046) |
| <i>Indigenous × Treatment × Post</i> | 0.0582 (0.0745) | 0.0580 (0.0718) | 0.0732** (0.0329) |
| Alternate Control Group 1 (n = 16,144) | | | |
| <i>Treatment × Post</i> | 0.0742** (0.0337) | 0.0570* (0.0340) | -0.0120* (0.0062) |
| <i>Indigenous × Treatment × Post</i> | 0.0404 (0.0663) | 0.0202 (0.0646) | 0.0606* (0.0330) |
| Alternate Control Group 2 (n = 69,602) | | | |
| <i>Treatment × Post</i> | 0.0831* (0.0498) | 0.0741 (0.0484) | -0.0030 (0.0030) |
| <i>Indigenous × Treatment × Post</i> | 0.0409 (0.0793) | 0.0135 (0.0742) | 0.0621* (0.0348) |
| Alternate Control Group 3 (n = 44,162) | | | |
| <i>Treatment × Post</i> | 0.0833* (0.0506) | 0.0708 (0.0487) | -0.0051 (0.0035) |
| <i>Indigenous × Treatment × Post</i> | 0.0684 (0.0814) | 0.0239 (0.0753) | 0.0728** (0.0340) |

‘Alternate Control Group 1’ consists of families in communities with a remoteness index of 0.45 or higher in the same provinces/territories that were impacted by the policy change, instead of across Canada. ‘Alternate Control Group 2’ and ‘Alternate Control Group 3’ consist of families in rural communities as defined by the Canadian Community Health Survey – across Canada and in the same provinces/territories that were impacted by the policy change, respectively. Sampling weights are used in all analyses. We include a full set of covariates in all regressions; parameter estimates for the full sample are available in Appendix B. Robust standard errors are clustered at the community level and reported in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source: Authors’ Calculations