

Construction of Nunavik Price Indices

Methodology and Preliminary Results

Sébastien Lévesque

Under the direction of Gérard Duhaime



UNIVERSITÉ
LAVAL

The **Canada Research Chair on Comparative Aboriginal Condition** is affiliated with the Interuniversity Centre for Aboriginal Studies and Research (CIÉRA) at the Faculty of Social Sciences of Université Laval.

This report was prepared under the **Nunivaat** program (Nunivaat.org). This program is managed by Université Laval and funded by the Kativik Regional Government.

Address:

Canada Research Chair on Comparative Aboriginal Condition

Université Laval

Pavillon Charles-De Koninck

1030, avenue des sciences humaines

Local 2439

Québec, QC

Canada, G1V 0A6

Phone: (418) 656-7596

chaireconditionautochtone@fss.ulaval.ca

© Sébastien Lévesque and Gérard Duhaime.

To contact the authors:

Sebastien.Levesque.11@ulaval.ca

Gerard.Duhaime@soc.ulaval.ca.

Reference: Sébastien Lévesque (under the direction of Gérard Duhaime), 2022. *Construction of Nunavik Price Indices — Methodology and Preliminary Results*. Québec, Canada Research Chair on Comparative Aboriginal Condition, Université Laval. 19 p. Available on nunivaat.org/research/publications/.

Translated from French by Elliott Macklovitch.

Cover illustration:

© Leah Qumaluk/Maggie Ittukalak. The Woman is Saying: “Go the Other Way”. Stonecut: black. Povungnituk, 186, no. 17. Reproduced with the permission of the family and Fédération des coopératives du Nouveau-Québec.

ISBN: 978-2-921438-11-7

(French edition: ISBN: 978-2-921438-12-4)

Legal deposit: Bibliothèque nationale du Québec, 3rd trimester 2022

Legal deposit: Library and Archives Canada, 3rd trimester 2022

Construction of Nunavik Price Indices

Methodology and Preliminary Results

Sébastien Lévesque

Under the direction of Gérard Duhaime

Contents

1	Introduction	1
1.1	Context	1
1.2	Objective of the report	1
2	Methodology	3
2.1	Approach	3
2.2	Data	3
2.2.1	Sources	3
2.2.2	Processing	3
2.3	Price indices	3
2.3.1	Calculation of the weights	3
2.3.2	Calculation of the indices	3
2.3.3	Measuring the impact	4
2.4	Limitations	4
3	Results	5
3.1	Measured price differential	5
3.2	Impact of the FOE program	5
4	Conclusion	9
	Notes and references	11
	Appendices	13
5	Product classification	15

List of Figures

1	NQCI. Indices by product categories, April 2022 (Quebec = 100)	6
2	Proportion of expenditures allocated to products covered by subsidies by product categories, April 2022 (%)	6
3	NQCI. Impact of the Food and Other Essentials Program, April 2022 (index points)	7
4	NQCI. Impact of the Food and Other Essentials Program, subsidized products only, April 2022 (index points)	7
5	NQCI. Indices by product categories, subsidized products only, April 2022 (Québec = 100)	8

1 Introduction

1.1 Context

The Kativik Regional Government, the Government of Québec and Makivik Corporation are working together to find long-term solutions to reduce the impact of the high cost of living in Nunavik on its inhabitants.

Various work has been done under the Nunivaat statistical program to document this phenomenon, including comparative price studies between Nunavik and the southern part of the province.^[1;2;3] The 2013 Agreement on the Financing of Measures to Reduce the Cost of Living in Nunavik included provisions for the first representative survey of household consumption patterns in Nunavik. This study allowed for the construction of cost-of-living indices representative of Nunavimmiut consumption patterns as well as analyses to support the development of a new funding agreement for cost-of-living reduction measures.^[4;5;6;7] The latest agreement in 2019 provides funding to continue efforts to document the cost of living in Nunavik.^[8]

This Nunavik Price Indices Construction project aims to build on the knowledge gained to develop rigorous measures that can be calculated periodically. It has three main objectives. First, it aims to track the evolution of consumer prices in Nunavik over time; this should lead to the construction of a Nunavik Consumer Price Index (NCPI). Second, it aims to track the consumer price gap between Nunavik and Québec; this should lead to the construction of a Nunavik-Québec Comparative Index (NQCI). Third, it aims to evaluate the impact of cost-of-living reduction measures on price indices. In addition, ad hoc analyses will be conducted to improve the program.

1.2 Objective of the report

The objective of this report is to present the methodology developed to monitor the evolution of the price gap between Nunavik and southern Quebec, thus covering objective 2 of the overall project. The report also provides the results of the first measurements of the price gap between Nunavik and southern Quebec obtained from this project. It also includes indicators to quantify the impact of the Food and Other Essentials (FOE)^[9]

program on prices, which contributes to Objective 3 of the overall project. Objective 1 of the overall project is not covered in this report and will be the subject of a later report.

2 Methodology

2.1 Approach

This price tracking program is based on the use of point-of-sale data from grocery stores in Nunavik, along with information available on the websites of retailers that operate in Quebec. By establishing channels to share sales data between Nunavik retailers and Université Laval, this project seeks to develop comparative price indices that are representative of the trends across Nunavik, indices which can be updated more frequently than price monitoring actually carried out within the stores.

2.2 Data

2.2.1 Sources

The Nunavik price data come from a selection of businesses that have agreed to participate in the project. These retailers send their monthly sales data directly to a secure server hosted at Université Laval. The Kativik Regional Government also transfers its grocery price reduction data from the Food and Other Essentials program to the university. Price data from the south of the province are collected online from the websites of a selection of retailers, which we call reference stores in this report.

2.2.2 Processing

The various products identified in Nunavik's point-of-sale data are classified according to a hierarchical classification system of products similar to the one developed by Statistics Canada for its Consumer Price Index (see appendix). The different categories in this system are employed in calculating the weights used to establish the indices, as well as to compare the price differentials that are measured by types of products.

Correspondences are then established between products sold by the participating retailers in Nunavik and the reference stores in the south of the province. All this information is compiled into reference data sets, and they are updated whenever new products appear in the monthly data transferred by the Nunavik retailers.

2.3 Price indices

Like the indices that are used to compare prices between regions in certain territories in the Cana-

dian North,^[10;11] the Nunavik-Quebec Comparative Index (NQCI) developed under this project aims to capture the measured price differential between Nunavik and southern Quebec. The measurements are calculated in such a way as to be representative of the pricing of the participating retailers in communities across Nunavik, and of the consumption patterns of the Nunavimmiut as well. The first indices were calculated for the month of April 2022 and were based on the comparison of 3,965 unique products with reference stores in the south.

2.3.1 Calculation of the weights

All of the sales data from the stores in Nunavik are used to calculate three types of weights reflecting the proportion of each store's sales within a community by product type; the proportion of each community's expenditures within Nunavik's total sales by product type; and the weight of each product category within total expenditures. As explained in the following subsection, these different weightings are used to correct certain biases that could result from points of comparison that are missing within the businesses and the communities, as well as to ensure that the calculated indices are representative of the consumption patterns of the Nunavimmiut.

2.3.2 Calculation of the indices

Correspondences are first established between the prices of products sold in Nunavik and the prices identified in the reference stores in the south. For each of the products sold in Nunavik, only one price per store is retained per one-month period; promotions and employee discounts are excluded. When the price of a product changes over the course of a month, the price retained is the one which is used for the longest period of time. Based on the single prices thus selected for each of the products per store, simple indices are calculated, where the value observed in the reference stores in southern Quebec represents 100.

The indices by products are then aggregated according to the lower level of the classification using geometric means.^[12]

In order to ensure that each store has a repre-

sentative weight in the price indices that reflects its market share, the indices are aggregated at the community level using geometric means that are weighted in accordance with the store's share of sales within the community.

Following the same logic, the indices for each of the communities are aggregated across Nunavik using geometric means that are weighted in accordance with each community's share of expenditures in each of the lower categories of the classification.

Lastly, the top-level indices are calculated using geometric means that are weighted by the expenditures^[13] allocated to each of the product categories which reflect the consumption patterns of the Nunavimmiut.

2.3.3 Measuring the impact

In order to estimate the impact of the Food and Other Essentials program, price indices were calculated using the prices of the eligible products before they were subsidized. The impact of the program was then estimated based on the difference between the indices calculated before the subsidies and the real price actually paid by Nunavik consumers.^[14]

2.4 Limitations

The consumer universe under study includes food products sold in grocery stores as well as a selection of everyday non-food products. Hence, while these indices allow us to estimate the price level of grocery products in Nunavik, the sample does not capture the price levels of other goods and services, including rent, clothing and transportation. Food products sold at fast food counters in grocery stores, as well as alcohol and cigarettes are also excluded from the sample. The appendix provides an exhaustive list of the categories of products covered in this study.

Not all products sold in Nunavik are available online and, in some cases, whether due to a lack of information or prices that were temporarily unavailable, correspondences could not be established between the stores in Nunavik and those in the south. Although the indices were calculated using a large number of representative items, the absence of products or brands may introduce biases if the price gaps for these differ substantially from the products present in the sample.

3 Results

3.1 Measured price differential

The measured price differential for all the products compared in the study is 131.3; i.e., for Nunavik as a whole, food and other everyday consumer products are on average 31% more expensive than in the reference stores in southern Quebec (Figure 1).

For all food products taken together, the differential with the south is 32 percent, although there are substantial variations from one category of food product to another. The differential for certain food products is less pronounced, e.g. dairy products, eggs and fruit, where the differences are less than 10%. Other types of products have an average price that is even lower than that observed in the reference stores in the south, in particular baby foods and vegetables.

Figure 2 shows the proportion of expenditures allocated to subsidized products for each of the product categories. As this figure illustrates, the categories of products showing a small price differential with the south are those with the largest proportion of expenditures on products that are subsidized by both the Food and Other Essentials program and the Nutrition North Canada program.^[15] For example, more than 93% of expenditures on baby foods go to products subsidized by these two programs.

Conversely, the categories with more non-subsidized products show greater price differentials, as in the case of several cereal products and the category of ‘Other food products’, which includes soft drinks and snacks, among other things.

For non-food products, the price level of baby care products is lower than in the reference stores, but the differential measured for all other non-food subcategories is more than 25%.

3.2 Impact of the FOE program

Figure 3 shows the difference, expressed in index points, between the indices calculated on the basis of prices that exclude the FOE subsidies and the indices calculated by including the amounts of subsidies, i.e. the real prices observed.

For the entire consumer universe under study, the impact of the FOE program is 9.3 index points for all products, and 7.8 points for food (Figure 3).

The extent of the impact for the various product subcategories varies according to the proportion of subsidized products within each subcategory and the subsidy rate for each product, but also the initial differential observed between Nunavik and southern Quebec.

Thus, for the categories where all or most of the products are covered by the program, FOE significantly reduces the price gap between Nunavik and the south. This is particularly the case for baby products, for fruit and for vegetables, where the program lowers prices to levels comparable to, or even lower than, the reference stores in the south.

For other product categories, the program reduces the price gap between Nunavik and the south considerably, although the price difference after application of the subsidy remains substantial. These categories generally include fewer products subsidized by the NNC program, and those products that are eligible only receive the lowest level of subsidy. This is the case of household cleaning products, for example.

Otherwise, the impact of the program is lower in the categories where few products are subsidized, e.g. meat or dairy products.

Looking exclusively at the products subsidized by FOE, the impact measured for the entire group is close to 30 points, almost cancelling the price differential observed between the stores in Nunavik and the reference stores in the south (Figure 4). Although FOE does not cover all products in the consumer universe under study (Figure 2), the program’s impact on the price level of subsidized products is considerable, reducing the differential (measured in index points) of the majority of categories to levels comparable to, or even lower than, the reference stores.

Overall, the subsidized products show an average price differential of 7.7% with southern Quebec (Figure 5). For these subsidized products, most of the product subcategories show a price differential with the south of less than 10%, and in several cases the price level is even lower than of the reference stores.

Figure 1
NQCI. Indices by product categories, April 2022 (Quebec = 100)

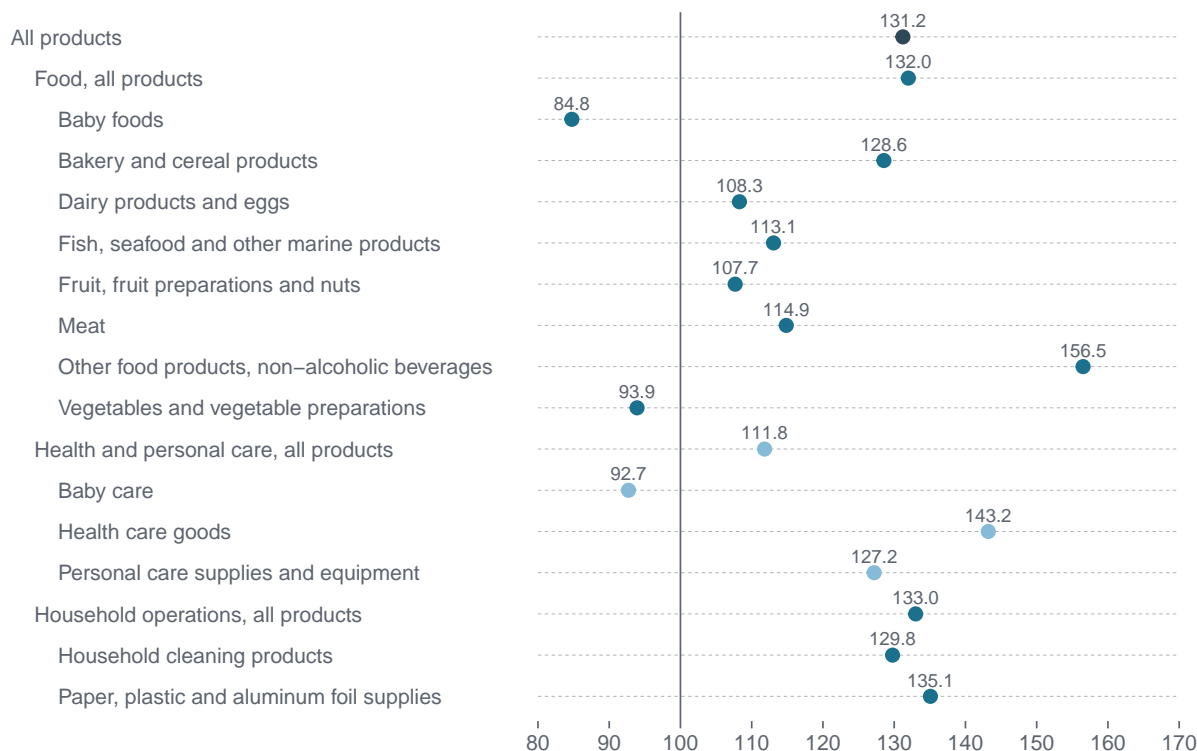


Figure 2
Proportion of expenditures allocated to products covered by subsidies by product categories, April 2022 (%)

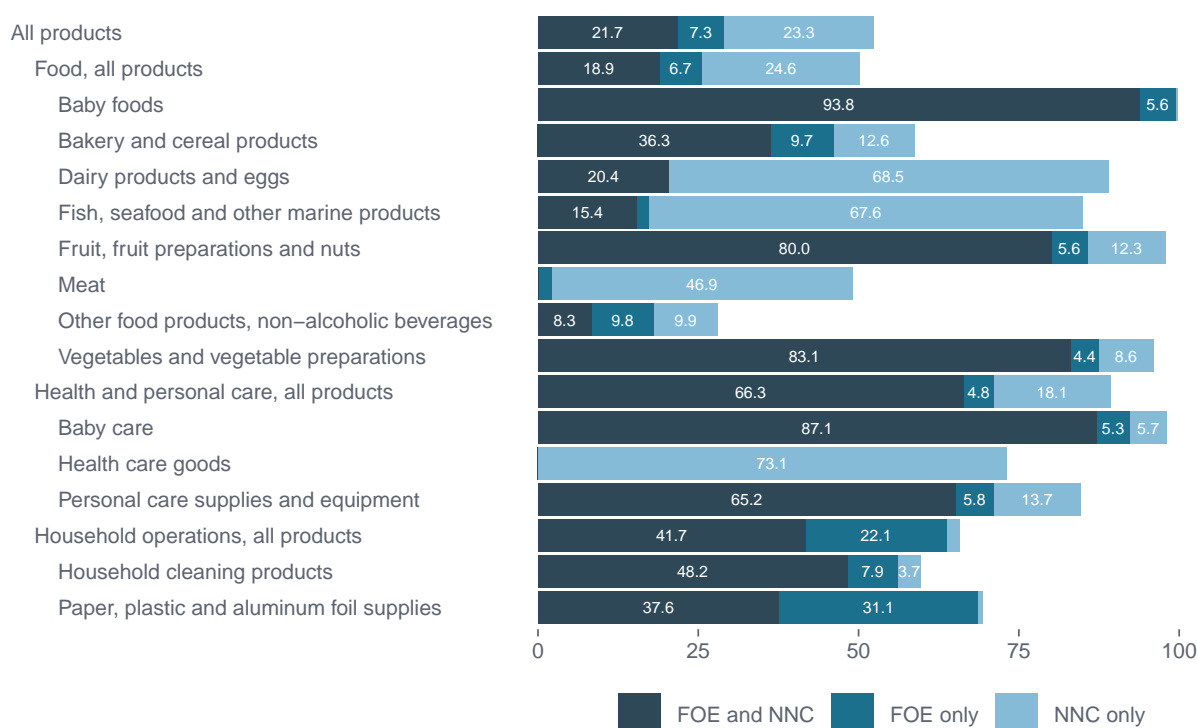
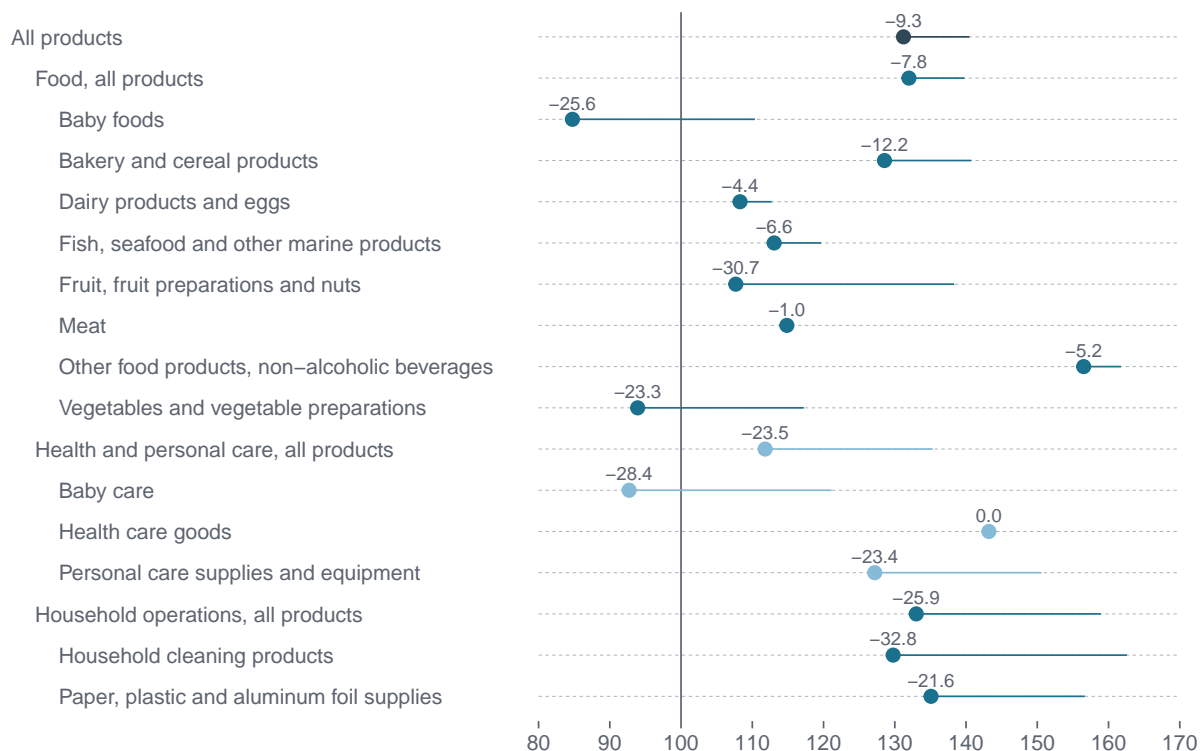


Figure 3

NQCI. Impact of the Food and Other Essentials Program, April 2022 (index points)

**Figure 4**

NQCI. Impact of the Food and Other Essentials Program, subsidized products only, April 2022 (index points)

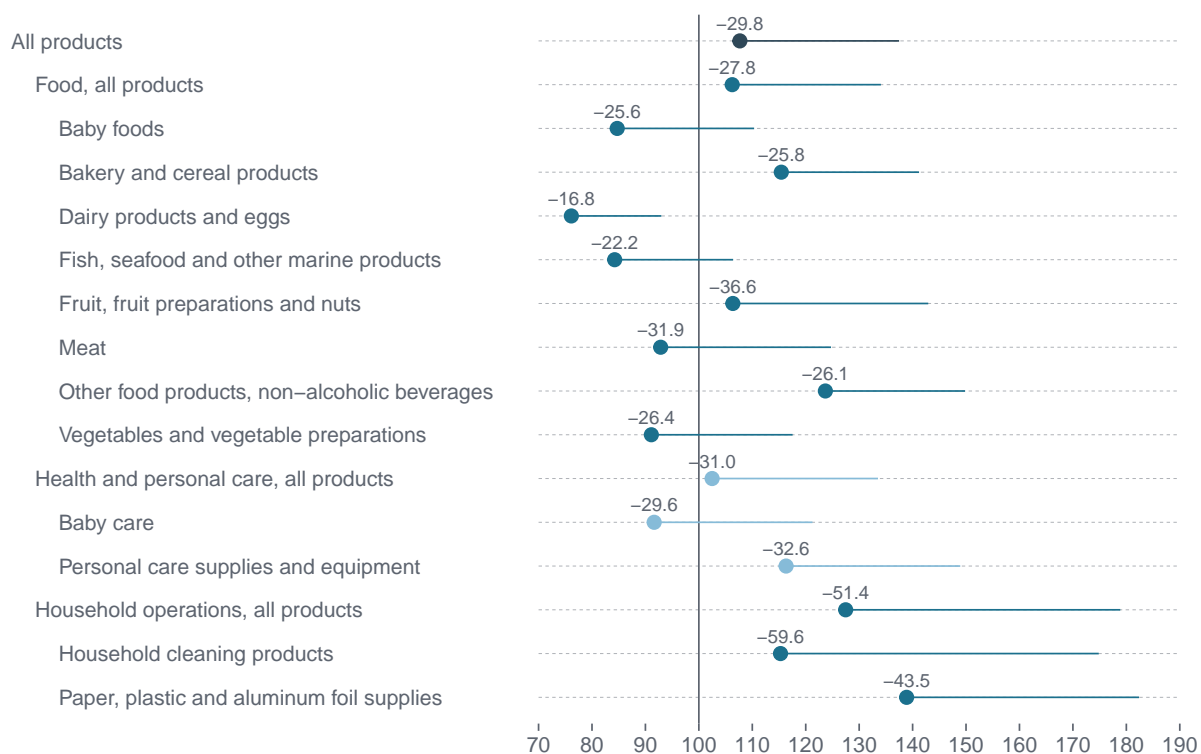
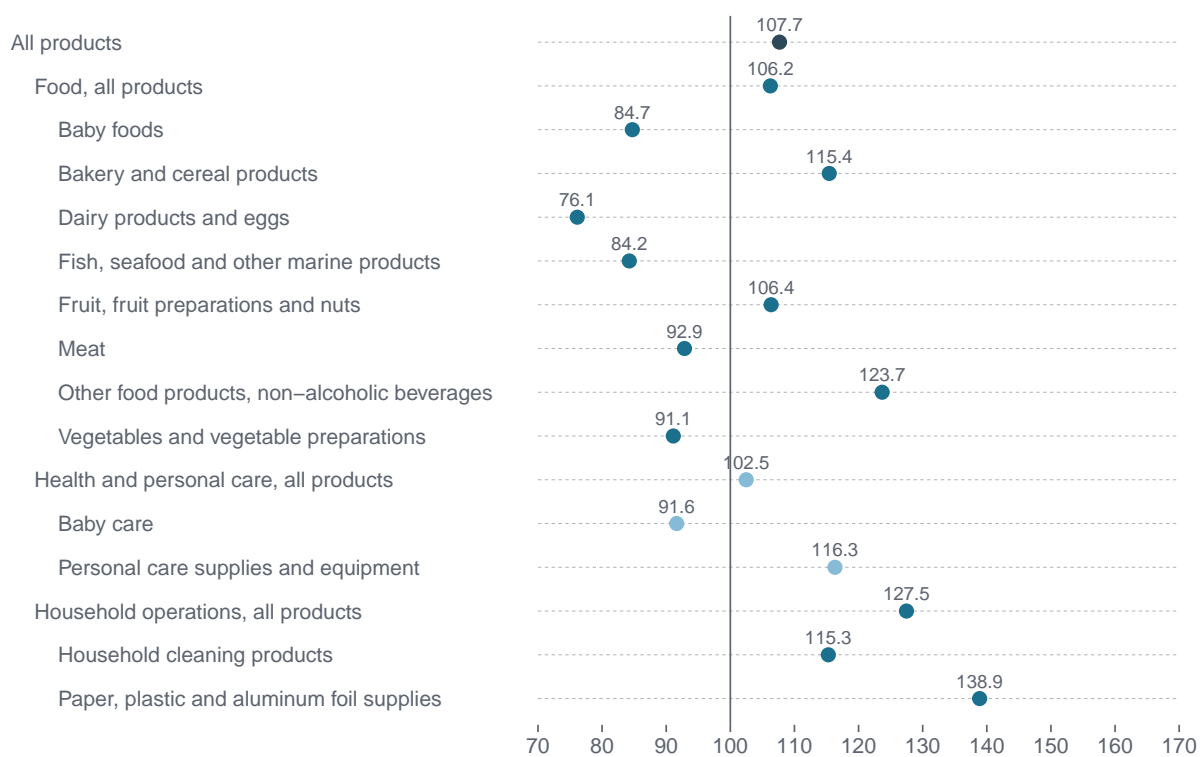


Figure 5

NQCI. Indices by product categories, subsidized products only, April 2022 (Québec = 100)



4 Conclusion

The objective of this report was to describe the methodology of the Nunavik Price Indices Construction project, more specifically the Nunavik-Quebec Comparative Index (NQCI), to present the first results obtained with the NQCI itself, and to measure, with the help of the NQCI, the impacts of the FOE program.

These preliminary results indicate that prices are generally higher in Nunavik than in the reference stores in southern Quebec. Moreover, the variations in the price differentials observed between the different categories of products attest to the significant impact that subsidy programs can have on price levels in the region. As measured in other analyses,^[7] the present results also attest to the ability of the FOE program to lower the cost of eligible products. The impact of NNC was not measured here, but these results nevertheless highlight the importance of these two programs, as the products covered by both FOE and NNC have the lowest price levels in the consumer universe studied.

Although some food products remain considerably more expensive in Nunavik than in southern Quebec, the price gap observed in this study is less than that measured in past price surveys.^[4] While comparisons with previous studies must be made with some reservations, particularly due to differences in methodology and data sources, the food index presented in this report is more than 20 points lower than the index calculated in the 2016 Nunavik Cost of Living Survey.^[4] These results seem consistent with a trend observed in previous work which suggests that the price differential has decreased in recent years for several types of products, a reduction that is due in particular to the enhancements made to the Food and Other Essentials and Nutrition North Canada programs.^[16;17;18]

However, these preliminary results need to be interpreted with some caution, given the limitations of the methodology described above, as well as the current stage of the project, which is still under development. Nonetheless, though the methodology may evolve as the project advances, the indices presented in this first report have been arrived at in rigorous fashion and do constitute an up-to-date indication of price levels

in Nunavik. Moreover, the methodology that has been developed and the data sources that are employed make it possible to periodically calculate measurements based on a considerable volume of observations, while taking into account the current consumption patterns of the region's inhabitants, something not possible using conventional methods of in-store price monitoring.

In the next phase of the project, a time series will be compiled in order to evaluate the stability of the measurements over time. And more data will be collected in order to increase the precision of the categories of products with fewer observations and augment the diversity of the stores in the south used to calculate the indicators. Lastly, the possibility of calculating indices for other types of goods will also be assessed.

Notes and references

- [1] Nick Bernard. 2006. *Nunavik Comparative Price Index 2006*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 34.
- [2] Gérard Duhaime and Andrée Caron. 2011. *Nunavik Comparative Prices Index 2011*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 56.
- [3] Gérard Duhaime and Andrée Caron. 2013. *Consumer Prices Monitoring in Nunavik 2011-2013*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 17.
- [4] Jean Robitaille, Enrico Guénard, Sébastien Lévesque, and Gérard Duhaime. 2018. *The Cost of Living in Nunavik in 2016. Research Report, Revised and Expanded Version*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 23.
- [5] Jean Robitaille, Enrico Guénard, Sébastien Lévesque, Christina Paquet, Sabie Roy, Alexandre Germain, and Gérard Duhaime. 2018. *The Cost of Living in Nunavik, Phase II: Analysis Report Number 1*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 20.
- [6] Jean Robitaille, Sébastien Lévesque, Enrico Guénard, Alexandre Germain, and Gérard Duhaime. 2018. *The Cost of Living in Nunavik, Phase II: Analysis Report Number 2*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 9.
- [7] Jean Robitaille, Enrico Guénard, Sébastien Lévesque, Sabie Roy, and Gérard Duhaime. 2018. *The Cost of Living in Nunavik, Phase II: Analysis Report Number 3*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 25.
- [8] Cabinet de la ministre responsable des Affaires autochtones. 2019. *Minister Sylvie D'Amours in Nunavik - \$115.8 million to reduce the cost of living in Nunavik*. Press Release. [https://www.newswire.ca/news-rel](https://www.newswire.ca/news-rel-eases/minister-sylvie-d-amours-in-nunavik-115-8-million-to-reduce-the-cost-of-living-in-nunavik-891891444.html)
- [9] Kativik Regional Government. 2021. *Food and Other Essentials Program*. <https://www.krg.ca/en-CA/programs/nunavik-col/food-essentials>.
- [10] Northwest Territories Bureau of Statistics. 2020. *Community Price Index*. <https://www.statsnwt.ca/prices-expenditures/community-price-index/>.
- [11] Yukon Bureau of Statistics. 2022. *Consumer Price Index 2021*. <https://yukon.ca/sites/yukon.ca/files/ybs/fin-consumer-price-index-2021.pdf>.
- [12] Statistics Canada. 2019. *The Canadian Consumer Price Index Reference Paper*. Statistics Canada, Ottawa. 83.
- [13] International Labour Office. 2020. *Consumer Price Index Manual: Concepts and Methods*. International Labour Office, Washington. 509.
- [14] The impact of the Food and Other Essentials program was also measured as part of the Nunavik Cost of Living Survey project in 2016. Jean Robitaille, Enrico Guénard, Sébastien Lévesque, Sabie Roy, and Gérard Duhaime. 2018. *The Cost of Living in Nunavik, Phase II: Analysis Report Number 3*. Canada Research Chair on Comparative Aboriginal Condition, Quebec. 25.
- [15] Government of Canada. 2020. *How Nutrition North Canada Works*. <https://www.nutritionnorthcanada.gc.ca/eng/1415538638170/1415538670874>.
- [16] Sébastien Lévesque and Gérard Duhaime. 2021. Price Trends in Nunavik 2011-2016 – Consolidating Sets of Comparative Price Data. *Nunivaat Analytics*, 2021 (2):5.
- [17] Government of Canada. 2017. *Nutrition North Canada Advisory Board Second Report*. <https://www.nutritionnorthcanada.gc.ca/eng/1508938932551/1508938956924>.

- [18] Gérard Duhaime, André Caron, Sébastien Lévesque, Julie Garon, and Marileine Baribeau. 2018. Le nouveau régime: Épisode de la mise en oeuvre de Nutrition Nord Canada au Nunavik, 2011-2013. *Canadian Review of Social Policy/Revue canadienne de politique sociale*, 78:52–80.

Appendix

5 Product classification

Food

- Baby foods

 - Canned infant or junior foods

 - Infant formula

- Bakery and cereal products (excluding baby food)

 - Bakery products

 - Bread, rolls and buns

 - Cookies and crackers

 - Cookies and sweet biscuits

 - Crackers and crisp breads

 - Other bakery products

 - Cereal products (excluding baby food)

 - Breakfast cereal and other cereal products (excluding baby food)

 - Breakfast cereal

 - Other cereal products (excluding baby food)

 - Flour and flour-based mixes

 - Flour

 - Flour-based mixes

 - Pasta products

 - Dry pasta

 - Fresh pasta and other pasta mixes

 - Macaroni and cheese mixes

 - Rice and rice-based mixes

- Dairy products and eggs

 - Dairy products

 - Butter

 - Cheese

 - Cheddar cheese

 - Mozzarella cheese

 - Processed cheese

 - Unripened or fresh cheese

 - Fresh milk

 - Low-fat milk

 - UHT milk

 - Whole milk

 - Ice cream and related products

 - Other dairy products

 - Eggs

Food (continued)

Fish, seafood and other marine products

Fish

Canned and other preserved fish

Canned salmon

Canned tuna

Other canned fish

Fresh or frozen fish (including portions and fish sticks)

Seafood and other marine products

Canned and other preserved seafood and other marine products

Other shellfish

Shrimps and prawns

Fruit, fruit preparations and nuts

Fresh fruit

Apples

Bananas

Oranges

Other fresh fruit

Nuts and seeds

Preserved fruit and fruit preparations

Fruit juices

Other preserved fruit and fruit preparations

Canned fruit

Dried and dehydrated fruit

Frozen fruit

Jam

Meat

Fresh or frozen meat (excluding poultry)

Fresh or frozen beef

Ground beef, lean

Ground beef, medium lean

Other fresh or frozen beef

Steak

Ground pork

Other fresh or frozen pork

Pork chop

Other fresh or frozen meat (excluding poultry)

Food (continued)

Meat (continued)

Fresh or frozen poultry

Fresh or frozen chicken

Chicken drumstick

Chicken thigh

Chicken wing

Other fresh or frozen chicken

Other fresh or frozen poultry

Processed meat

Canned luncheon meat

Ham and bacon

Bacon

Ham excluding deli ham

Other processed meat

Other food products and non-alcoholic beverages

Coffee and tea

Coffee

Instant and other coffee

Roasted or ground coffee

Tea

Condiments, spices and vinegars

Fermented or pickled vegetables

Herbs, spices and seasonings

Sauces, condiments and dips

Ketchup

Mayonnaise

Other sauces, condiments and dips

Pasta sauces

Edible fats and oils

Margarine

Other edible fats and oils

Non-alcoholic beverages

Other food preparations

All other food preparations

All other miscellaneous food preparations

Baking powder

Nut butter

Potato chips and other snack products n.e.c.

Frozen food preparations

Frozen pizza

Other frozen food preparations

Soup

Sugar and confectionery

Confectionery

Sugar and syrup

Food (continued)

Vegetables and vegetable preparations

Fresh vegetables

Broccoli

Carrots

Cucumber

Lettuce

Mushrooms

Onions

Other fresh vegetables

Potatoes

Tomatoes

Preserved vegetables and vegetable preparations

Canned vegetables and other vegetable preparations

Canned vegetables

Other vegetable preparations

Vegetable juice

Frozen and dried vegetables

Health and personal care

Baby care

Baby soaps and shampoo

Baby wipes

Diapers

Other baby care

Health care goods

Eye care goods

Medicinal and pharmaceutical products

Other health care goods

Personal care supplies and equipment

Feminine hygiene products

Oral-hygiene products

Other personal care supplies and equipment

Personal soap

Toiletry items and cosmetics

Creams, lotions and cosmetics

Hair preparations and other toilet preparations

Perfume and cologne

Household operations, furnishings and equipment

Household cleaning products

Detergents and soaps (other than personal care)

Detergents and rinse agents for dish washing

Laundry detergents and soaps

Other household cleaning products

Bleach and other household chemical products

Fabric softener

Household cleaning and polishing products

Paper, plastic and aluminum foil supplies

Paper supplies

Plastic and aluminum foil supplies

Household paper supplies

Foil supplies

Plastic supplies