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Basic Income Simulations in Nunavut

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Executive Summary

An important component to the work required to be completed to assess the potential of a basic income in Nunavut is to design simulations to look at how various basic income models could work in the territory. Here we present the results of the simulations using tax administrative data for the territory of Nunavut. The intent of these simulations is to identify the cost implications of different variants of a basic income. We provide the cost implications related to nearly 5,000 different basic income models obtained using two different data sets. The main take away messages from this work are:

- UBIs are a more expensive than IBIs.
- Basic incomes delivered to the individual are more expensive than basic incomes delivered to the family (fiscal unit).
- None of the basic incomes modeled (up to and including \$40,000/year) would eliminate income poverty in Nunavut.
- Basic income models that achieve notable reductions in income poverty far exceed the Government of Nunavut's current fiscal capacity.
- It is impossible to replace Income Assistance with a UBI at a similar cost and benefit level.
- It is possible to deliver similar income benefits as the base level benefits delivered through Income Assistance as an IBI but which reaches a different portion of the population given that it is delivered to tax filers.
- As with existing Income Assistance programs, IBIs are based on benefit reduction rates, so policy makers cannot avoid the complicated issue of the "welfare wall". While welfare walls can be reduced (generally at increased cost, benefit level and clawback dependent), they cannot be eliminated.
- The cost estimates presented here are as representative as the data, which is based on tax filer data for the year 2019.
- The Government of Nunavut should examine the possibility of low tax filing rates in the territory as it impedes with the ability of current programs to do the job they were designed to do.
- Any of the basic income models presented here would take several years to set up using existing administrative structures.
- Any basic income model would interact with the current and any future system of social supports and understanding all those interactions require detailed data and information that is not currently available.
- The Government of Nunavut should consider establishing greater in-house data analysis capacity to be able to undertake modeling projects such as they one outlined in this report.

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Introduction

To understand the costs, poverty effects, and tradeoffs of delivering a basic income in the Territory of Nunavut, a key component of this project is to simulate a range of basic income designs for Nunavut. As discussed in Petit et al. (2022), typically such microsimulations of basic income are conducted using Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) (Statistics Canada n.d.). However, the SPSD/M does not include any information for people in the territories and cannot be used to simulate basic income models in the territory of Nunavut. Instead, two different data sources were used to simulate a basic income in Nunavut and a multi-pronged data strategy was employed as neither of these two data sets are ideal. The two data sources are as follows:

- T1 administrative tax records that are only confidentially available through the Ministry of Finance (MoF), Government of Nunavut.
- The Longitudinal Administrative Databank (LAD) that is only available through the Canadian Research Data Centre Network (CDCRN).

This report summarizes the results of the basic income simulations using these data sets.

About the Data

T1 Administrative Data

T1 administrative tax records are the raw tax filer data provided directly to the Government of Nunavut (GN) by Canada Revenue Agency (CRA). It contains information on every tax filer who reported Nunavut as their territory of residence in the given tax year. There are important limitations to using this data set for simulating basic income designs that must be kept in mind when considering the results presented here:

- Only those who filed their T1 income tax package in 2019 are represented in the data and the only information available is that which would be reported on the T1 income tax package.
- If a person reported having a spouse (married or common law), they could only be matched to their spouse's information if they reported their spouse's SIN and their spouse also filed their T1 income tax package reporting Nunavut as their jurisdiction of residence.¹
- The T1 income tax package does not contain any information on children, meaning there is no information related to family size associated with the fiscal unit (a fiscal unit is comprised of an

¹ Because the GN is only provided with tax filer information for those who report Nunavut as their main residence, spouses that live in other jurisdictions are not included in the data provided by CRA. Unfortunately, based on the data provided to the GN, we cannot differentiate between a non-filing spouse and a spouse that files in another jurisdiction. We only present the results for those cases where we were able to match spouses in the tax data.

individual, a spouse if present, and dependent children under the age of 18 if present).² As there is no information related to the family size of the fiscal unit, we are unable to conduct any output measures related to incidence or depths of low-income using the T1 data because such measures are dependent on family size.

- The authors of this report did not access the T1 data held by the Government of Nunavut directly. Instead, the authors used a codebook for the data provided by GN to write the simulation code so that the GN could conduct the simulations. The software package of choice for these simulations was Stata. The confidentiality of the data used was maintained during this process and the authors were only provided with the high-level results that are reported here.

Longitudinal Administrative Data (LAD)

The second data source for the simulations is Statistics Canada's Longitudinal Administrative Database (LAD) (Statistics Canada 2022). The LAD is a subset of the T1 Family File (T1FF), a Statistics Canada product. The T1FF is a yearly cross-sectional file of all tax filers and their families. The base for the data is the T1 administrative data but significant effort is put in by Statistics Canada to develop a robust data file. Legal and common law spouses are attached to a tax filer based on either spousal information provided on the T1 tax form or by using sophisticated matching processes. Children are identified using information from the child benefit program.

The LAD is a random, 20% sample of the T1FF based on an individual's SIN. The LAD contains both individual and family weights to ensure that the sample represents the underlying tax filing population. While the LAD is longitudinal, for the purposes of the simulations we do not use the longitudinal aspect of the LAD. Instead, we use the cross-sectional component of the LAD. For these simulations, we use the most recently available tax year that does not overlap with the COVID-19 pandemic: we use information from the 2019 tax year, the same year we use for the T1 administrative data described above.

There are a few things to note about the LAD:

- Once an individual is selected for the LAD the individual remains in the LAD in each subsequent year regardless of whether they file taxes in subsequent years.
- Spousal information is matched regardless of the jurisdiction in which the spouse lives. As a result, the estimates presented here assume that the tax filer, spouse, and associated children live in Nunavut. This will not always be the case and will be a factor for consideration should a basic income model be implemented in the territory.
- The LAD is augmented each year with a sample of new tax filers.
- The LAD is organized into four levels of aggregation: individual, spouse, family, and child levels.
- For the purposes of the simulations, the definition of the family is the fiscal unit and is the definition of a family used by the tax system in Canada. A fiscal unit is comprised of an individual, a spouse if present, and dependent children under the age of 18 if present and living in the household (as defined from the parameters of the Canada Child Benefit which is the origin

² Because the GN has a small child supplement that is delivered by CRA, the Government of Nunavut can request to be provided with the child benefit data. We were informed that the Government of Nunavut has not requested this data.

of the information on children). As there is information related to the size of the fiscal unit in the data source, we can calculate low-income measures.

- The authors of this report accessed the LAD data directly in the secure environment of the Prairie Research Data Centre (PRDC). All results released were vetted before being released. If a result does not satisfy the vetting criteria, the result cannot be released. This ensures that confidentiality of the data being used is maintained.

The LAD differs from the T1 data held by the Government of Nunavut in that it is a sample of tax filers, and it is based on the T1FF held by Statistics Canada and has been heavily scrutinized and ‘errors’ corrected by rigorous methodology. **The results from the LAD can be considered to be based on a data set that is of higher quality and these estimates should be given more weight over those produced by the T1 Administrative Data.**³

Data Restrictions

Before the simulations are run for both data sets, we limited the simulation sample to tax filers who report Nunavut as their ordinary territory of residence, who were not deceased in 2019, were not child tax filers, and were between the ages of 18 and 64 in 2019.⁴

Methodology

We considered two versions of a basic income: a Universal Basic Income (UBI), which pays a benefit to all adults ages 18-64, and an Income Tested Basic Income (IBI) which pays a benefit to all adults ages 18-64 but scales back and eventually eliminates those benefits as net income (i.e., line 23600 of a T1 including employment income, net self-employment income, capital income, employment insurance, social assistance, etc.) increases. We also considered a child top up to the UBI and IBI in the LAD data simulations.

³ A third data set that could be used is the T1 Family File (T1FF). The T1FF is a Statistics Canada data set that is derived primarily, but not exclusively, from income tax returns. It includes detailed information of individual tax filers, their spouses, and their children (obtained by using information from Federal Child Benefits, provincial birth files, and the previous year of the T1FF). The T1FF is not a publicly available dataset nor is it available through the Statistics Canada Research Data Centres (RDC). Instead, a researcher must obtain special access to the T1FF directly from Statistics Canada and the results must be vetted. Very preliminary work with the T1FF data confirmed that the high-level results from the T1FF were nearly identical to those obtained from the LAD. As a result, we did not conduct detailed simulations using the T1FF data for this project and no results from this data are reported in this paper.

⁴ We include only those aged 18 to 64 because seniors are covered by existing cash transfers from both private and public pension programs. We do model a child top-up that is based on the Senior Citizen Supplementary Benefit which provides a payment of \$175/month (\$2,100/year) to low-income seniors in Nunavut. There will be cases where individuals are under the age of 18 and are independent, including those with children present in their fiscal unit. The models presented here exclude these types of units. Because these family types are rare, their exclusion does not affect the cost estimates presented here but will be matter for consideration by the GN should a basic income model be implemented in the territory.

For both the UBI and IBI scenarios (detailed below), they are modelled in addition to the current system of income and social supports in Nunavut. In particular, we assume that neither the UBI nor the IBI replace Income Assistance but rather are in addition to Income Assistance. This choice was made as we view Income Assistance as providing valuable services that a BI cannot: it addresses real-time changes in income (a BI delivered through the tax system can only be adjusted annually) and, while not perfect, Income Assistance has the potential to provide relational supports. We did not consider replacing Income Assistance with a tax-administered BI here; however, if the GN were to implement a tax-administered BI, this will be an issue they will need to confront, and more specific modelling should be done.

For the UBI, for both data sets (the T1 and LAD), we simulated 40 different annual benefits that range from \$1,000 to \$40,000 in \$1,000 increments. We also varied the beneficiary unit, simulating the delivery of the full UBI to all working-aged adults as individuals (“individual UBI”) as well as simulating the delivery of the UBI to fiscal units, where the UBI is scaled using the square root scale based on the number of adults (e.g., one for a single individual and two for a couple) in the fiscal unit (“family UBI”).⁵ That is, for the individual UBI, if the tax filer has a spouse/partner, each adult received the full UBI amount (e.g., for the \$1,000 UBI, each adult receives \$1,000 for a total of \$2,000 to the fiscal unit). For the family UBI, if the tax filer has a spouse/partner, the fiscal unit received the amount of the individual UBI multiplied by the square root of 2 (1.414; e.g., for the \$1,000 UBI, a fiscal unit with two adults would receive \$1,414).⁶

We also simulated a UBI child top up of \$2,100 per child which we can only simulate using the LAD since we do not observe children in the T1 data. Because this is a UBI that is not scaled according to the number of adults or children in the household, the results are the same for whether the beneficiary unit is the individual or the fiscal unit.

For the IBIs, for each data set we also simulated 40 different annual benefits that range from \$1,000 to \$40,000 in \$1,000 increments. For IBIs the basic income benefit is reduced based on reported net income (line 23600 on the T1 form).⁷ This means we must also set the benefit reduction rate (BRR). We model 20 different BRRs that range from 5% to 100% in 5% increments (a 0% BRR is identical to a UBI). As with the UBIs, we also vary the beneficiary unit. We delivered the benefit to individuals based on each individual’s net income (“individual IBI”). We also delivered the benefit to fiscal units, where the benefit is scaled by the square root of the number of adults in the household (e.g., by the square root of one for an individual and by the square root of two for a couple) and the benefit amount is assessed

⁵ Note that if a single childless adult age 18+ lives with their parents and files taxes, that individual is considered to be living in a separate fiscal unit from their parents.

⁶ There can only ever be at most two adults in a fiscal unit. Adult dependent children (e.g., persons ages 18 to 24 who are students and are considered to live at home) are their own fiscal unit and also receive the UBI if they file their taxes. This is consistent with how the CRA treats tax filers for the purposes of other CRA-delivered benefits (e.g., the GST/HST tax credit, etc.).

⁷ Net income is income concept that is used by the Canada Revenue Agency to deliver various refundable tax credits, including the GST tax credit, the Canada Child Benefit, and various provincial benefits. It includes employment income, net self-employment income, Employment Insurance, rental income, capital income, territorial social assistance, and worker’s compensation minus deductions including deductions for allowable child care expenses and allowable medical expenses (if claimed by the tax filer).

based on the net income of the fiscal unit (the individual's net income plus the spouse's net income, where present; "family IBI").

We also added to these an IBI child-top up of \$2,100 per child. For the individual IBI's, the child benefit is reduced based on the net income of the lower income spouse if a spouse is present. If no spouse is present, the child benefit is reduced based on the net income of the single parent. For the IBIs delivered to the fiscal unit, the child benefit is reduced based on the net income of the fiscal unit (the individual's net income plus the spouse's net income, where present).

We modeled the IBI designs as refundable tax credits based on annual income because the tax data does not support the frequent assessment of income that would be needed for a negative income tax type of basic income.⁸ Refundable tax credits are not taxable.

In summary, for our simulations, the basic income payment (BIP) is calculated for each model as:

$$BIP_{i,f} = G * \text{Equivalence Scale} - (\text{BRR} * \text{Net Income}_{i,f})$$

Where the subscripts i and f refer to whether the BIP is delivered to the individual (i) or family (f).

The child (denoted by the subscript k) top-up is calculated for each model as:

$$BIP_k = G_k * \text{Equivalence Scale} - (\text{BRR} * \text{Net Income}_{f,i})$$

using the values set out in Table 1.

In total, we simulate nearly 5,000 basic income models. We are unable to include behavioural responses to the basic income as insufficient information is available for Nunavut to make the necessary assumptions to model these responses. That is, we assume that people do not change their income-earning habits because of the implementation of a basic income, and we assume that non-tax filers do not change their tax filing behavior. However, this may not be the case for everyone. Behavioral responses can make a basic income either more costly or less costly. It becomes more costly if more people decrease other components of net income (e.g., employment income, income earned through hunting, fishing, trapping, etc.) to claim a larger amount of the basic income and/or non-filers begin filing. It becomes less costly if more people increase other components of their net income because of a lower welfare wall making it easier for those with low net income to choose work. As Green (2020) discuss, income-earning responses may occur in different ways at the same time. How a basic income may specifically affect behavioral responses in Nunavut is unclear.

⁸ In short, a negative income tax-type of basic income is a basic income that is assessed on a very frequent basis (e.g., monthly, bi-weekly) and adjusted in real-time to keep the total income of potential beneficiary's constant in real-time. Tax data, and the CRA in general, is not able to support real-time benefits. The creation of a new administrative body, as was done in the MINCOME basic income experiments in Manitoba in the 1970's to administer a negative income tax-type basic income is possible but administratively complex.

Table 1
Parameters Defining Basic Income Scenarios

Parameter	BI Type					
	UBI			IBI		
Beneficiary Unit	Individual	Family	Child Top-up	Individual	Family	Child Top-up
Basic Guarantee (G)	\$1,000–\$40,000, increasing in increments of \$1,000	\$1,000–\$40,000, increasing in increments of \$1,000	\$2,100	\$1,000–\$40,000, increasing in increments of \$1,000	\$1,000–\$40,000, increasing in increments of \$1,000	\$2,100
Benefit Reduction Rate (BRR)	0%	0%	0%	5%–100%, increasing in increments of 5%	5%–100%, increasing in increments of 5%	5%–100%, increasing in increments of 5%
Equivalence Scale	Per capita (1)	Square root (1.414)	Per capita per child per fiscal unit	Per capita (1)	Square root (1.414)	Per capita per child per fiscal unit
Income	None	None	None	Individual net income	Fiscal unit net income	Net income of the lowest income spouse and fiscal unit net income
Data Set Used	T1 and LAD	T1 and LAD	LAD Only	T1 and LAD	T1 and LAD	LAD Only
Number of Simulations	40 x 2 = 80	40 x 2 = 80	1 x 2 = 2	40 x 20 x 2 = 1,600	40 x 20 x 2 = 1,600	40 x 20 x 2 = 1,600

Basic Income Model Equivalence

While we simulated nearly 5,000 basic income models, this does not represent the full suite of possibilities; however, nearly the full suite of possibilities can be represented by an understanding of the equivalence of the simulated models to the desired model not simulated. For example, if there were a desire to cost a basic income that is of an amount that is not a multiple of \$1,000 (e.g., \$8,500) then comparing the results from the simulations related to a basic income benefit that is a multiple of \$1,000 directly below and above the desired benefit amount (e.g., \$8,000 and \$9,000) provides a cost and outcome range for such a benefit amount.

If instead, there is an interest in modeling an IBI with an earnings exemption, then there is a simple mathematical relationship between such an IBI and an IBI which does not include an earnings exemption. As a reminder, the general formula for a basic income payment is given by

$$BIP_{i,f} = G * \text{Equivalence Scale} - (BRR * \text{Net Income}_{i,f})$$

where G is the maximum size of the basic income benefit and BRR is the benefit reduction rate. This can be calculated for an individual or a family but changing whether net income of the individual or net income of the family is used and using the appropriate equivalence scale (1 for an individual benefit and 1.414 for a family benefit).

For the purposes of this discussion, we assume that the BIP is calculated for the individual so that the equivalence scale=1, yielding

$$BIP_i = G - (BRR * \text{Net Income}_i)$$

Let us assume that we are interested in a basic income model that delivers maximum benefit (G) of \$8,000 and the benefit is reduced by 50% of additional net income (BRR=0.5). We can derive the basic income payment for an individual with \$4,000 in individual net income as

$$BIP = \$8,000 - 0.5 * \$4,000 = \$6,000$$

As per the simulated results report below, the cost of such a basic income model would be approximately \$45M. What if, instead, there was an interest in adding an income exemption where the individual can retain some level of net income before the basic income benefit is reduced?

For example, assume we are interested in basic income model with an income exemption of \$2,000. What is the equivalence then between the BIP model without an income exemption and one with an income exemption?

One possibility is to find the equivalence between basic income models with the same resulting basic income payment which means we just need to solve for the associated BRR of such a model. To do so, we take the general formula, add the income exemption, and set the BIP to that derived above, which is \$6,000.

$$6000 = 8000 - BRR * (\text{Net Income} - \text{Income Exemption})$$

$$\$6,000 = \$8,000 - BRR * (\$4,000 - \$2,000)$$

$$\$6,000 = \$8,000 - BRR * \$2,000$$

$$BRR * \$2,000 = \$8,000 - \$6,000$$

$$BRR = \$2,000 / \$2,000 = 1.0$$

That is, for any given income, for any given basic income model with a desired basic income payment, adding an income exemption simply means there needs to be a higher BRR than that without an income exemption if the desired outcome is a cost neutral basic income model. In our case, a basic income model where the maximum benefit is set at \$8,000 then a basic income model with a 50% BRR and no income exemption has the same overall cost of a basic income model with a maximum benefit of \$8,000, an income exemption of \$2,000, and a BRR of 100%.

Alternatively, you can fix the BRR and find the associated G for a BIP of \$8,000:

$$\$8,000 = G - 0.5 * (\$4,000 - \$2,000)$$

$$\$8,000 = G - \$1,000$$

\$9,000=G

In other words, the associated cost of this BI model is the same as it would be for the modelled G of \$9,000 and BRR of 50%, or \$53.5M. Similar exercises can be completed for any type of model where you want to vary set parameters that were not directly modeled in the simulations.

Simulation Outcome Indicators

For the simulation results, the key outcome indicator that we simulated is the gross fiscal cost. The gross fiscal cost of each BI scenario is estimated by aggregating the BIP amounts for all recipients.⁹ It should be noted that Income Assistance claimed by tax filers was left in the definition of net income as we assumed that Income Assistance remained as is. Thus, the gross cost of each BI scenario is in addition to the 2019 cost of Income Assistance (and, in general, is in addition to the current costs of all income and social supports provided by the GN).

For the simulation results based on the LAD, we also simulated the effect of the various basic income models on the low-income rate, and the rate of those living in deep poverty (measured as living on less than 75% of low-income income). These outcome results are confined to the LAD because, unlike the T1 data, the LAD reports the size of the fiscal unit (including children).

How did we arrive at measures for low income? In Canada, income poverty is officially measured by Statistics Canada using the Market Basket Measure (MBM). However, currently no MBM statistics are available for any of the territories, including Nunavut. Statistics Canada is working with each of the territories to produce an MBM for each jurisdiction that reflects not only goods and services but also well-being, but this product was not available at the time of writing this report.

Instead, we were provided with a draft measure of MBM thresholds for Nunavut for the purposes of this work and detailed in Table 2 (Impact Economics with Two World Consulting Ltd. 2021a, 36). For the purposes of the outcome measures, a fiscal unit is considered to be living in low income if they are a fiscal unit with MBM disposable income below the noted MBM thresholds. We do this by calculating an estimate of MBM disposable income for the fiscal unit by taking after tax and transfers family income and deducting union dues, childcare expenses, spousal/child support payments made, contributions to registered pension plans, and medical expenses. Low-income (or poverty) rates post-BI are estimated by adding calculated BI payments to estimated MBM disposable income and comparing that with the applicable MBM income thresholds from Table 2. We measured the reduction in low-income associated with each BI scenario by comparing post- and pre-BI low-income rates.

⁹ The gross fiscal cost is the cost before taxes are collected. That is, for a UBI, the gross fiscal cost is the cost before taxes and transfers. As the assumption is that the benefit would be delivered as a refundable tax credit, this assumes that the benefit will not be included in taxable income. It is possible to design the benefit to be taxable income, where the benefit is entered into taxable income at tax time, with the total amount taxed back dependent on the total taxable income of the individual and the applicable tax rates.

Table 2
MBM Disposable Income Thresholds Use to Calculate Low-income Rates

Family Size	MBM Disposable Income Thresholds (\$)
1	47,500
2	67,175
3	82,272
4	95,000
5	106,213
6	116,351
7	125,673
8	134,350
9	142,500
10	150,208
11	157,540
12	164,545
13	171,264
14	177,729

Source: Impact Economics with Two World Consulting Ltd. (2021a) estimates a possible MBM low-income thresholds for a family of four as being \$95,000. Remaining thresholds are a simple calculation using the square root of the family size. Note: These draft MBM thresholds strongly parallel the income threshold established for access to legal aid services (Legal Services Board of Nunavut 2019, 13)

It is important to note limitations with using these MBM thresholds and estimated MBM disposable income for the purposes of calculating low-income rates. First, these are preliminary and unofficial estimates of MBM thresholds and are not finalized MBM thresholds based on Statistics Canada’s detailed calculations. It is expected that official Statistics Canada MBM thresholds for Nunavut will be available sometime in 2023.

Second, these total thresholds are based on five components: food, clothing, transportation, shelter, and other/well-being. There are various assumptions that are used to calculate the thresholds components that are important to its interpretations. For example, the shelter component is related to costs to secure unsubsidized shelter. Since subsidized shelter is extremely common in Nunavut, this affects the interpretation of the thresholds. However, using tax filer data, we are unable to identify who lives in subsidized housing thus our estimate of MBM disposable income also does not reflect received housing transfers or the provision of fully subsidized housing. However, if the interest is in determining income needed to secure market-housing then these estimates help provide that information.

Third, the thresholds presented in Table 2 are based on a reference family of two adults aged 25 to 49 and two children 9 and 13.¹⁰ The authors then adjusted these thresholds for other family sizes based on the square root scale. If the reference family is not generally representative of the population being studied, as may be the case in Nunavut, the thresholds will be similarly non representative.

¹⁰ The MBM-North measures being compiled by Statistics Canada will be based on a reference family of two adults and three children, the third child being 4 years of age.

Fourth, the MBM is a measure that is calculated for the economic family. Unfortunately, the only family type that tax data can identify is the fiscal unit and the only available data that has enough information to simulate basic income designs for Nunavut is tax filer data. Low-income measures calculated using the fiscal unit will not be the same as those based on the economic unit.

Finally, MBM thresholds in Table 2 are not adjusted for the cost of goods and services in various regions across Nunavut and reflect a territory-wide threshold. This likely does not reflect the differences in the cost of living in different regions in Nunavut. Taken together, the low-income results presented here should be treated as inferior rough guidelines and are not official low-income statistics.

As a final note on income poverty, as we assumed that the current income and social supports did not change, the income poverty for each BI scenario includes the effect of both the current system plus the particular BI scenario.

Results

As noted above, we have nearly 5,000 simulation results from two different data sets meaning it is challenging to summarize all of these models. In this section of the report, we provide a high-level summary. More detailed results are available at <http://nvt-simulation.surge.sh/>. The website provides a detailed visualization of the results for benefits that increase in \$5,000 unit increments.¹¹ The website also features various pulldown menus that allows users to select specific simulation parameters to narrow the results. Further, we have provided the GN with the results of all the nearly 5,000 simulation results. Below we provide a summary discussion.

Universal Basic Income (UBI) Scenarios

We first provide the cost results for the UBI simulations.

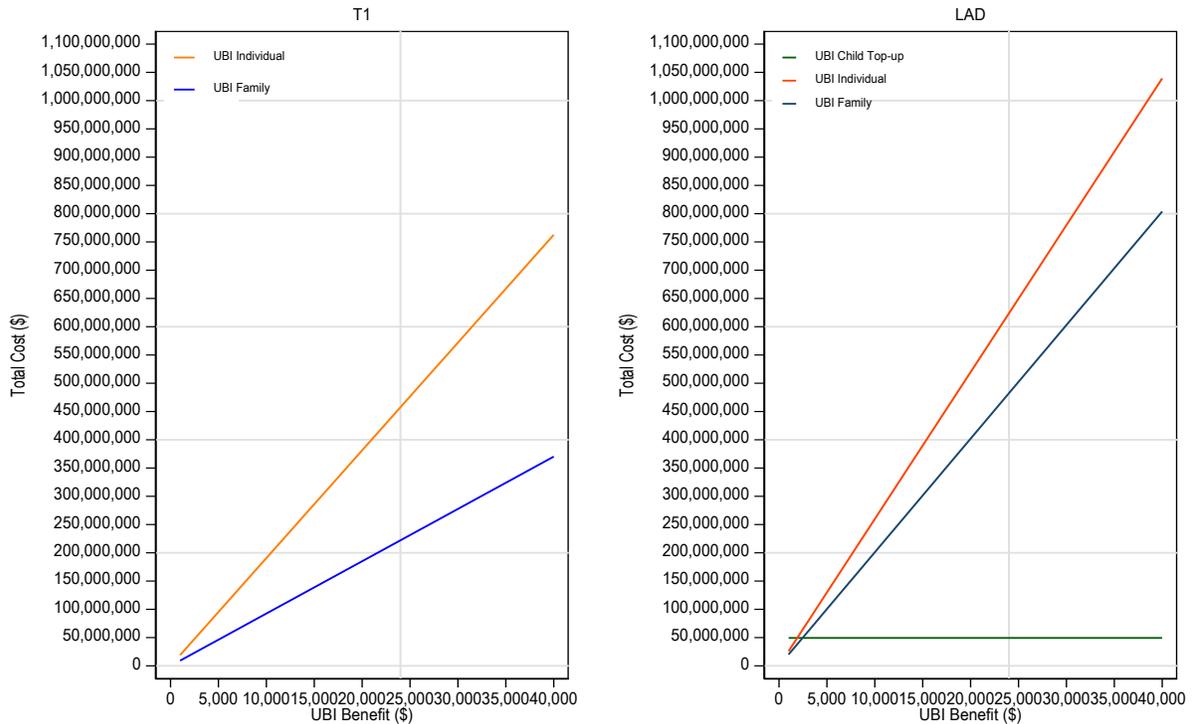
Cost Outcomes

Figure 1 shows the relationship between the UBI benefit and costs for both the individual UBI and the family UBI and for both data sets. Results from the T1 data are presented in the panel on the left and the LAD in the panel on the right. The LAD panel on the right also shows the fixed cost of the child-top delivered as a UBI.

There are some high-level takeaways. First, because the UBI benefit is a scalar function, the relationship between the costs and benefits are linear. Second, the slope for the individual UBI is steeper than the slope for the family UBI showing that the cost for an individual UBI rises at a faster rate than the family UBI. Third, the cost estimates are higher using the LAD than the T1. As noted earlier in this report, based on the nature of the data sets, we consider the results from the LAD to be of higher quality than the T1.

¹¹ The website is best viewed on Google Chrome. We chose to not have all the benefit amounts represented because the results become quite cluttered when considered with all the other options.

Figure 1
Simulated UBI Fiscal Cost for Nunavut



Source: Author calculations using T1 Administrative Data and Longitudinal Administrative Data (LAD) for 2019.

From Figure 1, we can also see that:

- Using the T1 data, the annual cost of the individual UBI ranges from \$19M for a \$1,000 benefit to \$763M for a \$40,000 benefit.
- Using the T1 data, the annual cost of a family UBI would be lower, ranging from \$9M for a \$1,000 (\$1,414 for a couple) benefit to \$370M for a \$40,000 (\$56,560 for a couple) benefit.
- In comparison, using the LAD, the annual cost of the individual UBI ranges from \$26M for a \$1,000 benefit to \$1,039M for a \$40,000 benefit.
- A UBI delivered to children under the values discussed previously would cost \$49M.

If Income Assistance were eliminated in favor of a UBI, and we constrain a UBI to have the same cost as Income Assistance (\$51M in 2019), this aligns with the following scenarios:

- A UBI child-top up of \$2,100 delivered annually (\$175/month) to all children in a fiscal unit (for an annual cost of \$49M).
- Based on the T1 data, an individual UBI of \$3,000/year (\$250/month, for an annual cost of \$57M).
- Based on the LAD data, an individual UBI of \$2,000/year (\$166.67/month, for an annual cost of \$52M).
- Based on T1 data, a family UBI of \$6,000/year (\$500/month, for an annual cost of \$55M).

- Based on LAD data, a family UBI of \$3,000/year (\$250/month, for an annual cost of \$60M).

How do these compare with benefits under the Income Assistance program? Table 3 outlines the basic allowance under the Income Assistance program by zone and number of family members. A complexity with comparing benefits under the basic income scenarios presented here and the benefits under the Income Assistance program is that these programs define a family unit differently. As outlined previously, because simulations are based on tax data, the family unit is necessarily then defined by the Income Tax Act. While Canada uses the individual as the tax unit, the fiscal unit is generally used to assess various non-refundable and refundable tax credits. Generally, a fiscal unit is defined as an individual, a spouse or common law partner if reported, and dependent children.

For the Income Assistance program in Nunavut, the regulations provide some guidance on how to define a family, but the guidance is not definitive. A child simply means “a person under the age of 18” and a dependent is “a member of the family of the applicant who resides with him or her and who is wholly or in part dependent on the income of the applicant, and includes the spouse living with an applicant, but does not include a foster child living in the home of the applicant or an adult in the home who is maintained by the Director.” As a result, for a basic income, we only know the distribution of the benefits by fiscal unit and not by a household. That said, all of the UBI’s enumerated above that are of comparable cost to Income Assistance offer a substantially lower benefit than the benefit under the

Table 3
Income Assistance Rates in Nunavut, By Zone and Family Size, August 2021

Zone # of family members	Zone 1	Zone 2	Zone 3	Zone 4
1	\$682	\$727	\$740	\$782
2	\$866	\$921	\$937	\$986
3	\$1,079	\$1,144	\$1,160	\$1,222
4	\$1,373	\$1,455	\$1,478	\$1,553
5	\$1,644	\$1,742	\$1,770	\$1,859
6	\$1,894	\$2,006	\$2,038	\$2,140
7	\$2,123	\$2,247	\$2,283	\$2,396
8	\$2,329	\$2,464	\$2,503	\$2,627
9	\$2,514	\$2,659	\$2,700	\$2,832
10	\$2,678	\$2,830	\$2,874	\$3,013
Each additional family member	\$163	\$171	\$173	\$181
Temporary Disability	\$125	\$125	\$125	\$125
Permanent Disability	\$250	\$250	\$250	\$250
60 years +	\$175	\$175	\$175	\$175

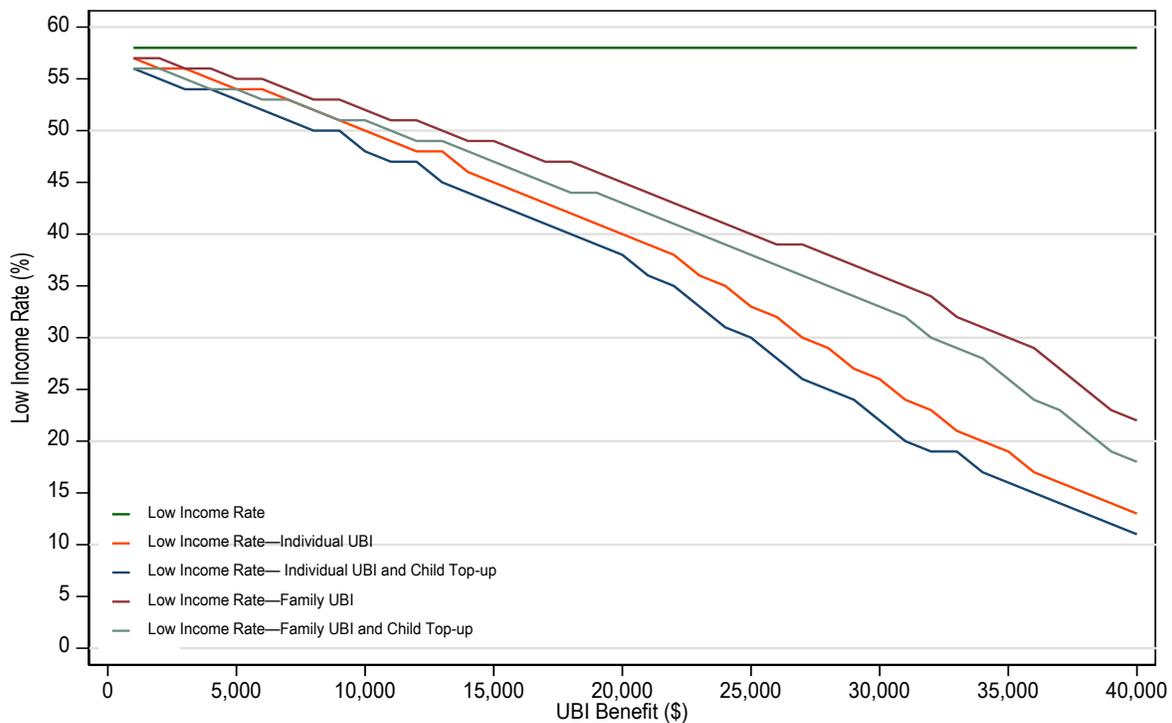
Income Assistance program. It is clear that most fiscal units that receive Income Assistance would receive a lower benefit under a UBI program of comparable cost.

We can also compare the UBI simulations to the Canada Emergency Response Benefit (CERB), which delivered the equivalent of an annual benefit of \$24,000. Based on the T1 data, an individual UBI of \$24,000 would cost \$458M annually and a family UBI of \$24,000 would cost \$222M annually. Based on the LAD, an individual UBI of \$24,000 would cost \$624M annually and a family UBI of \$24,000 would cost \$482M annually.

Low-income Measures

What is the impact of the UBI models on simulated low-income rates? Figure 2 shows the change in the low-income rate as the UBI benefit increases using the LAD results. The low-income rate, defined as the proportion of fiscal units whose estimated disposable income is lower than the low-income thresholds shown in Table 2, is 58 per cent in 2019 before a basic income (green line in Figure 2). All UBIs deliver poverty reduction albeit at difference magnitudes and rates. In all cases, Figure 2 shows that the function is often a step function where increasing the benefit does not always provide a change in low-income rates. This occurs as households closer to the threshold are lifted above the low-income threshold and households left under the threshold are further and further away from the threshold. Unsurprisingly, individual UBI's result in a lower low-income rate than do family UBI's.

Figure 2
Simulated MBM Poverty Rates from UBI Scenarios for Nunavut

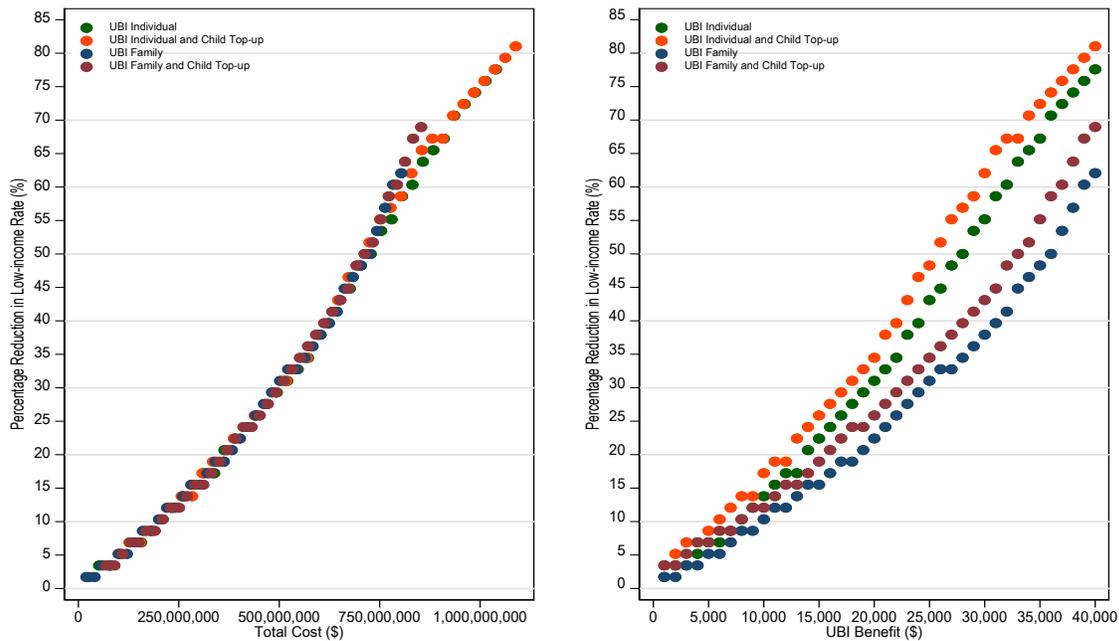


Source: Author calculations using the Longitudinal Administrative Database for 2019.

Figure 3 plots the percentage reduction in low-income rates as gross fiscal cost increases (left panel) and as the UBI benefit increases (right panel). We see that various UBIs deliver similar poverty reduction rates by total cost (left panel), but that reduction in poverty rates do differ across benefit amounts, widening as the benefit increases (right panel). This helps determine how much a certain reduction in low-income rates would cost and at what UBI benefit level. For example, if the desire is to reduce low-income rates by 50% (to 29%), this can be accomplished with an individual UBI of \$28,000/year (at a cost of \$728M) or an individual UBI of \$26,000/year with a \$2,100 top-up for every child (at a cost of \$725M). For a family UBI, a 50% reduction in low-income rates is achieved at benefit level of \$36,000/year (at a cost of \$723M) or a benefit level of \$33,000/year with a child top-up of \$2,100 (at a cost of \$713M). Recall that these costs are in addition to the current costs of income supports, including Income Assistance (\$51M in 2019). If Income Assistance were to be replaced by a UBI, to achieve the same level of low-income reduction, the benefit and costs of the UBI would be higher.

Finally, we consider the effect of a UBI on deep poverty (those whose disposable income is 75 per cent of the low-income threshold). Figure 4 shows the effect of UBIs on the rate of deep poverty in Nunavut. The rate of deep poverty in Nunavut before any basic income is delivered is 48 per cent. All UBIs deliver a reduction in deep poverty albeit at difference magnitudes and rates. Unlike with poverty rates, with deep poverty we see plateauing of deep poverty rates at very high benefit levels: there is no step function. Regardless, in no case do any of the UBI's modelled eliminate deep poverty. The lowest rate achieved is a deep poverty rate of 3 per cent. As before, individual UBI's reduce deep poverty by more than family UBI's.

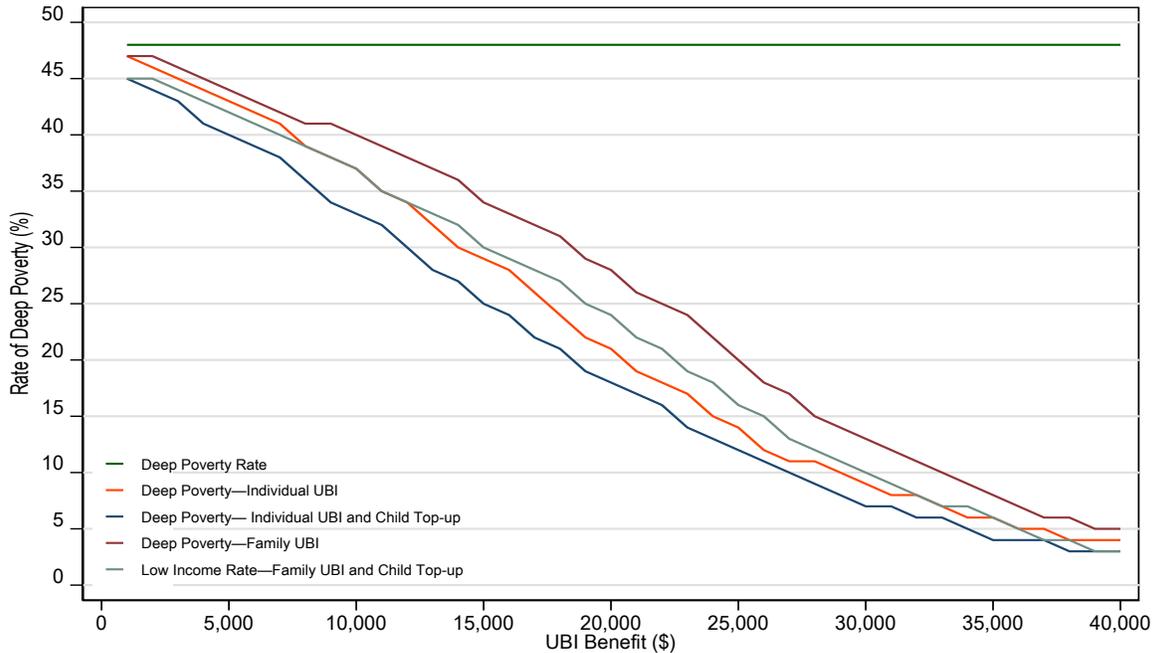
Figure 3
Simulated Reduction in Low-income Rates from UBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

Figure 4

Simulated Rates of Deep Poverty from UBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

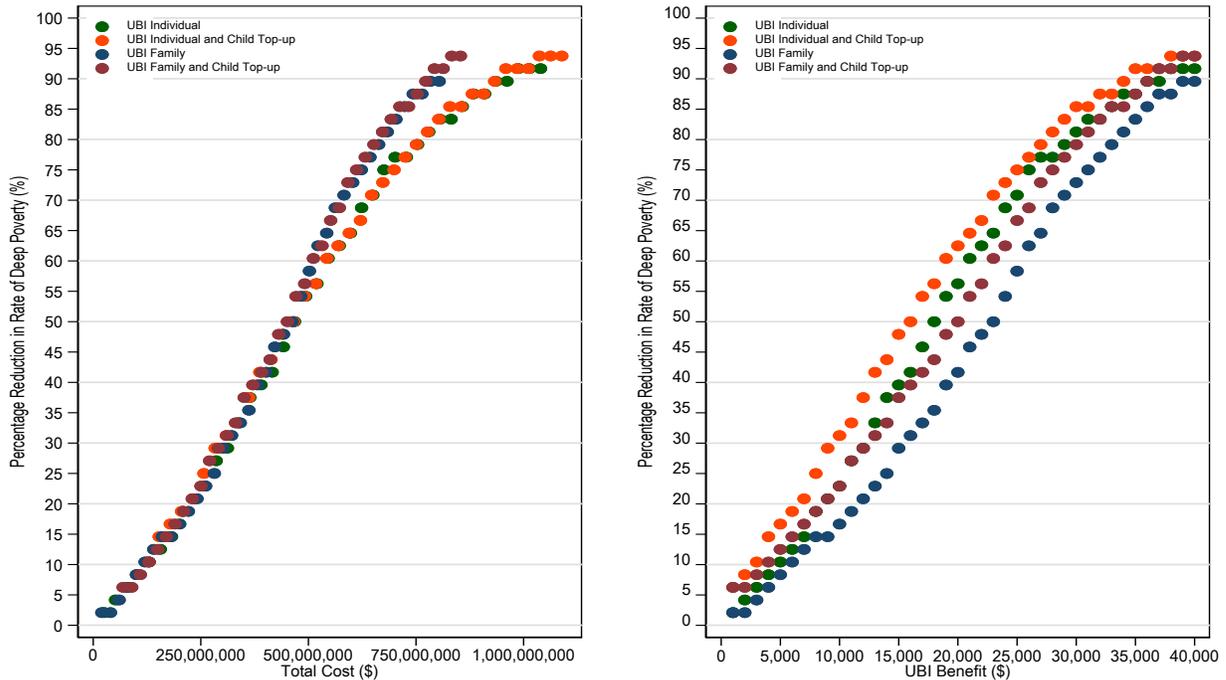
Figure 5 is similar to figure 3 but is for deep poverty: it shows the reduction in the rate of deep poverty as gross fiscal cost increases (left panel) and as the UBI benefit increases (right panel). As in figure 3, the various UBIs deliver similar reductions in deep poverty rates by total cost (left panel) up to a point when the family UBI delivers more reduction in deep poverty for a given cost. In contrast, if we look at the reduction in deep poverty by benefit levels, the individual UBI's deliver a larger reduction in deep poverty at any given benefit compared to family UBI's.

This helps determine how much a certain reduction in low-income rates would cost and at what benefit level. For example,

- If the desire is to reduce rates of deep poverty by 50% (to 24%), this can be accomplished by an individual UBI of \$18,000/year (at a cost of \$468M) or an individual UBI of \$16,000/year with a \$2,100 child top-up (at a cost of \$465M).
- For a family UBI, a 50% reduction in deep poverty is achieved at benefit level of \$23,000/year (at a cost of \$462M) or a benefit level of \$20,000/year with a child top-up of \$2,100 (at a cost of \$451M).

Recall that these costs are in addition to the costs of current income and social supports including the cost of Income assistance (\$51M in 2019). If Income Assistance were to be replaced by a UBI, to achieve the same level of deep poverty reduction, the benefit and costs of the UBI would be higher.

Figure 5
Simulated Reduction in Rates of Deep Poverty from UBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

Tailored UBI Simulation

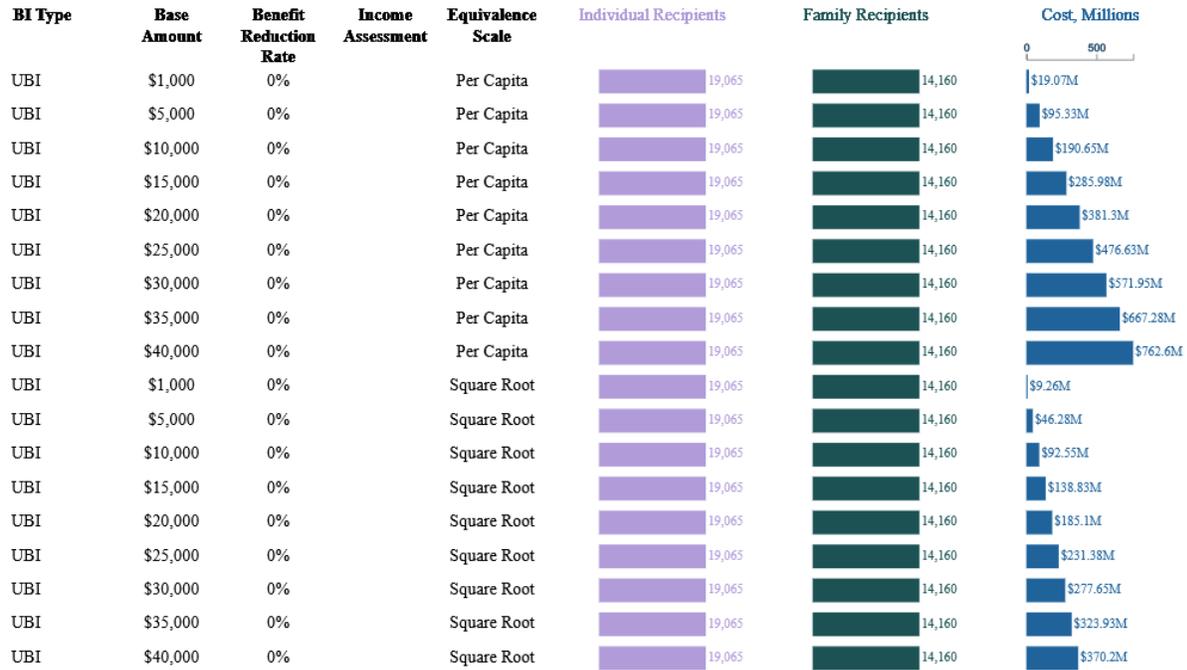
Not presented in any of these figures is a simulation that is neither quite a UBI or an IBI. We asked the question how much it would cost to give every fiscal a unit an income top-up that would exactly lift family net income to the MBM threshold. Fiscal units whose family net incomes are above the threshold would receive nothing and those below the threshold would receive a personalized cash transfer amount that would ensure that their family net income lifted them precisely to the low-income line. This simulation effectively eliminates income poverty as measured by the low-income thresholds and eliminates deep poverty. Such a cash transfer system would cost \$390M per year (in addition to the cost of Income Assistance) and would be more administratively complex as the cash transfer would have to uniquely calculated for each fiscal unit. The fiscal cost of this transfer would be similar to an individual UBI of a \$15,000/year or a family UBI of \$20,000/year.

Website Visualizations

Finally, we provide a summary of the results that can be found on the visualization website. Figure 6 shows the select results from the UBI Simulations for Nunavut that are accessible via the aforementioned website for the T1 data. Figure 6 shows, as did Figure 1, that an individual UBI is more costly than a family UBI (noted using the square root scale under the Equivalence Scale heading).

Figure 6

Select Results from the UBI Simulations for Nunavut, T1 Data: Recipients and Cost



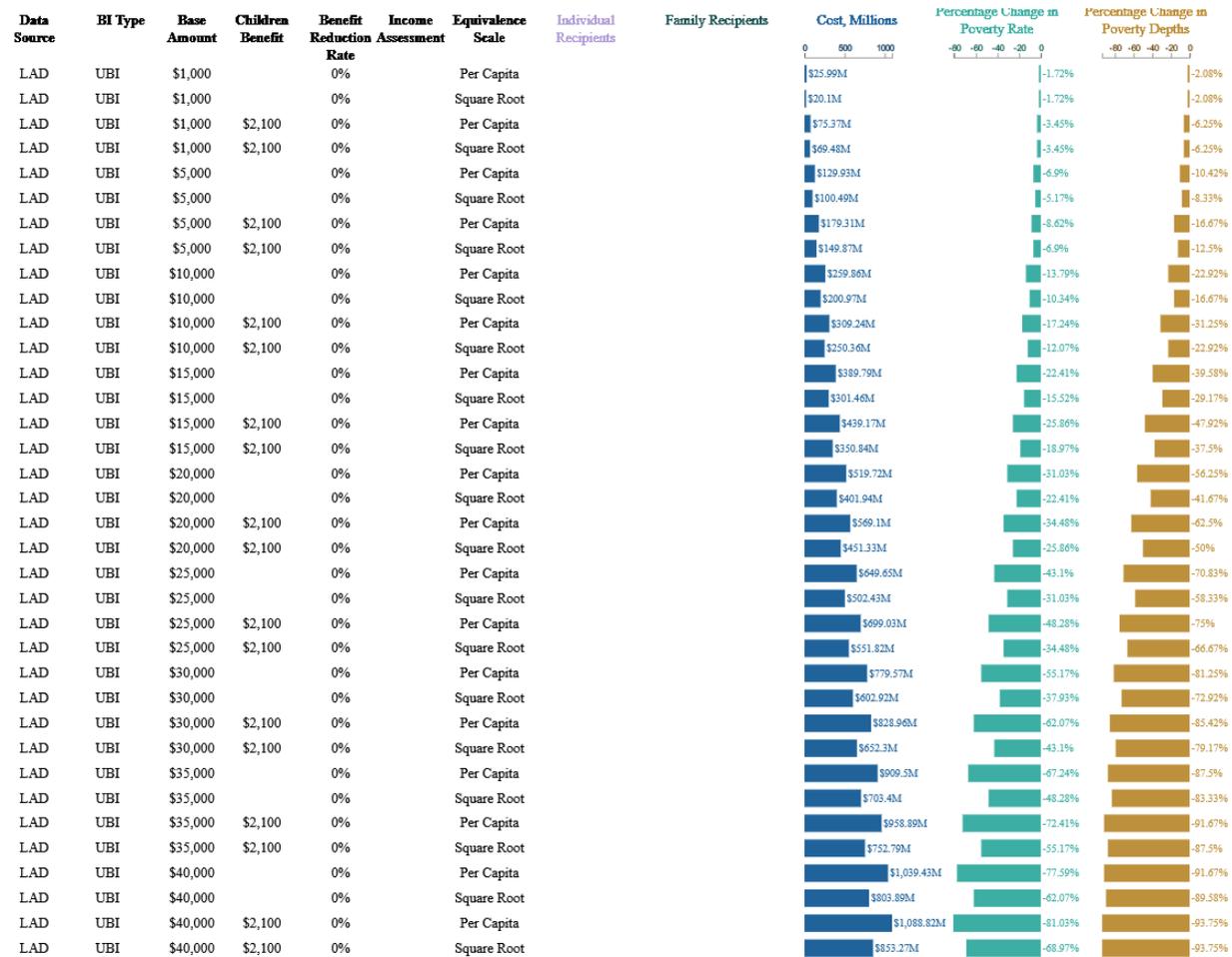
Source: Author calculations using T1 data for 2019.

While we are not able to do any poverty modeling using the T1 data because we do not know family size, for context, Impact Economics with Two World Consulting Ltd. (2021b) estimate that an annual income of \$47,500 is needed for a single person in Nunavut to live above the poverty line. None of the UBIs modelled here would lift a person with no other income above that threshold.

Figure 7 shows select results from the UBI Simulations for Nunavut using the LAD. Unfortunately, unlike the T1 data, we are unable to release the number of recipients under the LAD simulations but the LAD results show the changes in the low income rate and the change in the depths of low income. That said, as the T1 results show, the number of recipients does not vary under a UBI as all adults in Nunavut receive it.

Figure 7

Select Results from the UBI Simulations for Nunavut, LAD data: Cost and Poverty Reduction

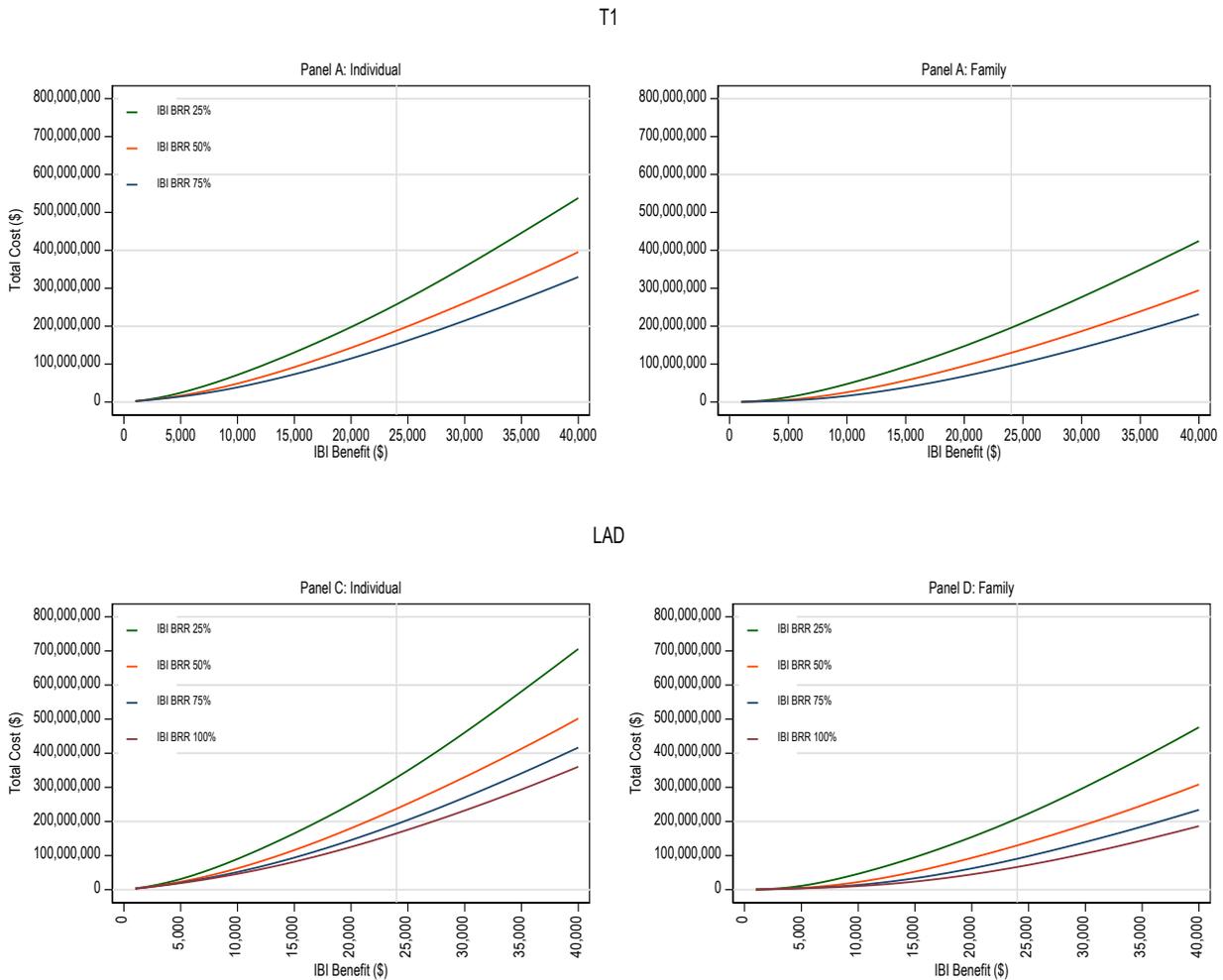


Source: Author calculations using the Longitudinal Administrative Database for 2019.

Income-based Basic Income (IBI) Scenarios

In this section, we present the IBI simulations. Recall that in the case of an IBI we have to consider the impact of not only varying the benefit and the beneficiary unit, but also the benefit reduction rate (BRR). For the results presented here from the T1 data, we assume that if a person reports having a spouse that we are unable to find in the tax data that spouse has \$0 in income. For the LAD data, we have full information on a person's spouse. This difference in information on spouses is apparent in the results.

Figure 8
Simulated IBI Fiscal Cost for Nunavut



Source: Author calculations using T1 data and LAD for 2019.

Figure 8 presents the cost information for four BRRs: 25%, 50%, 75%, and 100% (for the LAD). The panels on the left are for individual IBIs, while the panels on the right are for family IBIs.¹² The top row shows results from the T1 data and the bottom row shows the results for the LAD. In general, we see that as with the UBI, costs are higher for the individual IBI compared to the family IBI. Further, it is clear from

¹² Referring back to Table 1, note that with an individual IBI, each individual receives the benefit and it is reduced according to their own net income (regardless of whether or not a spouse is present). For a family IBI, a couple receives the basic income benefit multiplied by 1.414 and then it is reduced by their combined net family income. In cases where the spouse does not file taxes, the spouse's contribution to net family income is assumed to be \$0.

Figure 8 that the smaller the BRR, the higher the cost. Finally, unlike with the UBI, the relationship between the benefit and the cost is nonlinear.

More specifically, based on the T1 data, the cost of an individual IBI with a 25% BRR ranges from \$2.5M for a benefit of \$1,000 to \$538M for a benefit of \$40,000. The same IBI but for the family varies in cost from \$0.6M to \$425M. At the other end of the spectrum is an IBI with a BRR of 75%. Such an individual IBI ranges in cost from \$2.1M to \$330M, while a family IBI ranges from \$0.4M to \$232M (all costs are in addition to current income and social supports costs including income assistance costs of \$51M).

Based on the LAD, the cost of an individual IBI with a 25% BRR ranges from \$2.1M for a benefit of \$1,000 to \$435M for a benefit of \$40,000. The same IBI but based on the family varies in cost from \$0.7M to \$476M. For an IBI with a BRR of 75%, if based on the individual would cost \$3M for a \$1,000 benefit to \$417M for a \$40,000 benefit. If instead it is based on the family, a benefit of \$1,000 would cost \$0.5M while a benefit of \$40,000 would cost \$234M. At the extreme end of the spectrum is an IBI with a BRR of 100%. Such an individual IBI ranges in cost from \$3.0M to \$360M, while it ranges from \$0.5M to \$186M for a family IBI (all costs are in addition to current income and social supports costs including income assistance costs of \$51M).¹³

A family IBI with a 100% BRR is the closest basic income to Income Assistance—though not perfectly since under current Income Assistance rules in Nunavut there is a small earnings exemption that exists before the 100% BRR kicks in and the family is defined differently. Differences aside, an IBI with a 100% BRR, either a family IBI of \$22,000/year (gross cost: \$55M) or an individual IBI of \$11,000/year (gross cost: \$53M) aligns with similar costs as the income assistance system. That is, if an IBI of \$22,000 to the family or \$11,000/year to the individual with a BRR of 100% were implemented, the IBI would reach those not receiving Income Assistance or receiving low levels of Income Assistance, doubling the cost of income supports (\$55M for the IBI and \$51M for Income Assistance).

As before, we can also compare the IBI simulation to the CERB, which delivered the equivalent of an annual benefit of \$24,000. Based on the T1 data, an individual IBI of \$24,000/year would cost between \$138M to \$411M depending on BRR, and between \$81M and \$342M for a family IBI, BRR dependent. Using the LAD, such an IBI would cost between \$165M to \$555M for an individual IBI, and between \$67M and \$414M for a family IBI, BRR dependent.

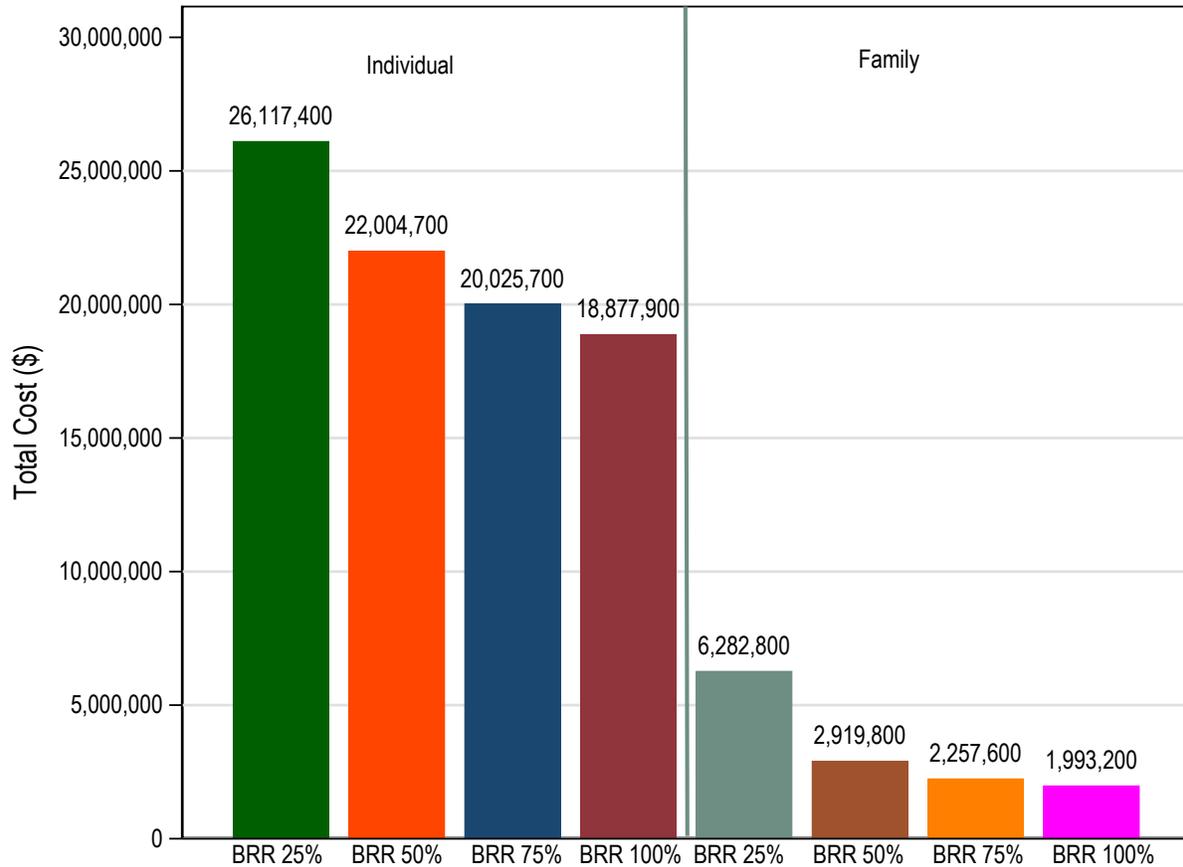
Child-top Up

In Figure 9 we present the cost information related to the child top-up based on the LAD. Recall that the child top-up is a benefit of \$2,100/year per child. When the benefit is delivered to individuals and scaled based on income, the BRR is calculated based on the net income of the lowest earning adult. When the benefit is delivered to families, the BRR is calculated based on family net income. In figure 9, the first four bars are associated with various BRRs where the benefit is delivered to an individual parent, while the next four bars are the costs associated with various BRRs where the benefit is delivered to families. Overall, the costs associated with a child-top up are higher when delivered based on the individual and

¹³ We did not simulate a BRR of 100% using the GN tax filer data, but upon considering those results we decided to add that simulation to work with subsequent data sets.

Figure 9

Simulated Fiscal Cost for Child-top Up for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

the income of the lower-income spouse than when calculated based on family net income. Further, costs are higher the lower the BRR.

In the case of total costs of a child-top up delivered to the individual/lowest income spouse, costs would range from \$26M for a 25% BRR to \$18.9M for a 100% BRR. For a child-top up delivered based on family net income, costs would range from \$6M for a 25% BRR to \$2M for a 100% BRR.¹⁴

Low-income Measures

We next examine the impact of the IBI models on simulated low-income rates based on the LAD results. Figure 10 shows the change in the low-income rate as the IBI benefit increases for select IBI BRRs and

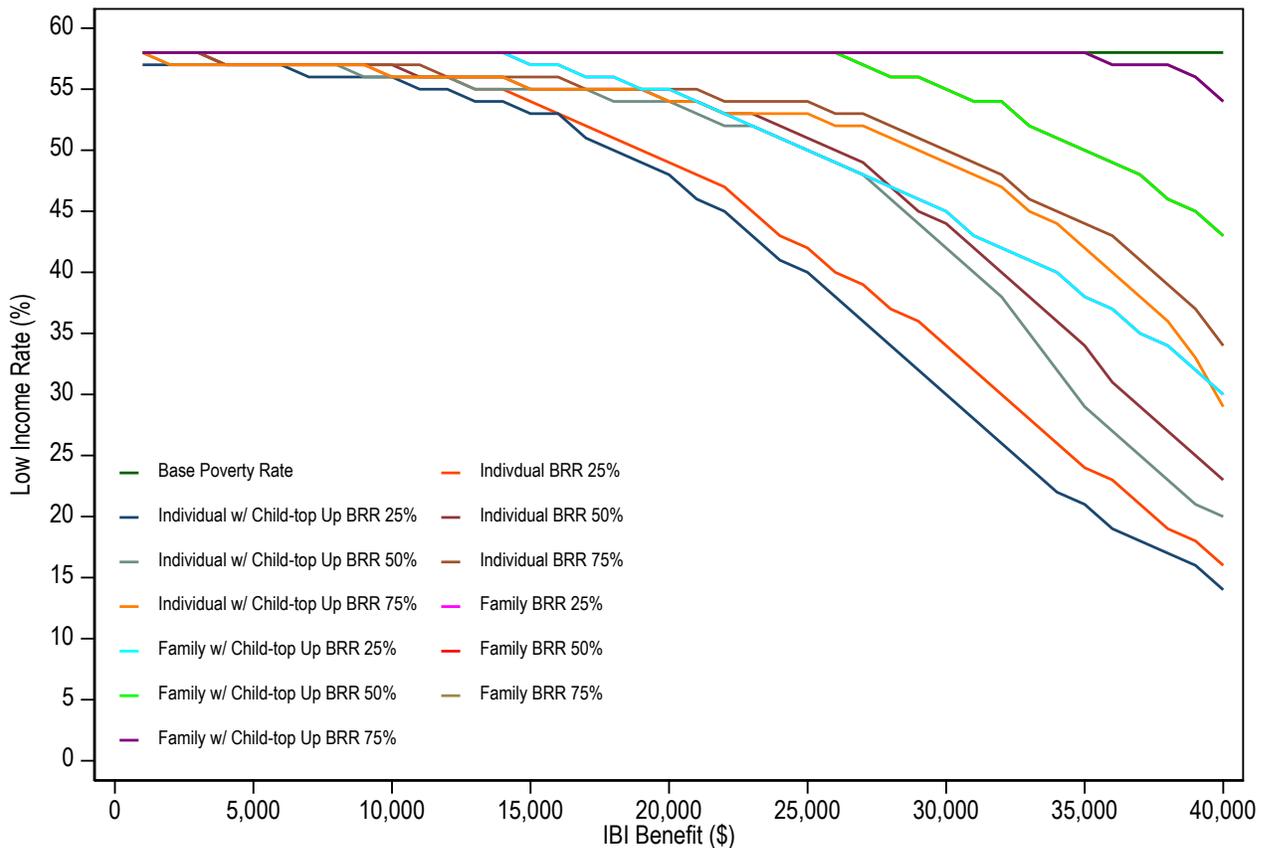
¹⁴ Note that it is possible that the lower income spouse in the individual BI scenarios, and the fiscal units in the family BI scenarios claim Income Assistance. If they do and the BI is scaled back because of income assistance as we have modelled, this means that those receiving income assistance receive a smaller child top-up than those with otherwise similar income but no income assistance. This is an interaction issue the GN should contemplate when considering the design and implementation of cash benefits including a BI.

whether or not the child-top up is included. As before, the low-income rate is defined as the proportion of fiscal units whose disposable income is lower than the low-income thresholds shown in Table 2. Before a basic income is implemented, the low-income rate is 58% for 2019.

Based on Figure 10, we make some observations. First, all IBIs decrease the low-income rate to some degree albeit at different magnitudes and rates. Family IBI's have a smaller impact on low-income rates than individual IBI's and the higher the BRR the smaller the decline in the low-income rate. In fact, for a family IBI with a BRR above 50%, it takes a large benefit before there is any reduction in the low-income rate.

Second, we see that the reduction in low-income rates follows a step function especially at lower benefit levels. This shows that increasing the IBI benefit level does not always decrease the low-income rate. This occurs as households closer to the threshold are lifted above the low-income threshold and households left under the threshold have started with an income that is further away from the threshold making it harder to lift them above the low-income threshold.

Figure 10
Simulated Low-income Rates from IBI Scenarios for Nunavut

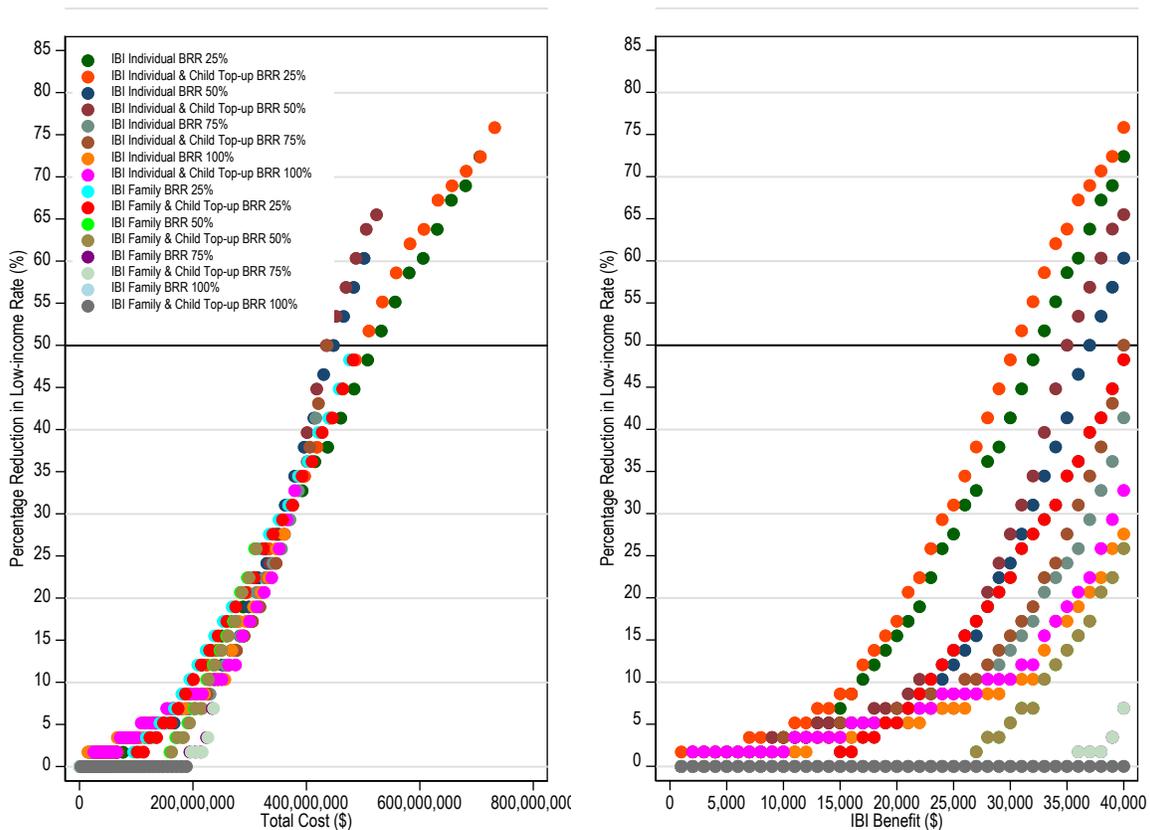


Source: Author calculations using the Longitudinal Administrative Database for 2019.

Figure 11 plots the percentage reduction in low-income rates by gross fiscal cost (left panel) and UBI benefit (right panel). We see from Figure 11 that various IBIs deliver similar reductions in low-income rates by gross fiscal cost up to a point, after which they diverge. Figure 11 also shows that not many IBIs can deliver a 50% reduction in poverty. In fact, the only IBIs that can achieve a 50% reduction in low-income are the individual IBIs with or without a child-top and with a BRR of 50% or less. In particular, if the goal is to reduce low-income rates by 50% (from 58% to 29%), this can be accomplished by an individual IBI with a 25% BRR and a benefit level of \$33,000/year at a cost of \$532M or a 25% BRR and a benefit level of \$31,000/year with a \$2,100/year per child top-up at a cost of \$510M. Alternatively, a 50% reduction in low-income rates can be accomplished with an individual IBI with a 50% BRR and a benefit level of \$37,000/year at a total cost of \$448M or an individual IBI with a 50% BRR and a benefit level of \$35,000/year with a \$2,100/year per child top-up at a cost of \$435M (all in addition to keeping current income and social supports in place).

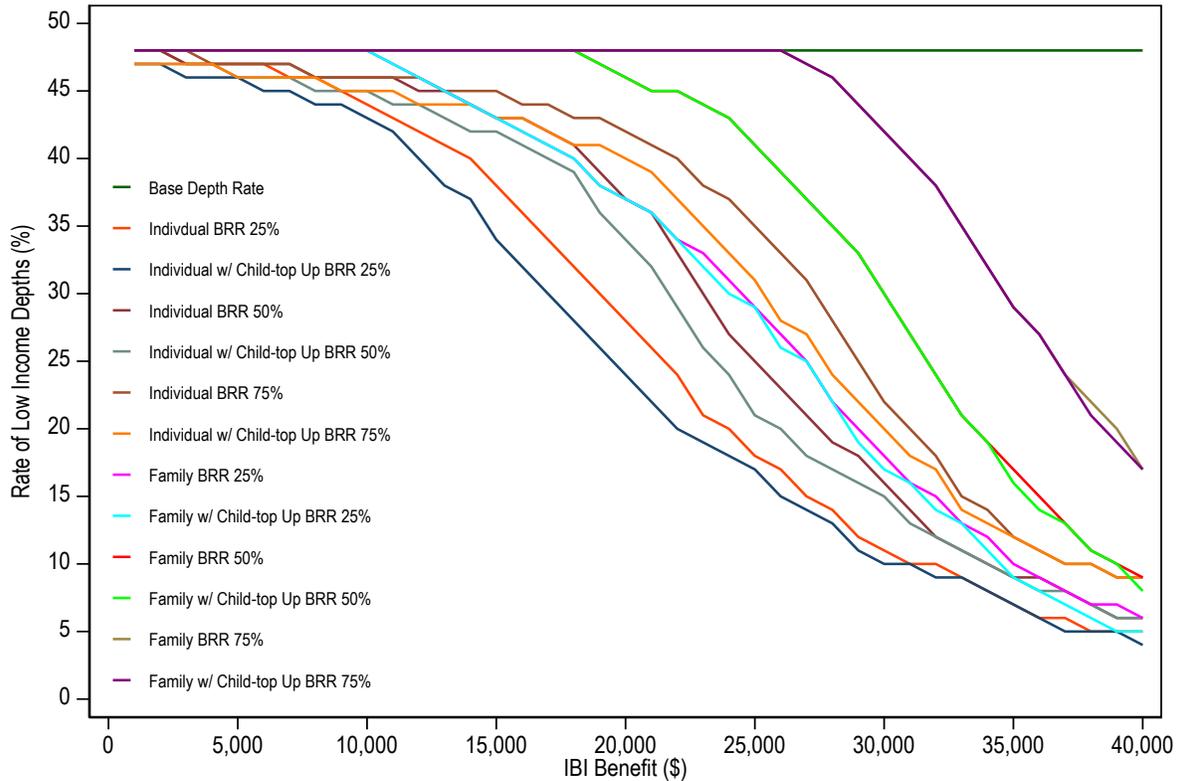
Finally, we consider the effect of an IBI on deep poverty (those whose disposable income is below 75 per cent of the low-income threshold). Figure 12 shows the effect of IBIs on the rate of deep poverty in Nunavut. The rate of deep poverty in Nunavut before any benefit is delivered is 48 per cent. All IBIs

Figure 11
Simulated Reduction in Rates of Deep Poverty from UBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

Figure 12
Simulated Rates of Deep Poverty from IBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

deliver a reduction in deep poverty albeit at difference magnitudes and rates. As before, we see plateauing of deep poverty rates at various benefit levels and BRRs. In no case do any of the benefits modelled fully eliminate deep poverty. The lowest rate achieved is a deep poverty rate of 3 per cent. As before, individual IBI’s reduce deep poverty by more than family IBI’s.

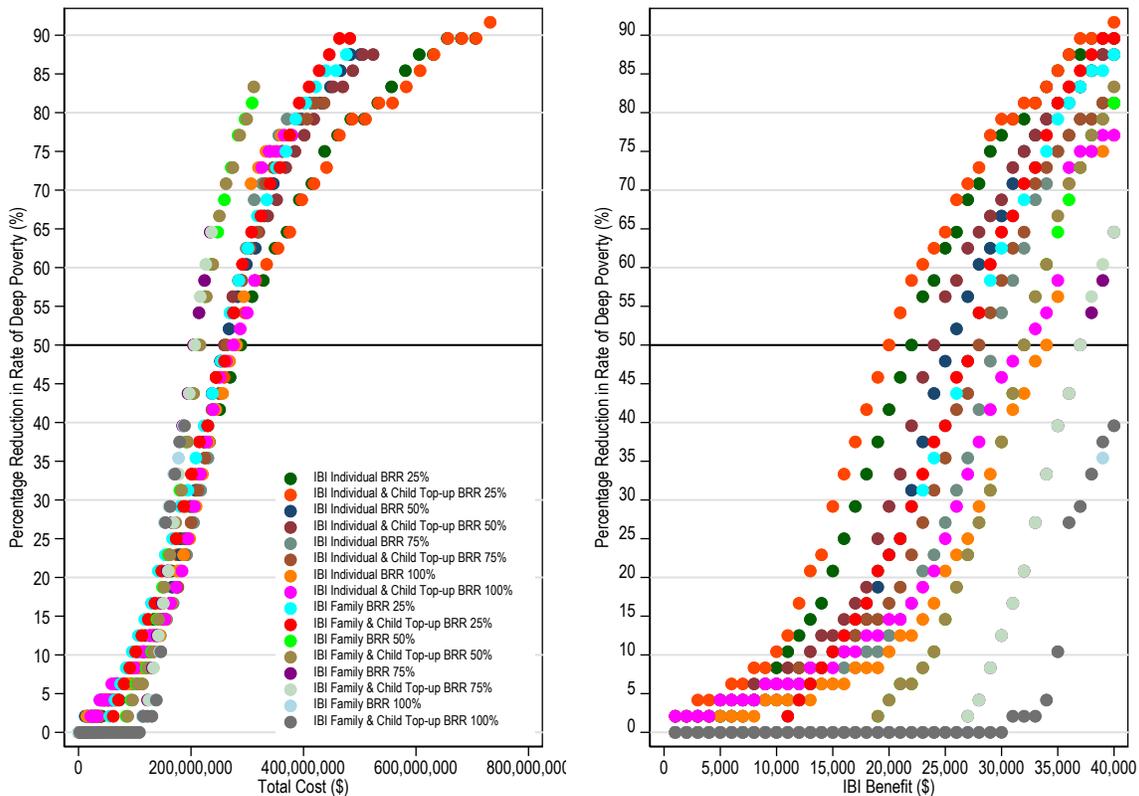
Figure 13 shows the reduction in rates of deep poverty by both gross fiscal cost (left panel) and IBI benefit (right panel). Various IBIs deliver similar reductions in deep poverty rates by gross cost (left panel) up to a point when the family IBI delivers more reduction in deep poverty for a given gross cost. In contrast, if we look at the reduction in deep poverty by benefit levels, individual IBI’s deliver a larger reduction in deep poverty at any given benefit compared to family IBI’s.

Unlike with low-income rates, when we focus on deep poverty, nearly all IBI benefits can meet a 50% reduction in deep poverty, with the exception of family IBIs with a 100% BRR, with or without a child top-up. If the goal is to reduce rates of deep poverty by 50% (to 24%) then this can be accomplished by a variety of IBIs:

- For an individual IBI, the target can be met by an:
 - Adult benefit level of \$22,000 with a BRR of 25% at a cost of \$289M

Figure 13

Simulated Reduction in Rates of Deep Poverty from UBI Scenarios for Nunavut



Source: Author calculations using the Longitudinal Administrative Database for 2019.

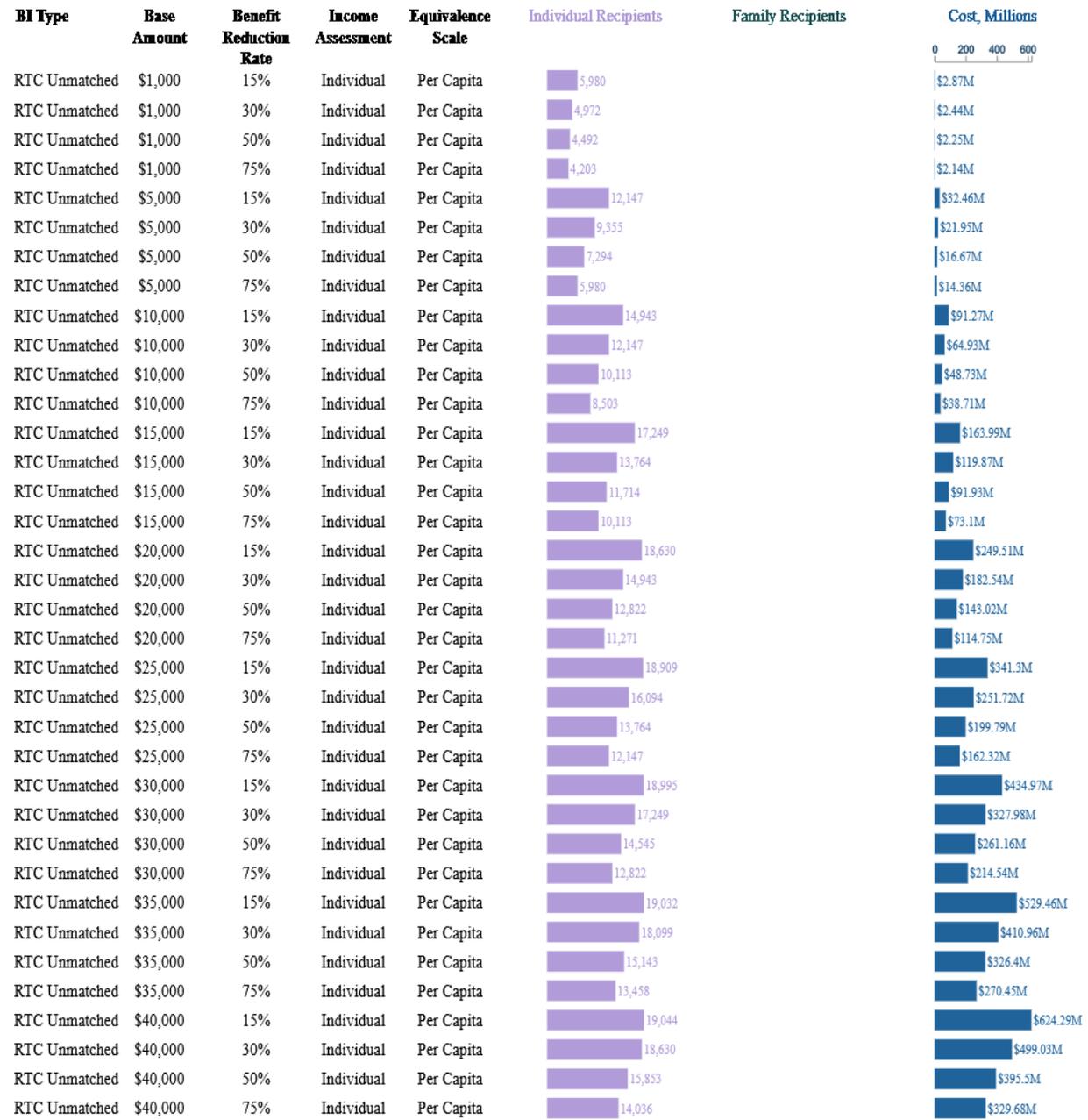
- Adult benefit level of \$20,000 and a child-top up with a BRR of 25% at a cost of \$277M
- Adult benefit level of \$26,000 with a BRR of 50% at a cost of \$267M
- Adult benefit level of \$24,000 and a child-top up with a BRR of 50% at a cost of \$259M
- Adult benefit level of \$29,000 with a BRR of 75% at a cost of \$257M
- Adult benefit level of \$28,000 and a child-top up with a BRR of 75% at a cost of \$263M
- Adult benefit level of \$34,000 with a BRR of 100% at a cost of \$281M
- Adult benefit level of \$32,000 and a child-top up with a BRR of 100% at a cost of \$275M
- For a family IBI, the target can be met by an:
 - Adult benefit level of \$27,000 with a BRR of 25% at a cost of \$253M
 - Adult benefit level of \$27,000 and a child-top up with a BRR of 25% at a cost of \$259M
 - Adult benefit level of \$32,000 with a BRR of 50% at a cost of \$213M
 - Adult benefit level of \$32,000 and a child-top up with a BRR of 50% at a cost of \$216M
 - Adult benefit level of \$37,000 with a BRR of 75% at a cost of \$204M
 - Adult benefit level of \$37,000 and a child-top up with a BRR of 75% at a cost of \$207M

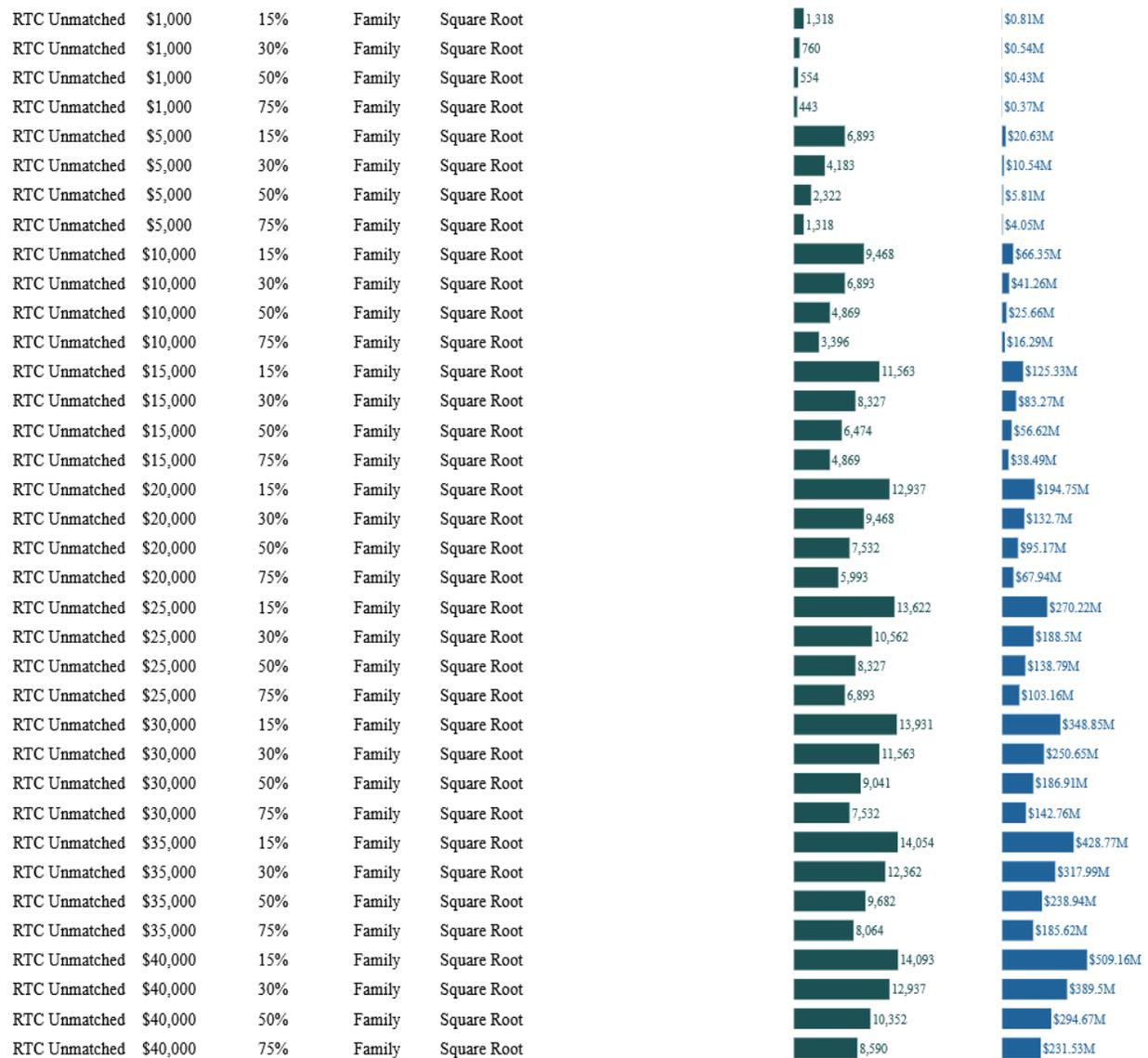
Website Visualizations

For more details, Figure 14 shows the select results from the same IBI Simulations for Nunavut based on the T1 data used in Figure 8. Figure 15 shows the select results from the IBI Simulations for Nunavut using the LAD that are accessible via the aforementioned website. Unfortunately, we are unable to release the number of recipients under the LAD simulations, unlike with the T1 data.

Figure 14

Select Results from the IBI Simulations for Nunavut, T1 Data: Recipients and Cost



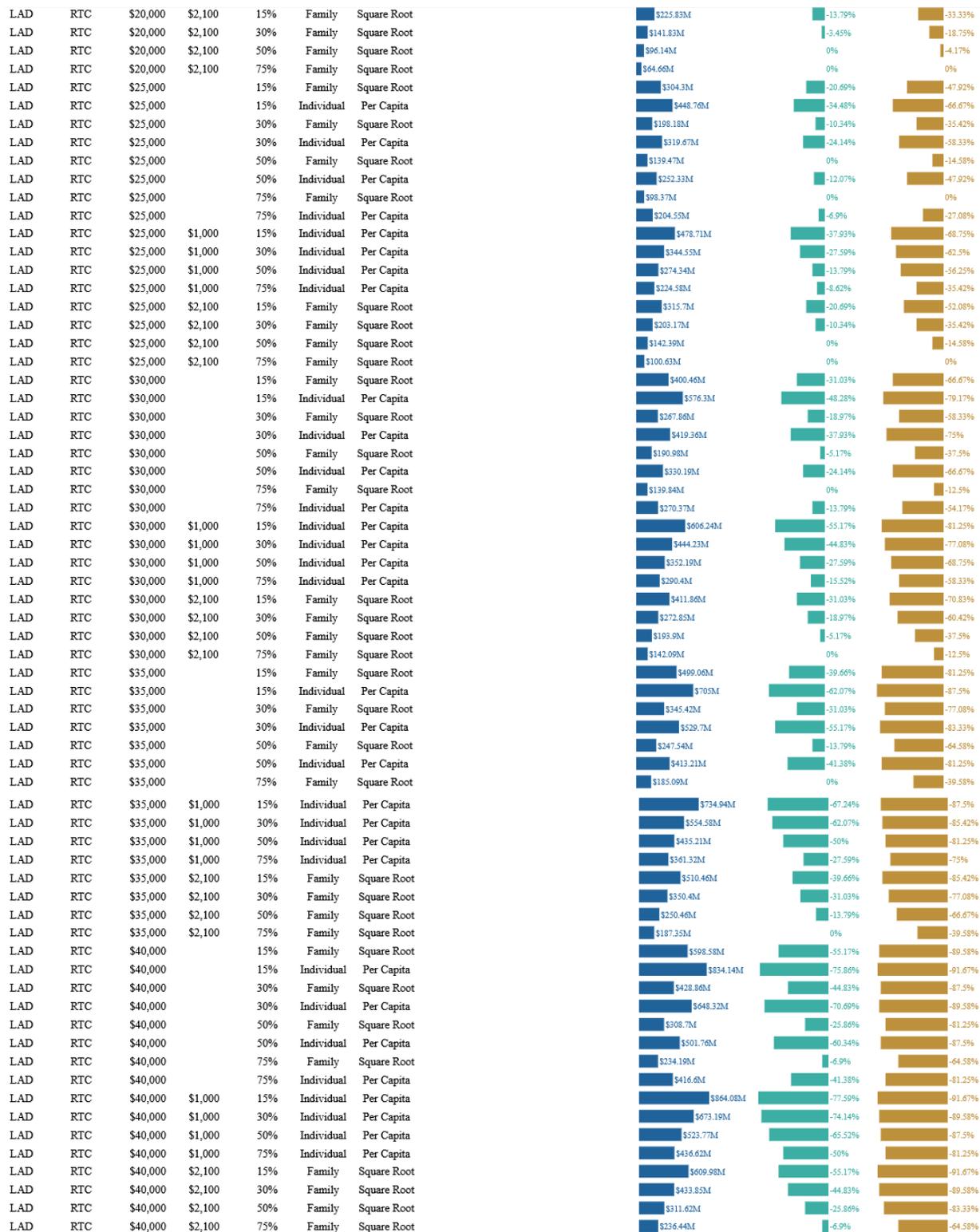


Source: Author calculations using T1 data for 2019.

Figure 15

Select Results from the IBI Simulations for Nunavut, LAD: Recipients and Cost

Data Source	BI Type	Base Amount	Children Benefit	Benefit Reduction Rate	Income Assessment	Equivalence Scale	Individual Recipients	Family Recipients	Cost, Millions	Percentage Change in	
										Poverty Rate	Poverty Depths
									0 800	-80 -40 -20 0	-80 -60 -40 -20 0
LAD	RTC	\$1,000		15%	Family	Square Root			\$0.85M	0%	0%
LAD	RTC	\$1,000		15%	Individual	Per Capita			\$4.12M	0%	0%
LAD	RTC	\$1,000		30%	Family	Square Root			\$0.66M	0%	0%
LAD	RTC	\$1,000		30%	Individual	Per Capita			\$3.56M	0%	0%
LAD	RTC	\$1,000		50%	Family	Square Root			\$0.58M	0%	0%
LAD	RTC	\$1,000		50%	Individual	Per Capita			\$3.27M	0%	0%
LAD	RTC	\$1,000		75%	Family	Square Root			\$0.54M	0%	0%
LAD	RTC	\$1,000		75%	Individual	Per Capita			\$3.11M	0%	0%
LAD	RTC	\$1,000	\$1,000	15%	Individual	Per Capita			\$34.06M	-1.72%	-4.17%
LAD	RTC	\$1,000	\$1,000	30%	Individual	Per Capita			\$28.44M	-1.72%	-2.08%
LAD	RTC	\$1,000	\$1,000	50%	Individual	Per Capita			\$25.27M	0%	-2.08%
LAD	RTC	\$1,000	\$1,000	75%	Individual	Per Capita			\$23.13M	0%	-2.08%
LAD	RTC	\$1,000	\$2,100	15%	Family	Square Root			\$12.25M	0%	0%
LAD	RTC	\$1,000	\$2,100	30%	Family	Square Root			\$5.65M	0%	0%
LAD	RTC	\$1,000	\$2,100	50%	Family	Square Root			\$3.5M	0%	0%
LAD	RTC	\$1,000	\$2,100	75%	Family	Square Root			\$2.8M	0%	0%
LAD	RTC	\$5,000		15%	Family	Square Root			\$19.67M	0%	0%
LAD	RTC	\$5,000		15%	Individual	Per Capita			\$40.91M	-1.72%	-2.08%
LAD	RTC	\$5,000		30%	Family	Square Root			\$9.03M	0%	0%
LAD	RTC	\$5,000		30%	Individual	Per Capita			\$28.66M	-1.72%	-2.08%
LAD	RTC	\$5,000		50%	Family	Square Root			\$5.3M	0%	0%
LAD	RTC	\$5,000		50%	Individual	Per Capita			\$23.23M	-1.72%	-2.08%
LAD	RTC	\$5,000		75%	Family	Square Root			\$4.25M	0%	0%
LAD	RTC	\$5,000		75%	Individual	Per Capita			\$20.59M	-1.72%	-2.08%
LAD	RTC	\$5,000	\$1,000	15%	Individual	Per Capita			\$70.85M	-3.45%	-6.25%
LAD	RTC	\$5,000	\$1,000	30%	Individual	Per Capita			\$53.54M	-1.72%	-4.17%
LAD	RTC	\$5,000	\$1,000	50%	Individual	Per Capita			\$45.23M	-1.72%	-4.17%
LAD	RTC	\$5,000	\$1,000	75%	Individual	Per Capita			\$40.62M	-1.72%	-4.17%
LAD	RTC	\$5,000	\$2,100	15%	Family	Square Root			\$31.07M	0%	0%
LAD	RTC	\$5,000	\$2,100	30%	Family	Square Root			\$14.02M	0%	0%
LAD	RTC	\$5,000	\$2,100	50%	Family	Square Root			\$8.22M	0%	0%
LAD	RTC	\$5,000	\$2,100	75%	Family	Square Root			\$6.51M	0%	0%
LAD	RTC	\$10,000		15%	Family	Square Root			\$8.42M	-1.72%	-6.25%
LAD	RTC	\$10,000		15%	Individual	Per Capita			\$115.48M	-5.17%	-12.5%
LAD	RTC	\$10,000		30%	Family	Square Root			\$9.35M	0%	0%
LAD	RTC	\$10,000		30%	Individual	Per Capita			\$81.82M	-3.45%	-6.25%
LAD	RTC	\$10,000		50%	Family	Square Root			\$22.47M	0%	0%
LAD	RTC	\$10,000		50%	Individual	Per Capita			\$62.64M	-1.72%	-4.17%
LAD	RTC	\$10,000		75%	Family	Square Root			\$13.95M	0%	0%
LAD	RTC	\$10,000		75%	Individual	Per Capita			\$51.88M	-1.72%	-4.17%
LAD	RTC	\$10,000	\$1,000	15%	Individual	Per Capita			\$145.43M	-6.9%	-18.75%
LAD	RTC	\$10,000	\$1,000	30%	Individual	Per Capita			\$106.7M	-3.45%	-8.33%
LAD	RTC	\$10,000	\$1,000	50%	Individual	Per Capita			\$84.65M	-3.45%	-6.25%
LAD	RTC	\$10,000	\$1,000	75%	Individual	Per Capita			\$71.91M	-3.45%	-6.25%
LAD	RTC	\$10,000	\$2,100	15%	Family	Square Root			\$79.82M	-1.72%	-6.25%
LAD	RTC	\$10,000	\$2,100	30%	Family	Square Root			\$44.34M	0%	0%
LAD	RTC	\$10,000	\$2,100	50%	Family	Square Root			\$25.39M	0%	0%
LAD	RTC	\$10,000	\$2,100	75%	Family	Square Root			\$16.2M	0%	0%
LAD	RTC	\$15,000		15%	Family	Square Root			\$3.93M	-6.9%	-16.67%
LAD	RTC	\$15,000		15%	Individual	Per Capita			\$209.68M	-12.07%	-29.17%
LAD	RTC	\$15,000		30%	Family	Square Root			\$83.68M	0%	-6.25%
LAD	RTC	\$15,000		30%	Individual	Per Capita			\$151.4M	-5.17%	-16.67%
LAD	RTC	\$15,000		50%	Family	Square Root			\$3.03M	0%	0%
LAD	RTC	\$15,000		50%	Individual	Per Capita			\$116.09M	-5.17%	-10.42%
LAD	RTC	\$15,000		75%	Family	Square Root			\$33.7M	0%	0%
LAD	RTC	\$15,000		75%	Individual	Per Capita			\$93.96M	-3.45%	-6.25%
LAD	RTC	\$15,000	\$1,000	15%	Individual	Per Capita			\$239.62M	-13.79%	-37.5%
LAD	RTC	\$15,000	\$1,000	30%	Individual	Per Capita			\$176.28M	-6.9%	-22.92%
LAD	RTC	\$15,000	\$1,000	50%	Individual	Per Capita			\$138.1M	-5.17%	-12.5%
LAD	RTC	\$15,000	\$1,000	75%	Individual	Per Capita			\$113.99M	-5.17%	-10.42%
LAD	RTC	\$15,000	\$2,100	15%	Family	Square Root			\$145.33M	-6.9%	-18.75%
LAD	RTC	\$15,000	\$2,100	30%	Family	Square Root			\$88.67M	0%	-6.25%
LAD	RTC	\$15,000	\$2,100	50%	Family	Square Root			\$55.93M	0%	0%
LAD	RTC	\$15,000	\$2,100	75%	Family	Square Root			\$35.96M	0%	0%
LAD	RTC	\$20,000		15%	Family	Square Root			\$214.43M	-13.79%	-31.25%
LAD	RTC	\$20,000		15%	Individual	Per Capita			\$324.16M	-22.41%	-50%
LAD	RTC	\$20,000		30%	Family	Square Root			\$136.84M	-3.45%	-18.75%
LAD	RTC	\$20,000		30%	Individual	Per Capita			\$230.97M	-12.07%	-39.58%
LAD	RTC	\$20,000		50%	Family	Square Root			\$93.22M	0%	-4.17%
LAD	RTC	\$20,000		50%	Individual	Per Capita			\$180.25M	-6.9%	-22.92%
LAD	RTC	\$20,000		75%	Family	Square Root			\$62.41M	0%	0%
LAD	RTC	\$20,000		75%	Individual	Per Capita			\$145.48M	-5.17%	-12.5%
LAD	RTC	\$20,000	\$1,000	15%	Individual	Per Capita			\$354.1M	-25.80%	-56.25%
LAD	RTC	\$20,000	\$1,000	30%	Individual	Per Capita			\$255.85M	-13.79%	-47.92%
LAD	RTC	\$20,000	\$1,000	50%	Individual	Per Capita			\$202.25M	-6.9%	-29.17%



Source: Author calculations using the LAD for 2019.

Summary

Some of the results of these exercises are unsurprising: UBIs are more expensive than IBIs and it is impossible to replace Income Assistance through a UBI at a similar cost and benefit level unless offset by compensating changes to taxation. Alternatively, discrepancies aside, it is possible to deliver similar income benefits as Income Assistance through an IBI at a similar cost to Income Assistance, in addition to the costs of Income Assistance (thereby doubling the total cost of income support). This would potentially increase effective tax rates for those with low income currently on Income Assistance as well as those who are not, increasing the welfare wall, and creating disincentives to work. Further, neither the UBIs nor the IBIs with a similar cost to Income Assistance would raise those with zero income above the income poverty threshold: income poverty would continue to persist under these scenarios.

Returning to the idea of the welfare wall, recall that the welfare wall is a barrier created by government-provided income-based support programs where individuals work less than they otherwise would because of losses to program benefits incurred from working—or the fear of potential losses. It is thus driven by both the BRR *and* the uncertainty and fear of benefit recipients for whom any loss of income can create financial hardship. The calculation of benefit amounts and eligibility can be complicated even for those of us who study this full-time, so the uncertainty and fear among recipients is well founded. However, BRRs are an important modeling element related to the total fiscal cost of a benefit. The trade-off between removing or lowering the welfare wall is a higher fiscal cost. Without further stated objectives or a budget constraint it is difficult to be specific about the “best” BRR or even BRRs (it is possible to have different BRRs across the income distribution) to use. Further, it is best practice to consider any specific BRR choice in the context of the entire system to ensure that marginal effective tax rates do not impose significant barriers to increased earnings.

There are also a number of concerns related to defining the beneficiary unit and the use of tax data that were raised in Tedds et al. (2021) which we reiterate here. First, because these simulations are based on tax data, the family unit is forced to be defined as that used by the tax system. The tax system uses a notion of the family based on the fiscal unit, which consists of an individual, spouse if present, and dependent children under the age of 18. This definition of a family may or may not be representative of family formation in specific communities, including Inuit communities, and is worthy for the GN to consider in more detail.

Second, the decision to base the beneficiary unit on a definition of family assumes income and asset sharing within the family, which is an assumption that may not hold for all families. Family-based basic income programs may exacerbate power imbalances within households and reinforce dependency relationships, which explains why many women’s groups support the individual as the beneficiary unit. It should be noted, however, that delivering IA to individuals may not address the serious issue of intimate partner violence. It is atypical for a person in an abusive household to hold any financial power or control of financial resources, and thus it is unlikely that such individuals would benefit from the income transfer regardless if the beneficiary is the family unit or individual unit (Jagannathan and Keshner 2020). In many cases individuals in abusive households do not have access to or control over a bank account (Cameron and Tedds 2021).

Further, a basic income that takes the individual as the beneficiary unit would provide benefits to many low-earning individuals in high-income households. To the degree that the objective of the basic income is related to poverty reduction, an individual as the beneficiary unit could increase **statistical inequality**. Individual-based basic income programs with no adjustment for family size are also more costly for a set benefit amount. Again, these are important policy design issues and are worthy for the GN to consider in more detail.

Third, the cost estimates presented here are precisely that, estimates. They are as accurate as the data on which they are based, which is tax filer data for the year 2019. To the extent that tax filer data is not representative of the population of Nunavut, the cost estimates will suffer from imprecision. An important aspect which could not be studied in detail with available data are tax filing rates by Nunavummiut. Data from Census 2016 indicates that Statistics Canada was only able to link to tax filer records for 71.4% of respondents, the lowest linkage rate across all provinces and territories (Statistics Canada 2017). Further, as detailed in Tedds, Cameron, and Atherly (2021) rough estimates suggested that 10.6% of people who were issued a T5007 did not file their taxes in 2017. The issue of tax filing in the territory of Nunavut is one that needs more attention as it impedes with the delivery of cash transfers in the territory. Further, to the extent that 2019 is not representative of income data for any given year, the cost estimates will also suffer from imprecision. As a result, the Government of Nunavut should treat these as estimates and guides as opposed to precise costing information. As stated before, however, there is support for treating the results from the LAD as more accurate than those from the T1 data. Should GN decide to pursue a basic income program, we would suggest that further modeling take place, that includes a more detailed objective, and more robust design and implementation details in order to provide more specific gross and net cost estimates.

While the T1 data does not allow for any inequality or income poverty analysis, the simulations conducted using the LAD do allow for such analysis. This allows for considering the trade-offs of design with achieving policy objective related to poverty. This then provides food for thought for the GN: what income poverty reduction targets might be achieved at what cost and what benefit levels? Both the federal government and several provinces have set poverty reduction targets which allows for a narrowing of options to be focused on these targets. We outlined here that none of the modelled options eliminate income poverty, whether measured as the low-income rate or the rate of deep poverty. However, it is clear from the gross cost of the simulations and given the current revenues of the Government of Nunavut along with its tax base, any of the simulated basic income models that would have any discernable impact on poverty are, for the most part, beyond the affordability reach of the GN without a wide expansion of revenues which could include transfers from the federal government. As a result, the GN may wish to explore potential changes to its existing Income Assistance program that can be informed by basic income principles as well as IQ principles as it decides how to pursue a wide-spread basic income program. Further, since a basic income delivered as a refundable tax credit through the tax system is not responsive to in-year income shocks, even if a basic income was pursued it would be unlikely to fully replace the income assistance system, meaning reforms to the income assistance system should be pursued under any policy choice related to a basic income.

Should the GN desire to implement one of the basic income models that is presented here, and implement it through the tax system, the GN will be subject to the tax collection agreement it has with

CRA. Under this agreement, the GN does have the ability to design refundable tax credits administered by the CRA. A refundable credit that does not piggyback on a federal tax credit—as with the basic incomes simulated here—would incur an additional full cost recovery charge by the CRA to administer the credit. CRA would need sufficient time to establish the administrative structure to deliver the tax credit and an 18+ month timeline would not be uncommon. Given the uniqueness of a basic income type tax credit in Canada, it is likely that a proposed basic income delivered through the tax system as a refundable tax credit would first be subject to discussions at the Federal-Provincial Committee on Taxation, which reviews tax policy to ensure that policy changes that are national or regional in scope are effective and appropriate. Further, by using the tax system it automatically means that the BIP cannot adjust in-year to income fluctuations because the tax system currently relies on annual reporting of income. While that may change in the future as the federal government implements e-payroll, in year adjustments are currently impossible within the current administrative structure of the tax system.

While we would have liked to consider how a basic income could interact with other programs and systems, because of the data being used—tax filer data—we have limited information on other programs that individuals and families in Nunavut access using tax filer data alone. In particular, we do not have information on subsidized housing. As a result, we were unable to model interactions of a basic income with these other systems and programs. Further, without an understanding *a priori* of how the GN and the federal government would treat the income received by a basic income, should it be delivered in a form other than a refundable tax credit, even if we did have detailed understanding of access to these other programs, the analysis would be incomplete and imperfect. The biggest factor that plays into the interactions with other programs and system is whether the income received under the basic income scheme would be considered taxable income, non-taxable income, partially exempt income, or not income (e.g., a benefit). As demonstrated by the CERB and detailed in Petit and Tedds (2020), defining what the income from the basic income benefit would be is a key determinant in how it will interact with other programs and system. This would require inter and intra consultations and agreements within the GN and with the federal government. Should GN pursue a basic income these consultations and agreements should occur in the design phase.

There is one additional takeaway from this work. The Department of Finance in the Government of Nunavut has access to valuable data with which this and other policy modeling could be done in house—the T1 data. However, the GN is not taking full advantage of their access to this data. First, the T1 data that is provided by CRA to GN must be carefully prepared for such analysis and that work has not been done. Second, GN has not requested access to the child benefit data for the territory from CRA even though it should be able to get such access since Nunavut has a child top up that is delivered by CRA with the Canada Child Benefit. Third, Finance does not appear to have capacity to engage in this work due to a variety of capacity constraints. We would strongly recommend that the GN prioritize addressing these constraints so that GN is able to undertake moderately sophisticated policy modeling in-house in the future. GN may wish to consult with jurisdictions with this modeling capacity, such as British Columbia, for more information on the benefits from and the requirements to build such a capacity.

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