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Poverty and Child Benefits in Canada Through a Child Material Deprivation Lens[1]

Geranda Notten[2] and Mariam Sène[3]

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[2] Graduate School of Public and International Affairs, University of Ottawa, 120 University Private, Ottawa, Ontario, Canada, K1N 6N5; e-mail: gnotten@uottawa.ca.

[3] School of International Development and Globalization, University of Ottawa.

Abstract

This research develops Canada's first child material deprivation scale, which includes 15 items and distinguishes between four levels of deprivation (none, marginal, moderate and severe). We use this scale to compare child poverty with income before taxes and various other indicators of material well-being. We find that, despite having an income above the poverty line, many households with children experience outcomes associated with material deprivation or at least considerable material challenges. We then explore the implications of this partial overlap between the material deprivation and income distributions in the context of the Canadian Child Benefit (CCB), an income-tested child benefit program that was introduced in 2016 and is widely considered successful in reducing child poverty. Our simulation of targeting performance and program spending shows how the CCB's near universal coverage and low benefit claw back rates are successful in reaching materially deprived children with still relatively generous benefits at higher incomes while also involving considerable spending on non-deprived children. We conclude that even when income is a practical metric to target income transfers it should not be the only one by which such programs are designed and evaluated.

Key words: *Child deprivation, child poverty, material deprivation, child benefits, Canada Child Benefit (CCB), Canada.*

JEL Classification: D31, I32 and I38.

1. Introduction

Decades of child rights advocacy, child poverty research, and child-focused policymaking suggest there has been a profound change in how societies view and respond to child poverty. With the adoption of the Convention of the Rights of the Child in 1989 (UNICEF, n.d.-a) and its ratification in 196 countries (UNICEF, n.d.-b), children have become rightsholders with those rights recognizing the unique life stage of childhood and its dimensions. Child poverty research evolved from counting children living in households with an income below the poverty line to complementary approaches that measure child-specific outcomes and children's perspectives (Bradshaw et al., 2009; De Neubourg et al., 2012; Gordon et al., 2003). Reducing child poverty became a political priority in jurisdictions across the world, including Canada (ESDC, 2018). Moreover, while income-support to families with dependent children is and has long been an influential instrument in reducing child poverty (Kenworthy, 2011), these supports are increasingly income-tested and administered through the tax system (Ferrarini et al., 2012).

We use exceptionally rich data on material well-being in Canada combined with publicly available information on the federal Canadian Child Benefit (CCB) program to illustrate the implications of using conceptually different measures of child poverty to design and evaluate child benefit programs. Specifically, we develop Canada's first child material deprivation (CMD) scale and thereby go beyond a measure of monetary poverty, an approach that is still often not routinely embedded in policy processes.

Our data were collected in 2023 following a period of record inflation (Section 3). We have information on material deprivation, including child-specific items, food insecurity, self-reported income before taxes, economic hardship, and income adequacy and focus on a sub-sample of respondents living in households with children under the age of 18. To construct Canada's first child material deprivation scale we apply a methodology used in Europe (Guio et al., 2018). We then compare this scale to various indicators of material well-being (Section 4) and analyse the income-tested CCB, a federal child benefit program administered through the federal income tax system that was introduced in 2016 that is widely considered successful (Section 5). These analyses lead to the conclusion that while income may be a practical metric to target income transfers, it should not be the only one by which such programs are designed and evaluated (Section 6).

2. Measuring child poverty through material deprivation

Childhood is a unique life stage during which a child's well-being and their development into future adults are intertwined in complex ways. Financial resources, such as income, wealth and access to financial services are important in ensuring that children and their families can access the goods, services and activities that contribute to a well-rounded childhood (De Schutter et al., 2023). A lack of financial resources may also negatively impact other drivers of child well-being;

for instance, stress about finances reduces parents' mental space and capacity to provide their children with a stable emotional environment (Cooper & Stewart, 2021).

Measures of a lack of financial resources have traditionally been *income*-based (Nolan & Whelan, 2010). They consider all members, including dependent children, income poor when their collective income falls below a poverty threshold. Yet, income is only one financial *input,* and income poverty measures cannot account for all differences in households' circumstances and needs, which is why complementary measures focusing on adverse *outcomes* arising from a lack of financial resources have gained prominence (Notten & Kaplan, 2021).[4]

When measuring child well-being, both income and outcome-based poverty measures developed for the general population are limited because they are mute on whether financial resources are directed towards the household's children, and because they only partially capture the adverse outcomes that children experience (De Neubourg et al., 2012). These limitations led to the development of child centered outcome-based measures of poverty, such as the EU's Child Material Deprivation indicator (Gross-Manos & Bradshaw, 2022; A.-C. Guio et al., 2018).

Research consistently shows that income poverty and outcome-based poverty measures are positively associated with poor individuals in a monetary sense, being also more likely to experience adverse material outcomes (e.g, Chzhen et al., 2016; Notten & Kaplan, 2021). But the strength of this association is only moderate. There is a substantive group of households, and particularly those with children, that experience outcome-based poverty despite having an income above the poverty line (Chzhen et al., 2016; Notten & Kaplan, 2021).[5]

3. Canada's first child material deprivation scale

We construct Canada's first child material deprivation scale following the same methodology as that used for the EU's child material deprivation indicator (Guio et al., 2018). outcome-based poverty measures have only recently gained some traction among Canadian governments and interest groups, even though Canadian research demonstrates that insights from research elsewhere apply equally to Canada (Notten, 2015; Notten & Kaplan, 2021; Smith et al., 2023).

3.1 Data

We use survey data that were collected online in two phases (Notten et al., 2024).[6] For this research, we mainly use the 'phase two' survey from April/May 2023 (N=4,625) and focus on the sub-sample of respondents living with children aged 0 to 17 years (N=1,409 respondents, N=2,468 children). This survey was designed to be representative of the Canadian population

[4] Notten & Kaplan (2021) discuss this argument at length and use Canadian data to compare a material deprivation indicator to an income poverty measure.
[5] This is unlikely the result of an (over)reporting bias. In fact, underreporting seems to be a bigger concern for parents with children (Chzhen et al., 2016).
[6] The primary aim of the data collection was to construct an updated material deprivation index applying to the entire Canadian population. See Mendelson and authors (2024) and Notten and authors (2024) for more details.

aged 18 and older using the 2021 Census population characteristics (Notten et al., 2024, section 3.3). The child age proportions (ages 0-4, 5-12 and 13-17) in the data are similar to those in the 2021 Census (Table A2). The data hold information on respondent and household characteristics and various material indicators including material deprivation, food insecurity, income before taxes, and economic hardship. To test the suitability of the deprivation items (discussed below), we draw from findings in earlier research (Notten et al, 2024) based on findings from the 'phase one' survey (October 2022, N=2,000) and summaries from two focus groups and four interviews consisting of persons at higher risk of poverty (February 2023, N=15).[7] Unless mentioned otherwise, we use sample weights when the unit of analysis are respondents whereas we have no weights when the unit of analysis is the children in our sample.[8] Tables and Figures starting with A are available the appendix to this working paper. We clarify definitions and variable operationalizations as they are first mentioned.

Table 1 lists the deprivation items considered for the Child Material Deprivation scale (CMD). Respondents answering that they did not have the item were asked whether it was "because they cannot afford it, or for some other reason?". Only respondents indicating they did not have an item because they did not have the money for it were counted as deprived in that item. The CMD scale includes seven child specific items and eight household specific items.[9] Table 1 shows both the incidence of item deprivation for respondents living with children and for children in the sample. Item deprivation rates for respondents vary from a very low 2.2 percent who do not have reliable access to internet to 16.2 percent not accessing regular dental care. The incidence rates are generally higher for the child population, indicating that there are proportionately more children living with deprived respondents than non-deprived respondents. Table A3 in the appendix further shows that 33 percent of the respondents miss one or more items whereas 67 percent are not deprived in any item.

3.2 Scale construction: Testing the deprivation items

The CMD scale consists of various observable facts, called deprivation items (Table 1), which are jointly associated with the level and severity of material deprivation among children (Guio et al., 2018). Scale construction involves a testing process that assesses whether these deprivation items meet the scientific criteria of suitability, validity, reliability and additivity (Guio et al., 2016).

[7] These data provide insights on respondents' views on the necessity of deprivation items. The annex to Notten et al (2024) provides the questionnaires, the protocol of the interviews / focus groups and a summary of insights obtained.
[8] Both surveys had regional quotas that overrepresented smaller provinces. Phase two survey also oversampled single parents, adults between the ages of 25 and 64 living in one-person households, and people identifying as Indigenous, Black, or South Asian. Oversampling increases the accuracy of these smaller populations who are at higher risk of poverty (Notten et al., 2024).
[9] This method of data collection does not enable analyses on how resources / access to deprivation items are prioritized between household members and siblings.

Table 1: Deprivation items

Item name	Survey question	Item deprivation, percent	
		Respondents	Children
Child items:			
Style of clothes	Do the children in your household have the style of clothes they need to fit in with friends?	9.0 ± 1.74	10.5
Fee-paying school events	Are the children in your household able to participate in school trips and school events that cost money?	7.4 ± 1.72	10.6
Hobbies outside of school	Do the children in your household participate in organized activities outside of school, such as arts, dance or music lessons, sports, or hobbies?	14.0 ± 2.10	14.8
Place for homework	Do the children in your household have a suitable place at home to study or do homework?	3.6 ± 1.20	5.4
Indoor toys	Do the children in your household have their own indoor children's toys that are appropriate for their age?	3.9 ± 1.06	5.5
Outdoor leisure equipment	Do the children in your household have their own outdoor leisure equipment?	7.9 ± 1.49	10.7
Required school supplies	Do the children in your household have the school supplies required by their teacher?	3.8 ± 1.08	4.6
Household items:			
Dental care	Are you/is everyone in your household able to get regular dental care, including teeth-cleaning and fillings, at least once a year?	16.2 ± 2.04	19.7
Gifts	Are you able to buy some small gifts for family or friends at least once a year?	9.6 ± 1.47	9.3
Internet	Do you have a reliable Internet connection at home?	2.2 ± 0.94	3.4
Meat	Are you/is everyone in your household able to eat meat or fish or a vegetarian equivalent at least every other day?	7.5 ± 1.37	8.7
Special occasions	Are you able to participate in celebrations or other occasions that are important to people from your social, ethnic, cultural, or religious group?	9.0 ± 1.47	9.4
Shoes	Do you/does everyone in your household have at least one pair of properly fitting shoes and at least one pair of winter boots?	4.8 ± 1.14	6.3
Temperature	Are you able to keep your house or apartment at a comfortable temperature all year round?	7.8 ± 1.53	8.9
Transportation	Are you/is everyone in your household able to get around your community whenever you/they need to?	4.7 ± 1.10	4.9

Source: Phase Two survey, calculations by authors.

Note: Items ‘indoor toys’ and ‘outdoor equipment’ and all household items were asked to all respondents living in households with at least one child from 0 to 17. All other child items only applied children aged 5 to 17. Respondents could skip questions, leading to a limited number of a missing values for each item. For these reasons the sample size varies per item between 1,093 and 1,397 (respondents) and 2,043 and 2,435 (children). Percentages are calculated from weighted counts of respondents. Confidence bands (95%) are based on standard errors calculated using 1,000 replicate bootstrap weights.

A deprivation item is suitable when many people view it as necessary for an acceptable living standard in their society. The research by Notten et al (2024) involved consulting Canadians' views regarding the necessity of a list of deprivation items in the phase one survey. The research then consulted a sample of food insecure respondents through focus groups and interviews to better understand these items' importance for those with a high(er) likelihood of lived experience. The research involved dropping / adding / rephrasing of various items and resulted in the deprivation items listed in Table 1. Of the 14 items in the phase one survey, nine items pass the threshold of having more than 50 percent of the general population agreeing that the item is (very) necessary (Table A4) (Guio et al., 2016). Whereas there was no majority for the five remaining items, these items scored above 50 percent for one or more relevant subpopulation, namely those reporting an income below 30k, couple parents and single parents. Two items (hobbies, required school supplies) do not have scores because they were added following the focus groups and interviews whereas one (small weekly allowance) was dropped due to mixed opinions.

A valid deprivation item has a statistically significant association with other variables known to be associated with poverty (Guio et al., 2016). Our tests show that all 15 items have such a relationship with respondents reporting food insecurity, an income before taxes that is 50 percent below the median, or experience economic hardship (meaning they followed at least one of three of the following strategies: sell assets, borrow money, seek help from a charity, Table A5).

We first test the reliability of deprivation items using Cronbach's alpha to assess whether the deprivation items jointly measure an unobserved latent variable (Guio et al., 2016). An alpha of 0.70 or higher is considered satisfactory. The alpha of our scale is 0.865 and excluding each one of the fifteen items reduces that score (Table A6). We then use a unidimensional two-parameter Item Response Theory (IRT) model to assess the discrimination and severity of each item. The items are generally able to distinguish (discriminate) between materially deprived and not materially deprived respondents as shown by the steep inflection points of the item characteristic curves (Figure A1). The items also display different levels of severity, which is a desirable feature as it enables capturing the severity of deprivation (see the different theta values at a probability of 0.5 in Figure A1). A few items discriminate less (dental, hobbies, homework, internet) and there are two clusters of items with similar severity levels (around theta values 1.5 and 2) suggesting potential redundancy. Nonetheless, all items pass the minimum thresholds for severity and discrimination.

The additivity criterion asserts that respondents experiencing more item deprivations ought to be, on average, worse off than those with fewer deprivations (Guio et al., 2016). For each possible pair of deprivation items, we tested whether respondents reporting zero deprivations have a statistically significant higher income than those deprived in one of two items. Similarly, we tested whether the average income of those deprived in one of two items was higher than those deprived in both. All items pass the first test. While the average incomes in the second test align with the additivity principle, none of the differences are statistically significant (Table A7). This

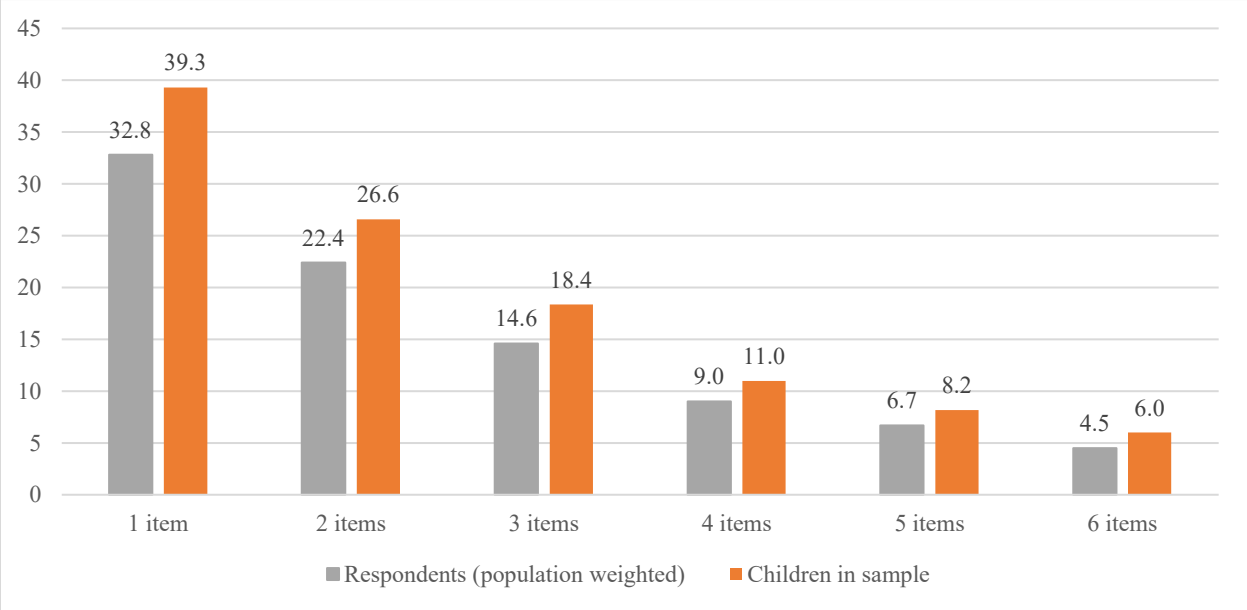
finding is likely the result of smaller subsamples of respondents with one and two item deprivations per pair.[10]

Concluding, we retain all items because most items pass most tests, and no item systematically underperforms (Table A7). It is desirable that further research tests these items on a larger dataset and analyzes the scope for reducing the number of items. Reducing the scale from 15 to 14 items considerably reduces the percentage of materially deprived respondents, especially when excluding child specific items or certain household items that have high item deprivation rates (Table A8).

3.3 Options for analyzing child material deprivation

After developing the scale, one must set one or more deprivation thresholds. A single threshold serves the purpose of distinguishing between deprived and non-deprived populations whereas multiple thresholds allow distinguishing between the severity of deprivation.

Figure 1: Deprivation rate (percent), by deprivation threshold



Source: Phase Two survey, calculations by authors.
Note: Sample sizes are 1,409 for respondents and 2,468 for children.

Figure 1 illustrates that threshold decisions have a very large influence on the deprivation rate in a population (Notten & Kaplan, 2022). A threshold at one deprivation item yields a deprivation rate of 32.8 percent among the population weighted sample of respondents living with children whereas this percentage declines to 4.5 percent for five items. For children in our sample, the percentage declines from 39.3 percent for a threshold of one to 6 percent for a threshold of six.

[10] All eight household items performed well on this test using the full dataset that also includes respondents without children in their household (Notten et al., 2024).

The higher incidence rate for children signals that there are proportionately more children living with deprived respondents than with non-deprived respondents (Figure 2).

We use various thresholds in the remainder of this research. There exist several methodologies that help assess which threshold does the best job at empirically distinguishing between deprived and non-deprived respondents (Gordon, 2006; Notten & Kaplan, 2022). Applying the measurement error-based approach by Notten and Kaplan (2022) and using various definitions of the respondents' food insecurity, economic hardship and income information we find that thresholds of one or two deprivations would be optimal (see Figures A2 and A3 and the accompanying technical note).

The deprivation rates at these thresholds are very high. This likely reflects the fact that our data were collected after a sustained period of record inflation that significantly eroded the purchasing power of Canadians, as confirmed by soaring official food insecurity statistics (Statistics Canada, n.d.). It is also possible that the high deprivation levels are in part due to response bias in the data (due to quota sampling in an online survey based on a panel from a private company) and/or lower accuracy (due to using a sub-sample of a survey with a much smaller sample size than a national survey from Statistics Canada).

We divide our sample into not deprived (zero deprivations), marginally deprived (one deprivation), moderately deprived (two or three deprivations) and severely deprived (four or more deprivations). A practical reason for choosing this categorization is that it yields similarly sized groups for marginal (12.7 percent), moderate (15.6 percent) and severely (11 percent) deprived children, which helps reduce the number of small cell sizes for the cross-tabulations in the next section. Further research using a larger sample could assess whether an alternative categorization should be considered.

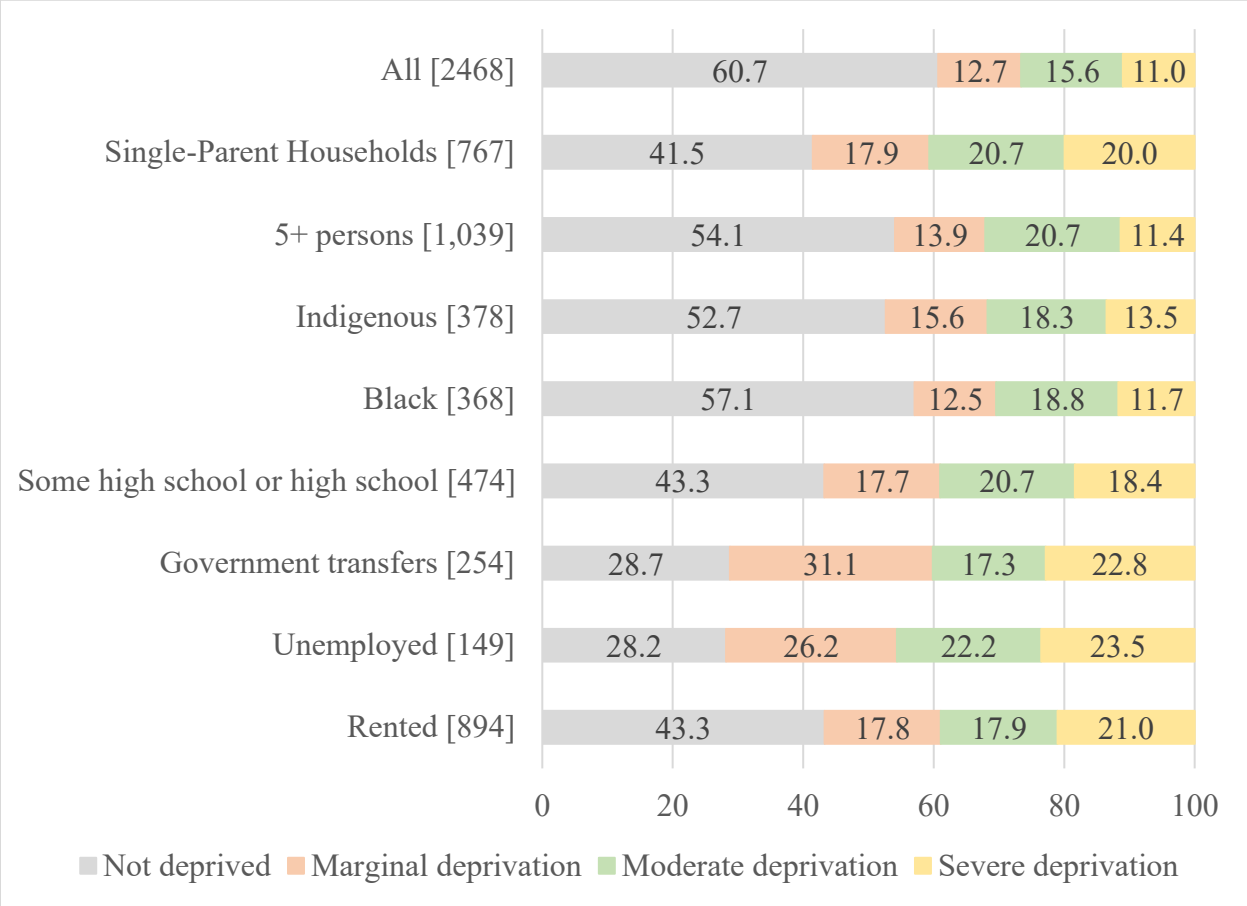
4. Child material deprivation in Canada and other material well-being indicators

Experiencing some degree of material deprivation is common among the children in our sample, with 39.3 percent of children living in a household that cannot afford one or more of the 15 deprivation items (Figure 2, All). The degree / breadth of deprivation nonetheless varies considerably, with 12.7 percent experiencing one deprivation, 15.6 percent experiencing two or three deprivations and 11 percent experiencing four or more deprivations. Research shows that households with lower levels of deprivation, tend to be deprived in items that have a high incidence, such as dental care and hobbies outside school (Table 1) (A. Guio & Pomati, 2017). Our research further suggests that child deprivation items such as style of clothes, required school supplies, a place for homework and fee-paying school events, while having medium to low incidence rates, may also be items that households economize first on. We find that excluding these items from scale leads to a large drop in the deprivation rate (Table A8).

The characteristics listed in Figure 2 are known risk characteristics for other poverty indicators such as low income and food insecurity in Canada (Dhunna & Tarasuk, 2021; Notten & Kaplan,

2021; Tarasuk et al., 2019). Children living in larger households and/or those where the respondent identifies as black or Indigenous have risk levels somewhat above the average. At particularly high risk are children living in households led by a single parent, where government transfers are the main source of income, living in rented housing, where the respondent is unemployed or where the respondent has only completed (some) high school. While our findings are consistent with those elsewhere, we caution that the accuracy of the estimates may be lower due to small sample sizes (unemployed: 6.2 percent of all children, government transfers: 10.9 percent, Indigenous: 15.5 percent, Black: 15.1 percent).[11]

Figure 2: Deprivation categories, overall and by high-risk respondent characteristics, percent [sample size]



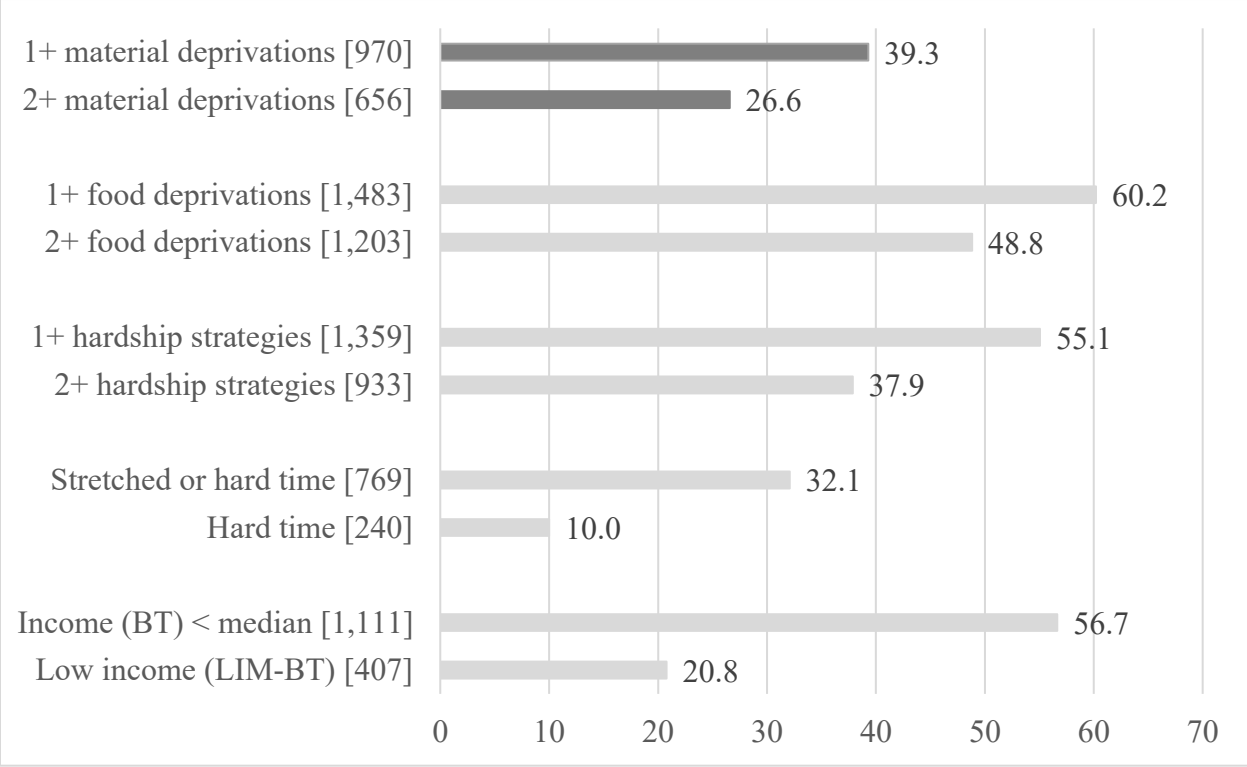
Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in sample. Not deprived (zero deprivations), marginal deprivation (one deprivation), moderate deprivation (two or three deprivations) and severe deprivation (four or more deprivations). Figures A4 and A5 hold all characteristics for children in the sample and for respondents living with children. Tables A9 and A10 provide deprivation rates (using thresholds of one and two deprivations) and proportions for children in the sample and respondents living with children.

There is a consensus in the literature on (child) well-being that conceptually distinct indicators of

[11] Table A10 shows that the confidence intervals for respondents with these characteristics are wide.

material well-being indicators are complements rather than substitutes (Notten & Kaplan, 2021). The use of multiple indicators offers crucial nuance to an otherwise oversimplistic picture of what (child) poverty entails and how policies can reduce it. Different indicators have different strengths and weaknesses when it comes to their use to assess the problem and their use in designing and implementing policies to address the problem. Unfortunately, those doing a better job at the first are often not suitable for use in policy implementation (see next section).

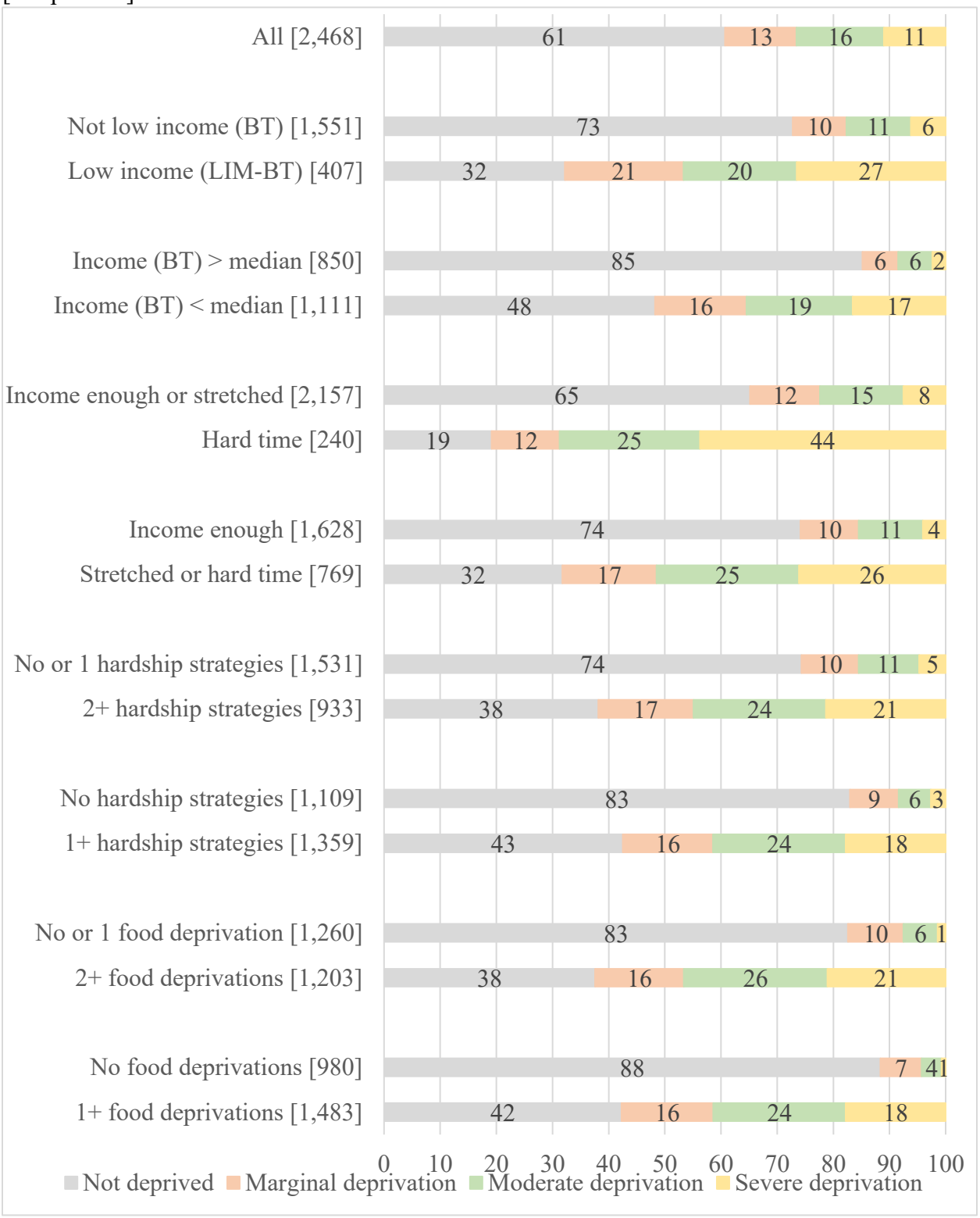
Figure 3: Child material deprivation and other material well-being indicators, percent [sample size]



Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in the sample. Tables 5 (p.23), 10 (p. 29) and 12 (p. 31) in Notten et al (2024) list the questions and threshold values for food insecurity, economic hardship and income adequacy. Median (adult equivalent) income (before taxes) is based on the population sample and thus included respondents not living with children. Low income means an income below fifty percent of the median.

Different indicators yield widely different estimates of which share of children experience material challenges or low(er) income (Figure 3). Similarly, the threshold selected to separate groups that are (likely) fine materially from those who are not for a given indicator also makes a big difference. It is very common for children in our sample to live in households that cannot afford one, two or more food items (out of six). It is also common that the household pursued at least one or two economic hardship strategies (out of three). One third of children live in households where the respondent indicated their income was not enough, with their budget being stretched or them experiencing a hard time. More than half of the children live in households whose adult equivalent income before taxes was below the national median, with a fifth of children living in a household having an income below fifty percent of the median.

Figure 4: Overlap deprivation categories with other material well-being indicators, percent [sample size]



Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in sample. Not deprived (zero deprivations), marginal deprivation (one deprivation), moderate deprivation (two or three deprivations) and severe deprivation (four or more deprivations).

With these indicators, the share of children experiencing poverty or at minimum some level of material precarity thus varies from ten to sixty percent. The low income, food insecurity and material deprivation indicators (or conceptual variations thereof) are the ones most used in poverty analysis and poverty reduction policymaking in jurisdictions across the world (Notten & Kaplan, 2021). Whereas in North America jurisdictions often combine income poverty and food insecurity, those in Europe use income poverty and material deprivation (Notten & Guio, 2024).

Figure 4 shows that there is a positive association between experiencing any level of material deprivation and experiencing poverty / material challenges in other indicators. The incidence of material deprivation, regardless of the three deprivation thresholds, is well above average deprivation levels for those with an income below the poverty line / median, judging that their income is not enough (stretched or hard time), having taken recourse to economic hardship strategies, or having food deprivations. The overlap is very high for children in households that have a hard time because they lack income (81 percent experiences material deprivation and a hard time) and for those living in low-income households (68 percent). For the other indicators, the overlap varies between 68 and 52 percent.

The high level of agreement for hard time and low-income arises in part because the incidence of having a hard time or low income is low compared to other thresholds of the same indicators and to other indicators (Figure 3). A stricter threshold reduces the likelihood that a household is identified as poor / experiencing material challenges while is it not (false positive) whereas it increases the likelihood that a household is counted as not poor or experiencing material challenges while it is (false negatives) (Notten & Kaplan, 2022).

However, other reasons for disagreements between indicators are less mechanical, and instead relate to conceptual differences in what is measured and the strengths and weaknesses of an indicator in capturing what one ultimately intends to measure. Crucial conceptual distinctions between these indicators are whether one measures resources (such as income), outcomes (such as material deprivation, food insecurity, economic hardship) or subjective views (such as income adequacy).

And thus, Figure 4 also shows considerable disagreement between child material deprivation and the other indicators. When the other material wellbeing indicators indicate a child experiences poverty / material challenges, 32 to 48 percent of those children live in households not experiencing any material deprivation. When the other material wellbeing indicators indicate a child does not experience poverty / material challenges, 12 to 35 percent of children live in households that nonetheless experience some level of material deprivation. While the percentages of the latter group are lower, such disagreements may still cover many children in an absolute sense. Take for instance, low income. Given that 79.2 percent of children live in households with an income above the poverty line (Figure 3) and 27 percent of those children experience material deprivation (Figure 4), this means that 21 percent of children in our sample may be experiencing material deprivation while their household income is above the income poverty threshold (0.792x0.27=0.213).

Table 2: Material deprivation over the income (before taxes) distribution, two thresholds

	No deprivations	1+ deprivations	Total
Quintiles:			
1	9.1	16.6	25.7
2	12.2	9.2	21.4
3	14.3	5.8	20.1
4	14.6	2.6	17.2
5	14.2	1.4	15.6
Total	64.4	35.6	100.0
Income categories:			
Low Income	6.7	14.2	20.9
Low-Middle Income	20.7	15.1	35.7
High(er) Income	36.9	6.4	43.4
Total	64.3	35.8	100.0
	No or 1 deprivation	2+ deprivations	Total
Quintiles:			
1	14.1	11.6	25.7
2	15.4	6.0	21.4
3	16.5	3.6	20.1
4	15.7	1.5	17.2
5	14.7	0.9	15.6
Total	76.3	23.7	100.0
Income categories:			
Low Income	11.1	9.8	20.9
Low-Middle Income	25.5	10.3	35.8
High(er) Income	39.7	3.7	43.3
Total	76.2	23.8	100.0

Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in sample (n=1,958). All income indicators are based on adult equivalent income before taxes, using the square root of household size as an equivalence scale. Income quintiles are based on the population sample and thus included households with no children. Low income means an income below fifty percent of the median. Low-middle income means an income above fifty percent of the median and below the median. High(er) income involves an income above the median.

Income is often a key source of information for governments in targeting income supports to families with children. We therefore also explore the overlap between material deprivation and income by income quintiles and for low, middle and upper incomes. Table 2 shows that deprivation levels consistently decline as income levels rise. Deprivation levels in the top two quintiles and above median income are much lower. Simultaneously, many deprived children living in households with an income between the poverty threshold and the median experience

material deprivation: 42 percent at a threshold of 1 or more deprivations (15.1 / 35.8 percent, 3rd column) and 43 percent at a stricter threshold of 2 or more deprivations (10.3 / 23.8 percent, 3rd column).

There are several reasons why income-testing is a crude method to target program spending to households who are experiencing material challenges (Notten & Kaplan, 2021). The first is that income is only one of various possible resources, financial or otherwise, that households use to achieve their living standard. Specifically, income misses the potential for savings or access to credit to (temporary) smooth consumption when income falls short. Households can also access to other supports available locally or through relationships. These could be those households with a low(er) income that manage to avoid material deprivation. Income also misses the spending on servicing debts and repaying them that cannot go towards current consumption. These could be those households with a high(er) income that experience material deprivation.

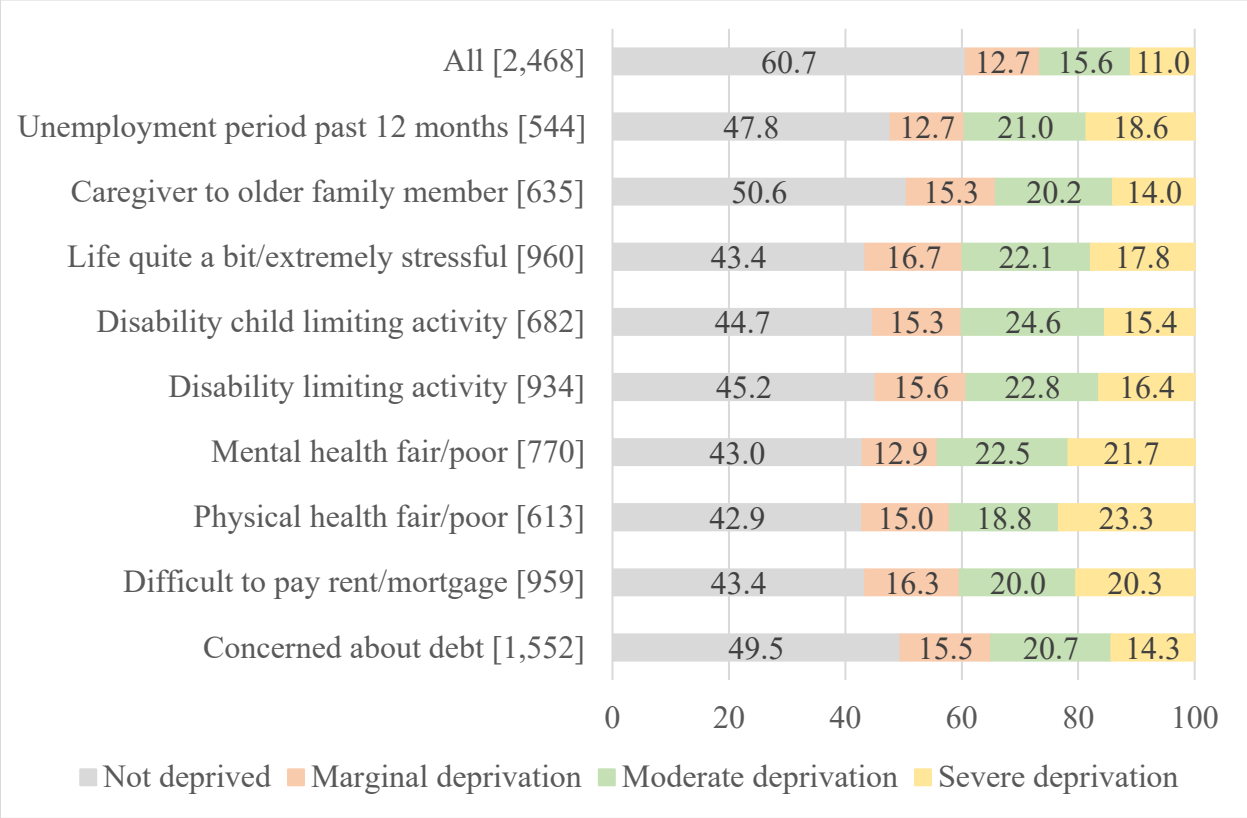
The second reason is that price levels and thus purchasing power differ spatially whereas income transfers do not generally. Even though wages may be higher in more expensive cities, housing costs may be disproportionately more expensive, thus leaving less income for other expenses and lower purchasing power associated with a given amount of child benefits. These purchasing power differences may explain why some households with lower income avoid material deprivation, whereas some with higher income experience it.

The third reason is that the needs and circumstances of children and their households vary considerably more across households than an adult equivalent scale and income definition can realistically account for. Adult equivalent scales only adjust income for basic demographic factors such as household size (Canada) and possibly the age of household members (the modified OECD scale used in Europe). Equivalence scales do not consider whether a household member has a disability or another health issue and may thus need more income to meet the same essentials as a household where none of the members is disabled. Income definitions do not consider whether the working household members have access to employer benefits such as health and dental insurance, or not, even though resulting out-of-pocket spending on uncovered health and dental costs reduces the income available to meet other essentials.

Figure 5 illustrates this by cross tabulating the incidence of material deprivation levels for households experiencing challenging circumstances. Deprivation levels of children living in such households are above average. Having experienced an episode of unemployment in the past year may have reduced a household's income and savings while increasing its debt, making it harder to finance current expenses. The drop in income resulting from unemployment may thus only be part of the picture. Caregiving and/or health issues may signal that households have higher needs while they may simultaneously limit income-generating opportunities for adult household members. Challenges to pay rent/mortgage are linked to housing affordability, insufficient income, or negative income shocks. Debt concerns suggest that part of current or future spending goes towards debt service instead of current needs.

This section's analysis shows that income is only a crude measure of households' material outcomes. And yet, while outcome-based measures such as (child) material deprivation and food insecurity are likely more accurate in measuring households' actual material living standard than income, they are not suitable to establish eligibility for income transfers. This is because such measures are based on households' responses to survey questions, which respondents could answer in their favor if access to income transfers would depend on it. The income tax system, especially in richer countries, provides information that is considerably harder to manipulate by households and can facilitate the screening for eligibility and benefits payouts. In the next section we analyse what all this implies for the design and performance of the CCB.

Figure 5: Deprivation categories, overall and by high-risk respondent circumstances, percent [sample size]



Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in the sample. Not deprived (zero deprivations), marginal deprivation (one deprivation), moderate deprivation (two or three deprivations) and severe deprivation (four or more deprivations).

5. Implications for child benefits illustrated by the Canada Child Benefit

The CCB was introduced in 2016 following the election of a Liberal government that campaigned on reducing inequality. The program is income-tested, considerably more generous than the child benefit programs it replaced, and it is administered through the income tax system with monthly payments. The maximum annual benefit per child varies between $7,787 (under age 6) and $6,570 (between age 6 and 17) for families earning an adjusted net income (AFNI) of

$36,502 or below. Benefits per child are reduced depending on the number of children and income level. Claw back rates vary between 7 and 23 percent for incomes between $36,502 and $79,087 and between 3.2 and 9.5 percent for incomes greater than $79,087. They are lowest for families with one eligible child and highest for families with four or more children.[12] In 2023-2024, about 3.7 million families received the CCB, amounting to a total spending of about 27 billion Canadian dollars (Canada Revenue Agency, n.d.), reflecting about 5.3 percent of government spending (Department of Finance Canada, 2024).

In this simulation we analyze the CCB's likely performance in terms of poverty reduction and targeting efficiency using the child material deprivation indicator as the poverty measure. The Canada Revenue Agency uses AFNI as the income definition to determine eligibility and calculate CCB amounts. AFNI is a very specific before taxes income definition that already incorporates some tax deductions.[13] To calculate benefits, we used the government's child and family benefits calculator for a couple with two children under the age of six living in Ontario. We calculate the CCB amount using the net median income for a representative household with children in each quintile.[14] These estimates are rudimentary: they apply the same income to every household with children in a quintile; the income values do not account for deductions such as childcare costs and private pension saving in income taxes; they assume that respondents excluded the CCB from the income they reported in the survey; and they assume that each household files taxes. Robson and Schwartz (2020) find that 10-12 percent of working-age adults do not file taxes and that the rate of non-filing is higher at lower incomes. To approximate program spending on the children in our sample, we use the median income, and population shares of the number of children in each income quintile, thus assigning the median income to every household with children in that quintile. Finally, we use the distribution of deprivation rates by income quintiles (Table 2) to assess the degree to which program spending reaches materially deprived households with children. Tables 3 and 4 summarize the results.

The CCB's coverage is very broad, and benefit levels are very generous for those with low incomes, while they only taper slowly at higher incomes. Table 3 shows the CCB amounts for a couple with two children under the age of six living in Ontario. The median net income of a household with children in the first quintile is 25,000$ and it receives an additional income of 15,574$ per year in child benefits or 51.9 percent of its income before taxes. Annual benefits are still 11,457$ for a household with an income of 67,000$, reflecting a top up of 12.7 percent. While many families with a high income still receive benefits, the amounts, albeit not low in an absolute sense, are a small percentage of household income. And thus, targeting efficiency as measured in terms of errors of exclusion is likely tiny as very few materially deprived families with children in our sample would not receive the CCB. Consequently, the error of inclusion from the perspective of poverty reduction is very high as many non-materially deprived

[12] Government of Canada, Canada Child Benefit, website: https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/t4114/canada-child-benefit.html#toc14 consulted on 14 April 2025.
[13] AFNI is not reflective of a family's after-tax income because an after-tax calculation additionally involves subtracting several other deductions, income taxes and adding tax credits and the CCB.
[14] As our survey only holds self-reported income before taxes, we use the online tax calculator of Wealthsimple to estimate the corresponding net income values.

households receive the CCB.

Table 3: CCB amounts for a couple with two children under the age of six and living in Ontario, at the median net income of each quintile, in Canadian dollars [15]

	Income quintiles				
Quintile	1	2	3	4	5
Median net income of households with children (rounded to nearest thousand)	25,000	50,000	67,000	87,000	123,000
	CCB amounts				
Total per year	15,574	13,752	11,457	9,374	7,322
Per child per year	7,787	6,876	5,728	4,687	3,661
Total per month	1,298	1,146	955	781	610
Per child per month	649	573	477	391	305
	CCB amount as percentage of net income				
Total per year	51.9	21.2	12.7	7.8	4.0

Source: Phase Two survey, calculations by authors: Income before taxes. Government of Canada, Canada Child Benefit, benefit calculator: CCB amounts. The calculations are based on 2024-2025 benefit amounts, with amounts rounded to the nearest integer.

Studies evaluating the CCB find that the program reduced income poverty, increased spending, and improved food security (Baker et al., 2021; Najjarrezaparast & Pendakur, 2021; Brown & Tarasuk, 2019). Albeit not eliminating poverty among children, reductions in income poverty and food insecurity are particularly high for families with low incomes, incomes below the median and single-parent families (Baker et al., 2021; Brown & Tarasuk, 2019), with larger gains in food security for vulnerable families (Brown & Tarasuk, 2019). Canada's national statistics agency does not collect (child) material deprivation information. However, given that deprivation indicators are more strongly associated with food insecurity than income poverty (see previous section), it is highly likely that one would have also found positive effects using a (child) material deprivation measure.

We estimate that total program spending on the children in our sample is around 5.5 million Canadian dollars (Table 4). Taking a material deprivation threshold of one, 64.6 percent of spending in the first quintile correctly goes to materially deprived children whereas 35.4 percent goes to children who are not materially deprived (despite having an income in the lowest quintile). Not surprisingly, the percentage of correct spending declines moving to higher income quintiles whereas that of leakage increases. In the highest income quintile, 91 percent of spending goes to children who are not materially deprived. Overall, 38.1 percent of spending goes to materially deprived children whereas 61.8 percent goes to those who are not. Using a

[15] Calculated for a couple with two children under age 6 (birthdates 2023-01-01 and 2021-01-01) living in Ontario in 2023 by adding the income value mentioned in the table and an amount of zero for all other required amounts.

stricter threshold of 2 deprivations the pattern is similar, with the difference that overall leakage is higher as there are now fewer children considered materially deprived.

Table 4: Simulation of CCB spending on children in our sample, by quintile

	Income quintiles					
Quintile	1	2	3	4	5	Total
Total CCB spending	1,609,114	1,324,527	1,079,871	840,185	665,592	5,519,288
	Material deprivation threshold of 1+ deprivations					
Leakage	569,764	755,104	768,266	713,180	605,859	3,412,174
Correct spending	1,039,350	569,423	311,605	127,005	59,733	2,107,114
Leakage (%)	35.4	57.0	71.1	84.9	91.0	61.8
Correct spending (%)	64.6	43.0	28.9	15.1	9.0	38.2
	Material deprivation threshold of 2+ deprivations					
Leakage	882,821	953,164	886,461	766,913	627,192	4,211,217
Correct spending	726,293	371,363	193,410	73,272	38,400	1,308,071
Leakage (%)	54.9	72.0	82.1	91.3	94.2	76.3
Correct spending (%)	45.1	28.0	17.9	8.7	5.8	23.7

Source: Phase Two survey, calculations by authors: Quintile estimates for median income before taxes, material deprivation rates by quintile, the population shares of households with 1, 2 and 3+ children. Government of Canada, Canada Child Benefit, benefit calculator: CCB amounts at the median income before taxes. Leakage and correct spending are assessed relative to material deprivation. Spending is 'correct' when it reaches materially deprived children, and it is 'leaked' when it reaches children who are not materially deprived.

The CCB is thus very successful in reaching materially deprived children, even if their families' incomes are well up in the income distribution. In terms of generosity, however, there are some unavoidable equity challenges as the metric used to determine benefit amounts is based on income and not on actual material living conditions. A child experiencing two deprivations will receive 7,787$ per year if their family's income is in the lowest quintile but only 6,876$ if their family's income is in the second quintile (Table 3), which violates the norm of horizontal equity stipulating that likes should be treated alike (children experiencing two item deprivations in this case). From the perspective of poverty reduction, a non-deprived child in the first income quintile receives the same amount as a deprived child in that same quintile, thus violating the norm of vertical equity stipulating a progressive distribution of benefits.[16]

This brings us back to the underlying reasons for the lack of overlap between the income and material deprivation distributions: differences in the costs of living and household's specific needs, circumstances and assets. From a program perspective, these reasons can explain why what appear to be errors of program inclusion and spending leakage when using an income metric to assess poverty may in part not be erroneous or inefficient spending. Similarly, using an

[16] Along the same lines, the vertical equity norm stipulates that children with more / severe deprivations should, in theory, get more support than those with fewer or none. However, as agued in the last paragraph of section 4, material deprivation indicators are not suitable tor use as a screening tool to establish program eligibility.

income metric, some spending that appears to be correct may be reaching households that manage to avoid deprivation despite having a low income. The costs of living for our benchmark family vary considerably: Canada's official poverty thresholds used to calculate the Market-Basket-Measure (MBM) in 2023 vary from about 45,000$ for a family of two adults and two children living in a town of 30-99 thousand inhabitants in the province of Quebec to about 58,000$ for a similar family living in Vancouver in the province of British Columbia.[17] With the CCB being the same amount regardless of geography, the purchasing power of a CCB dollar in small town Quebec is considerably higher than that in Vancouver.[18] Such differences also signal that material deprivation, even if experienced at higher income quintiles, is a real possibility because higher incomes in more expensive geographic regions may not suffice to compensate for the higher costs of living. In a similar vein, those with higher needs and larger debts would benefit from more generous benefits even if their income is not in the lowest quintile.[19] And thus, even when some poverty measures, such as the MBM, take account of some of this variation, it is impossible and impractical to account for many other variations between households' individual circumstances.

6. Concluding discussion

This research used unique data to develop Canada's first child material deprivation (CMD) scale. The CMD includes 15 items and distinguishes four levels of deprivation (none, marginal, moderate, and severe). Comparisons between the CMD and other indicators of material outcomes, including income before taxes, show that income is only a crude measure of households' material outcomes, whereas outcome-based measures such as (child) material deprivation are likely more accurate in measuring households' actual living standard. We find that, despite having an income above the poverty line, many households with children experience outcomes associated with material deprivation or at least considerable material challenges. We also showed that underlying reasons for the lack of overlap between the income and child material deprivation distributions are likely the results of differences in the costs of living and households' specific needs, circumstances, and assets. Our simulation of targeting performance and program spending showed how the CCB's near universal coverage and low benefit claw back rates are successful in reaching materially deprived children with still relatively generous benefits at higher incomes. This effectiveness comes at a cost of considerable spending on non-deprived children and some horizontal inequities, with families experiencing similar deprivations receiving different amounts of CCB because they have different incomes.

From a child material deprivation perspective, the CCB's design is effective *because* it is designed to generously support families over a broad income range. The seemingly inefficient

[17] Statistics Canada, Market Basket Measure (MBM) thresholds for the reference family by Market Basket Measure region, component and base year, Table: 11-10-0066-01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110006601 accessed 30 June 2025.
[18] The MBM thresholds are much higher in Canada's northern territories with Iqaluit in Nunavut's threshold approaching 122,000$ being the highest.
[19] Not considered here is that the CCB has a top up if a child qualifies as disabled and that there are other programs (including the tax system) that offer needs-based support.

high program spending on non-income poor families thus directly engenders a reduction in poverty that is *unobserved* by income-poverty measures. The effectiveness – efficiency trade off between universal and targeted benefits (Notten & Gassmann, 2008) is thus even less clear cut when using both income- and outcome-based poverty perspectives, further favouring universal and loosely income-targeted designs.[20] Simultaneously, income-testing through the tax system, such as used in the CCB, is a relatively efficient and effective administrative tool to reduce child poverty, or more generally, support families with the costs of raising children by providing income transfers in countries with advanced tax systems in which most citizens must pay income taxes. It would, for instance, not be practical nor cheap for programs such as the CCB to account for many of such differences because such attempts would raise program costs significantly because of the need for extra information, evaluation, and verification (Notten & Gassmann, 2008).

We thus conclude that income is a very useful means to target income transfers, but that it should not be the only one by which such programs are designed and evaluated. Our analysis clearly shows that measuring a program's success by the income dimension alone biases the evaluation. There is also the concern that an overconfidence in the accuracy of income data may lead to policy decisions that target a too narrow income range and/or have a steep claw back rate. It is therefore important to cross-validate program designs and evaluations using outcome-based poverty measures, even if such metrics are not suited to screen for eligibility. For this to be possible, the routine collection of such survey data by a national statistics agency is necessary.

Were Statistics Canada to collect data on (child) material deprivation, we would expect to find similar patterns compared to those revealed here, though likely not at the same magnitudes. This is because our analysis has several limitations that affect the representativeness and accuracy of our estimates. Our findings rely on a relatively small sub-sample of an online survey in which respondents were identified through quota sampling to reflect the 2021 Census population aged 18 and over. Sample size was the main motivation underlying our classification into marginal, moderate and severe child material deprivation categories. Further research with a larger sample should assess substantive reasons for such categories. Our income information reflects income before taxes, whereas an income after taxes or disposable income definition would be preferable to study income poverty and inequality. Income is also self-reported and thus it is likely that different respondents report income differently and that they may forget to report more incidental income streams. Our CCB evaluation was not based on microdata and required various simplifying assumptions to enable a simulation. Finally, children were not involved in developing our measure of child material deprivation. The measure is based on what adults see as deprivation for children and that might be quite different to how children see and experience it (Smith et al., 2023).

[20] Also, by creating a large pool of families that benefit from the CCB, the program is politically more stable.

7. Bibliography

Baker, M., Messacar, D., & Stabile, M. (2021). The effects of child tax benefits on poverty and labor supply: Evidence from the Canada Child Benefit and Universal Child Care Benefit (Working Paper 28556). National Bureau of Economic Research.

Bradshaw, J., Hoelscher, P., & Richardson, D. (2009). An index of child well-being in the European Union. In Indicators of Children's Well-Being (pp. 325–369). Springer.

Brown, E. M., & Tarasuk, V. (2019). Money speaks: Reductions in severe food insecurity follow the Canada Child Benefit. Preventive Medicine, 129, 105876.

Canada Revenue Agency. (n.d.). CCB Benefit Year 2023-2024 Statistics. Retrieved 11 April 2025, from https://www.canada.ca/content/dam/cra-arc/prog-policy/stats/ccb-stats/2022-tax-year/ccb1-en.pdf

Chzhen, Y., De Neubourg, C., Plavgo, I., & de Milliano, M. (2016). Child poverty in the European Union: The multiple overlapping deprivation analysis approach (EU-MODA). Child Indicators Research, 9, 335–356.

Cooper, K., & Stewart, K. (2021). Does household income affect children's outcomes? A systematic review of the evidence. Child Indicators Research, 14(3), 981–1005.

De Neubourg, C., Bradshaw, J., Chzhen, Y., Main, G., Martorano, B., & Menchini, L. (2012). Child deprivation, multidimensional poverty and monetary poverty in Europe (IWP-2012-02; Innocenti Working Paper). UNICEF.

De Schutter, O., Frazer, H., Guio, A.-C., & Marlier, E. (2023). The escape from poverty: Breaking the vicious cycles perpetuating disadvantage. Policy Press.

Department of Finance Canada. (2024). Budget 2024 (1719–7740). https://www.budget.canada.ca/2024/report-rapport/budget-2024.pdf

Dhunna, S., & Tarasuk, V. (2021). Black–white racial disparities in household food insecurity from 2005 to 2014, Canada. Canadian Journal of Public Health, 112(5), 888–902.

ESDC. (2018). Opportunity for all – Canada's first poverty reduction strategy (Em12-48/2018E-PDF). Employment and Social Development Canada. https://www.canada.ca/en/employment-social-development/programs/poverty-reduction/reports/strategy.html

Ferrarini, T., Nelson, K., & Höög, H. (2012). The fiscalization of child benefits in OECD countries. AIAS, GINI Discussion Paper, 49.

Gordon, D. (2006). The concept and measurement of poverty. Poverty and Social Exclusion in Britain. The Millennium Survey, Policy Press, Bristol, 29–69.

Gordon, D., Nandy, S., Pantazis, C., Pemberton, Simon, & Townsend, P. (2003). Child poverty in the developing world. Policy Press.

Gross-Manos, D., & Bradshaw, J. (2022). The association between the material well-being and the subjective well-being of children in 35 countries. Child Indicators Research, 15(1), 1–33.

Guio, A., & Pomati, M. (2017). How do European citizens cope with economic shocks? The longitudinal order of deprivation. Monitoring Social Inclusion in Europe, 385.

Guio, A.-C., Gordon, D., Marlier, E., Najera, H., & Pomati, M. (2018). Towards an EU measure of child deprivation. Child Indicators Research, 11(3), Article 3.

Guio, A.-C., Marlier, E., Gordon, D., Fahmy, E., Nandy, S., & Pomati, M. (2016). Improving the measurement of material deprivation at the European Union level. Journal of European Social Policy, 26(3), Article 3.

Kenworthy, L. (2011). Progress for the Poor. Oxford University Press, USA.

Mendelson, M., Notten, G., Matern, R., & Seer, S. (2024). Poverty in Canada through a deprivation lens (pp. 1–21). Food Banks Canada. https://fbcblobstorage.blob.core.windows.net/wordpress/2024/06/FBC_2024PovertyInCanada_ENG_v6.pdf

Najjarrezaparast, P., & Pendakur, K. (2021). How Did the Canada Child Benefit Affect Household Spending? Canadian Public Policy, 47(4), 479–496.

Nolan, B., & Whelan, C. T. (2010). Using non-monetary deprivation indicators to analyze poverty and social exclusion: Lessons from Europe? Journal of Policy Analysis and Management, 29(2), Article 2.

Notten, G. (2015). Child poverty in Ontario: The value added of material deprivation indicators for comparative policy analysis in North America. Journal of Comparative Policy Analysis: Research and Practice, 17(5), Article 5.

Notten, G., & Gassmann, F. (2008). Size matters: Targeting efficiency and poverty reduction effects of means-tested and universal child benefits in Russia. Journal of European Social Policy, 18(3), Article 3.

Notten, G., & Guio, A.-C. (2024). Reducing poverty and social exclusion in Europe: Estimating the marginal effect of income on material deprivation. Socio-Economic Review, 22(1), 301–325.

Notten, G., & Kaplan, J. (2022). An empirical validation method for narrowing the range of poverty thresholds. Social Indicators Research, 1–21.

Notten, G., Seer, S., Mendelson, M., Matern, R., & Parkin, A. (2024). Material deprivation—An updated index for Canada (pp. 1–100). Food Banks Canada.

https://fbcblobstorage.blob.core.windows.net/wordpress/2024/06/FBC_2024_MeasuringPovertywithMDI_v20240327_FINAL-June-17-002.pdf

Notten, & Kaplan, J. (2021). Material deprivation: Measuring poverty by counting necessities households cannot afford. Canadian Public Policy, 1–17.

Robson, J., & Schwartz, S. (2020). Who doesn't file a tax return? A portrait of non-filers. Canadian Public Policy, 46(3), 323–339.

Smith, A., Martin, S., Peled, M., & Poon, C. (2023). Developing an index of adolescent deprivation for use in British Columbia, Canada. Child Indicators Research, 16(1), 273–291.

Statistics Canada. (n.d.). Dimensions of Poverty Hub [Government website]. Retrieved 8 April 2025, from https://www.statcan.gc.ca/en/topics-start/poverty.

Tarasuk, V. S., Fafard St-Germain, A. A., & Mitchell, A. (2019). Geographic and socio-demographic predictors of household food insecurity in Canada, 2011-12. BMC Public Health, 19. https://doi.org/10.1186/s12889-018-6344-2

UNICEF. (n.d.-a). Convention on the Rights of the Child. Retrieved 29 April 2025, from https://www.unicef.org/child-rights-convention

UNICEF. (n.d.-b). Frequently asked questions on the Convention on the Rights of the Child. Retrieved 29 April 2025, from https://www.unicef.org/child-rights-convention/frequently-asked-questions#:~:text=How%20many%20countries%20have%20ratified,has%20yet%20to%20do%20so.

8. Appendix [21]

Table A1. Number of respondents with children aged 0-17 and children

		Freq.	Percent
Nr. of respondents	No children	3,216	69.9
	At least 1 child	1,409	30.1
	Total	4,625	100
Nr. of children	0	3,216	69.9
	1	736	15.6
	2	473	10.1
	3+	200	4.4
	Total	4,625	100

Source: Phase Two survey, calculations by authors.

Table A2. Comparison child population in our sample with the 2021 Census

Age category	Sample freq.	Sample perc.	Census freq.	Census perc.
0-4 years	641	26.0	1,831,195	25.3
5-12 years	1,049	42.5	3,336,235	46.2
13-17 years	778	31.5	2,057,425	28.5
Total	2,468	100	7,224,855	100

Source: Phase Two survey, calculations by authors. Census, authors' calculation based on Statistics Canada (2021) Table 98-10-0020-01 Age (in single years), average age and median age and gender: Canada, provinces and territories, census metropolitan areas and census agglomerations with parts.

[21] More details regarding the data can be found in the report detailing the construction of an updated material deprivation index for Canada and its accompanying appendix: *Notten, G., Seer, S., Mendelson, M., Matern, R. & Parkin, A., Material deprivation - An updated index for Canada, report, Food Banks Canada, p. 1-100. [Traduction française] [Appendix] [Annexe]*

Table A3. Number of deprivations experienced by respondent

Number of deprivations (15 items)	Freq.	Percent	Number of deprivations (7 child items)	Freq.	Percent
0	911	67.3	**0**	1086	78.8
1	171	10.4	**1**	171	11.6
2	123	7.8	**2**	73	4.9
3	69	5.6	**3**	33	1.8
4	35	2.3	**4**	20	1.2
5	25	2.2	**5**	12	1.0
6	21	1.2	**6**	4	0.1
7	14	0.9	**7**	10	0.6
8	10	0.4	**Total**	**1,409**	**100**
9	10	0.9			
10	3	0.1			
11	3	0.0			
12	5	0.4			
13	3	0.1			
14	3	0.3			
15	3	0.1			
Total	**1,409**	**100**			

Source: Phase Two survey, calculations by authors.
Note: Included are respondents having at least one non-missing response to a deprivation item.

Table A4. Suitability: Respondents assessing items as “absolutely necessary” or “necessary” (percent)

	Total	Couple with children	Single with children	Income less than $30K
Child items:				
Homework	76	79	81	79
Fee-paying events	68	70	68	71
Indoor toys	64	66	65	68
Style clothes	45	49	53	46
Outdoor equipment	43	52	48	52
Small weekly allowance	39	45	46	46
Hobbies outside of school	Not included in phase one survey.			
Required school supplies	Not included in phase one survey.			
Household items:				
Shoes	92	90	86	93
Temperature	89	88	87	90
Dental Care	82	82	76	84
Transportation	82	79	83	83
Meat	78	78	71	79
Internet	61	62	69	65
Special occasions	46	52	56	51
Gifts	43	49	49	55

Source: Phase one survey. Online survey conducted in October 2022 (N = 2,000). Calculations by Elemental DCI. Items categorized into child specific and household items and then ordered in decreasing percentages. The item “small weekly allowance” was dropped following the focus groups and interviews due to mixed opinions (Notten et al, 2024).

Table A5. Validity: Odds ratios of deprivation items per variable associated with poverty

Deprivation item	Variable associated with poverty	Odds ratio
Child items:		
Style of clothes	Household Food Security Status	8.9
	Below LIM	3.3
	Economic hardship	12.1
Fee-paying school events	Household Food Security Status	9.7
	Below LIM	5.5
	Economic hardship	4.4
Outdoor leisure equipment	Household Food Security Status	6.0
	Below LIM	3.8
	Economic hardship	4.4
Indoor toys	Household Food Security Status	13.7
	Below LIM	4.6
	Economic hardship	4.8
Place for homework	Household Food Security Status	6.8
	Below LIM	2.6
	Economic hardship	4.2
Hobbies outside of school	Household Food Security Status	6.3
	Below LIM	3.6
	Economic hardship	4.3
Required school supplies	Household Food Security Status	23.7
	Below LIM	4.5
	Economic hardship	9.1
Household items:		
Meat	Household Food Security Status	22.2
	Below LIM	5.4
	Economic hardship	7.3
Shoes	Household Food Security Status	21.0
	Below LIM	4.3
	Economic hardship	5.9
Dental care	Household Food Security Status	4.2
	Below LIM	6.0

Deprivation item	Variable associated with poverty	Odds ratio
	Economic hardship	3.6
Temperature	Household Food Security Status	9.7
	Below LIM	3.0
	Economic hardship	4.2
Internet	Household Food Security Status	12.9
	Below LIM	3.5
	Economic hardship	7.9
Transportation	Household Food Security Status	12.1
	Below LIM	6.8
	Economic hardship	9.4
Gifts	Household Food Security Status	12.1
	Below LIM	2.6
	Economic hardship	6.6
Special occasions	Household Food Security Status	11.8
	Below LIM	4.1
	Economic hardship	6.1

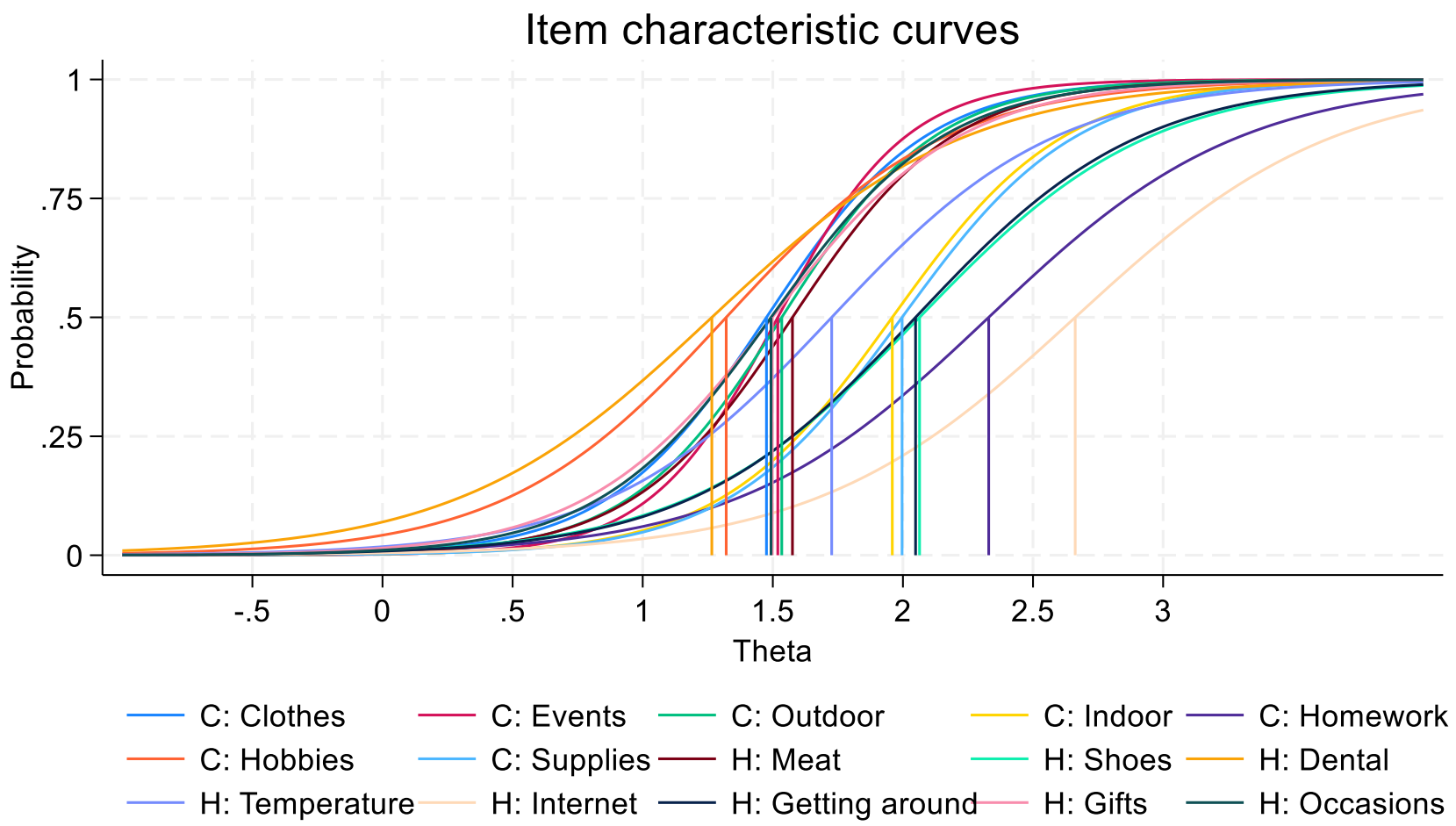
Source: Phase Two survey, calculations by authors.
Notes: Unweighted estimates. *Household food insecurity status* is a binary variable indicating that the respondent was deprived in 2 or more items of the 6-item food insecurity scale. *Below LIM* is a binary variable indicating whether the respondent's self-reported income before tax was below the low-income threshold of 50 percent below the median using adult equivalent income (Low Income Measure or LIM) and the square root of household size as the equivalence scale. *Economic hardship* is a binary variable indicating whether the household used 1 or more of 3 economic hardship strategies. The *odds ratio* is the predicted change in odds for a unit increase in the predictor. For example, the odds of a person who is food-insecure lacking the item "clothes" are 8.9 times greater than for someone who is not food-insecure. All coefficients were tested as statistically significant from zero.

Table A6. Reliability: Cronbach' s alpha

	Cronbach' s alpha
15-item scale	0.865
	Cronbach' s alpha excluding item:
Child items:	
Style of clothes	0.853
Fee-paying school events	0.850
Outdoor leisure equipment	0.853
Indoor toys	0.857
Place for homework	0.860
Hobbies outside of school	0.856
Required school supplies	0.858
Household items:	
Meat	0.853
Shoes	0.860
Dental care	0.862
Temperature	0.855
Internet	0.862
Transportation	0.857
Gifts	0.854
Special occasions	0.856

Source: Phase Two survey, calculations by authors.
Notes: Unweighted estimates.

Figure A1. Reliability: Item characteristic curves



Source: Phase Two survey, calculations by authors.
Notes: Unweighted estimates.

Table A7. Deprivation item tests: Summary

Item	Suitability	Validity	Reliability	Additivity
Style of clothes	Test: √ by groups with children	All items pass all 3 tests: √	Test 1: √ Test 2: √	Test 1: √ Test 2: Average income is higher for respondents with 1 deprivation (compared to 2 deprivations) but the difference is not statistically significant.
Fee-paying school events	Test: √		Test 1: √ Test 2: √	
Outdoor leisure equipment	Test: √		Test 1: √ Test 2: √,	
Indoor toys	Test: √		Test 1: √ Test 2: √	
Place for homework	Test: √		Test 1: √ Test 2: √, less discriminating	
Hobbies outside of school	Not tested		Test 1: √ Test 2: √, less discriminating	
Required school supplies	Not tested		Test 1: √ Test 2: √	
Meat	Test: √		Test 1: √ Test 2: √	
Shoes	Test: √		Test 1: √ Test 2: √	
Dental care	Test: √		Test 1: √ Test 2: √, less discriminating	
Temperature	Test: √		Test 1: √ Test 2: √	
Internet	Test: √		Test 1: √ Test 2: √, less discriminating	
Transportation	Test: √		Test 1: √ Test 2: √	
Gifts	Test: √ by higher poverty risk groups		Test 1: √ Test 2: √	
Special occasions	Test: √ by groups with children		Test 1: √ Test 2: √	

Notes: The passing criteria of the tests are as follows: *Suitability test*: Percentage of survey responses that an item is (very) necessary (≥ 50%) by the general population (phase one survey) and by subpopulations likely having lived experience with poverty (reporting an income below $30,000) or who live in a household with dependent children (single and couples with dependent children). No opinion data were collected for items "Hobbies outside school" and "Required school supplies" because these items were added to the phase two survey following interviews and focus groups (Notten et al, 2024). *Validity tests 1–3*: Unweighted estimates. A statistically significant (1%) and

positive coefficient in a binary logistic regression (dependent variable: deprivation item, independent variable: low-income measure before tax [LIM], food insecurity status, and economic hardship status). *Reliability tests*: Test 1: Unweighted estimates. Cronbach's Alpha above 0.7; Test 2: Two-parameter IRT test assessing item performance in terms of severity (including items ≤ 3 standard deviations) and discrimination (including items with correlation ≥ 0.4). *Additivity test*: Unweighted estimates. A statistically significant (5%) difference between mean equivalized household incomes of two groups based on a total of 420 pairwise comparisons (results not shown in this appendix, available only in reproduction files). For each possible pair of deprivation items, Test 1 compares the mean incomes of respondents reporting 0 versus 1 deprivation for the item pair (210 tests). Test 2 compares mean incomes of respondents reporting 1 versus 2 deprivations for the item pair (210 tests). The average income of respondents reporting 0 deprivations is higher and statistically significant than that of respondents reporting 0 deprivations for all item pairs. The average income of respondents reporting 1 deprivation is higher but not statistically significant than that of respondents reporting 2 deprivations for all but one item pair.

Table A8. Sensitivity Test: Effect on material deprivation rate when excluding one of 15 deprivation items (percentage point reduction), for a threshold of one or two items

Excluded item:	One-item threshold	Two-item threshold
Child: Hobbies outside school	-6.4	-5.2
Child: Style of clothes	-5.3	-4.1
Child: Required school supplies	-5.2	-3.1
Child: Place for homework	-5.1	-3.7
Child: Fee-paying school events	-5.1	-3.6
Dental care	-5.0	-4.2
Special occasions	-2.4	-2.9
Temperature	-2.0	-1.4
Gifts	-1.8	-1.9
Meat	-1.7	-1.0
Shoes	-1.1	-0.6
Transportation	-1.1	-0.8
Internet	-0.7	-0.6
Child: Outdoor leisure equipment	-0.4	-1.1
Child: Indoor toys	-0.3	-0.3

Source: Phase Two survey, calculations by authors.
Note: Ordered by absolute effect on the deprivation rate at a threshold of one item (from large to small).

Technical note to setting the deprivation threshold

The empirical tests described below indicate that at a deprivation threshold of one or two items is best at empirically distinguishing between deprived and non-deprived respondents. We applied the measurement error-based approach by Notten and Kaplan, which relies on additional information associated with a family's material well-being. We use various definitions of the respondents' food insecurity, economic hardship and income information in the phase two survey (Notten et al, 2024).

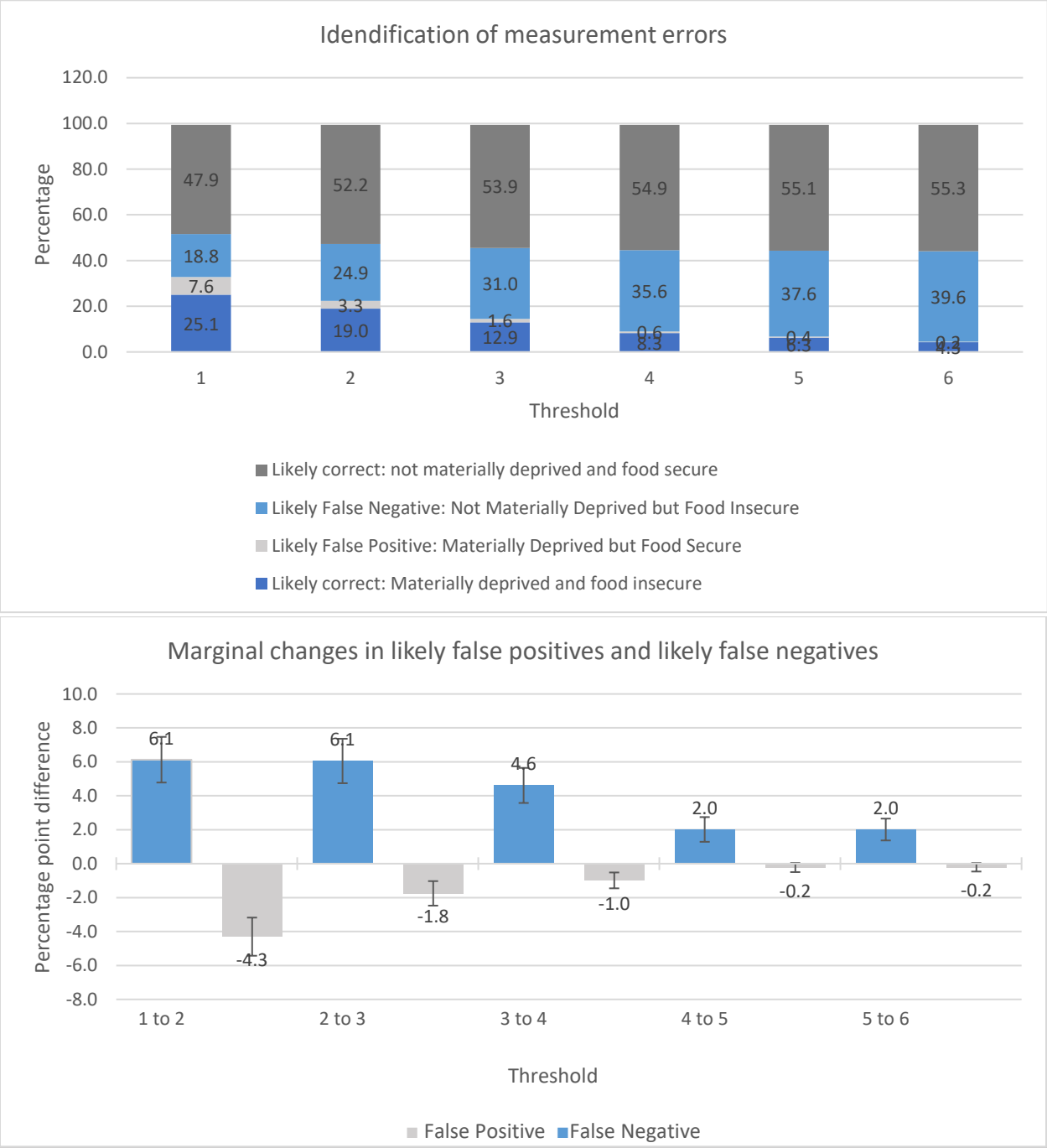
Figure A2 below illustrates this approach with food insecurity. At a given deprivation threshold, a crosstabulation between material deprivation status and food insecurity status yields four groups (top panel). Taking advantage of the positive association between these two variables, two groups are likely correctly identified: respondents who are both deprived and food insecure and those who are both not deprived and food secure. One group, those who are not materially deprived but are food insecure, identifies those who may mistakenly be identified as not deprived (likely false negatives). Another group, those who are materially deprived but food secure, identifies respondents who may mistakenly be identified as deprived (likely false positives).

As the deprivation threshold increases, becomes stricter, the percentage of deprived respondents in the population declines (see Figure 1 main text). Moreover, Figure A2 shows that the proportions of the four groups shift, with a larger proportion being (likely) correctly identified as not materially deprived and a larger proportion of being (likely) false negatives. Stricter thresholds thus increase the error of false negatives while they decrease that of false positives. It is thus impossible to simultaneously minimize both error groups. This research views both types of errors as equally problematic and thus sees the optimal threshold as the one at which the absolute increase in (likely) false negatives is approximately equal to the decline in (likely) false positives (Figure A2, bottom panel). Moving from a threshold of one to two deprivations, 6.1 of respondents go from being (likely) correctly measured as materially deprived to become (likely) false negatives. Another 4.3 percent move from (likely false positives) to being (likely) correctly measured as not materially deprived. Considering the confidence intervals around these point estimates, both groups are of the same size in an absolute sense. At every next increase in the threshold, the increase in (likely) false negatives is larger than the decrease in (likely) false positives. This suggest a threshold of one or two is optimal.

Figure A3 shows the results for an alternative definition of food insecurity (considering a respondent as food insecure when they cannot afford one of six items rather than two), economic hardship (considering someone as experiencing economic hardship when they followed at least one of three hardship strategies) and two income definitions (considering some at risk of experiencing material deprivation if their income is below fifty percent of the median or below the median). Of these four tests, three more point at a threshold of one or two. Only one test, using the low-income definition, suggests a threshold of three or four items. This cut-off is likely too restrictive as income is a crude proxy for living conditions because it does not consider differences in families' needs and circumstances that could result in material deprivation despite having an income above 50 percent of the median.

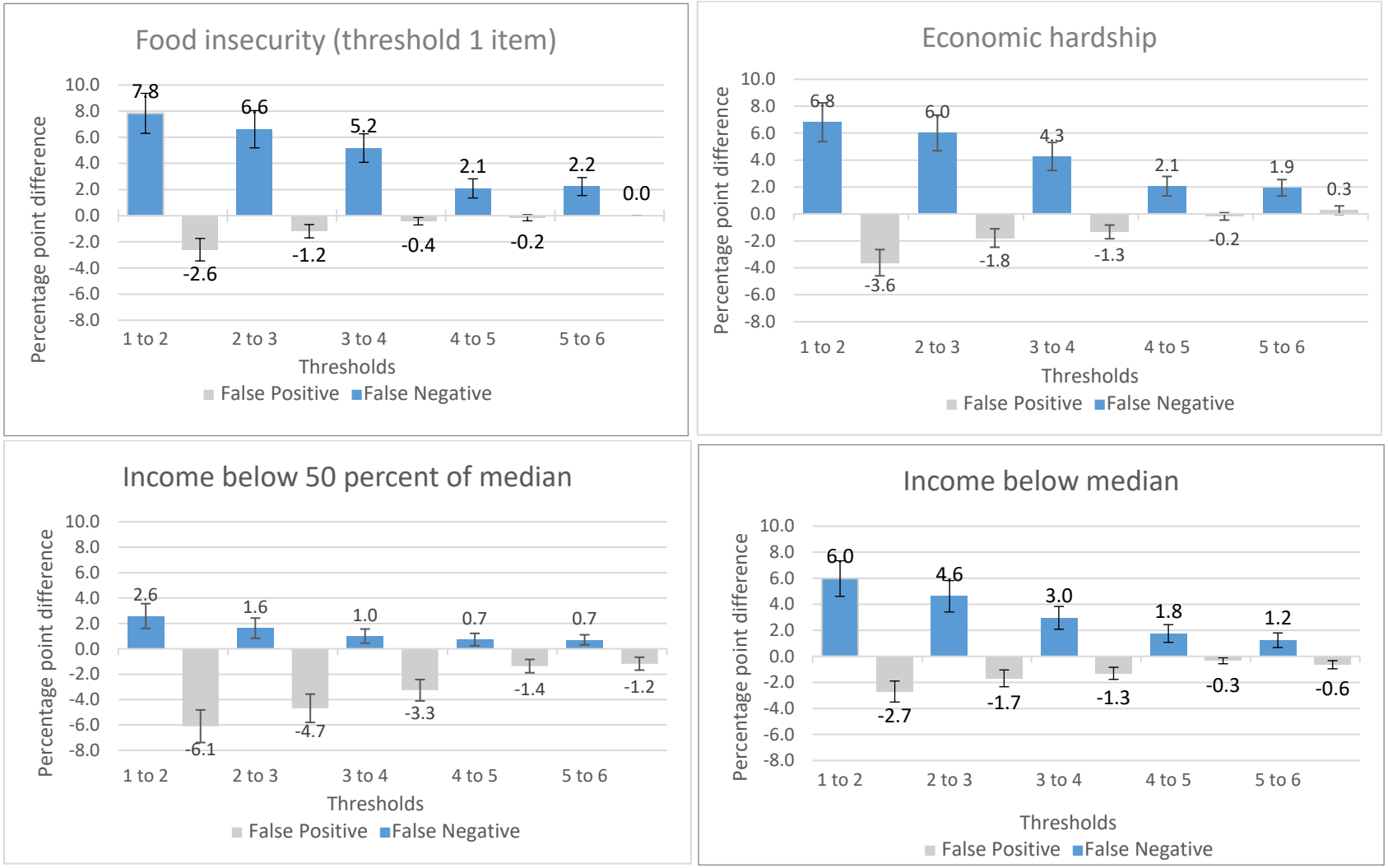
Finally, we applied the Bristol Optimal Method (BOM) using the income variable and the food insecurity variable on various statistical approaches (ANOVA, logit, Kruskal-Wallis Test Statistic) and consistently find a threshold of one (Gordon, 2006, results available on request).

Figure A2: Identification of measurement errors by deprivation threshold, using food insecurity status for empirical validation



Source: Phase Two survey, calculations by authors.
Notes: This food insecurity indicator considers a person food insecure when they cannot afford two or more food items out of six items in total.

Figure A3: Marginal changes in likely false positives and likely false negatives, using various indicators for empirical validation



Source: Phase Two survey, calculations by authors.

Notes: The top left panel counts someone as food insecure when they miss one or more out of six food items. The top right panel counts someone as experiencing economic hardship when they followed one or more of three strategies. The bottom left panel deems someone vulnerable to material deprivation when their income falls below fifty percent of the median whereas the bottom right panel sets that threshold at the median income.

Table A9: Deprivation rates and distribution (percent) by respondent characteristics and deprivation threshold (unit of analysis: children in sample)

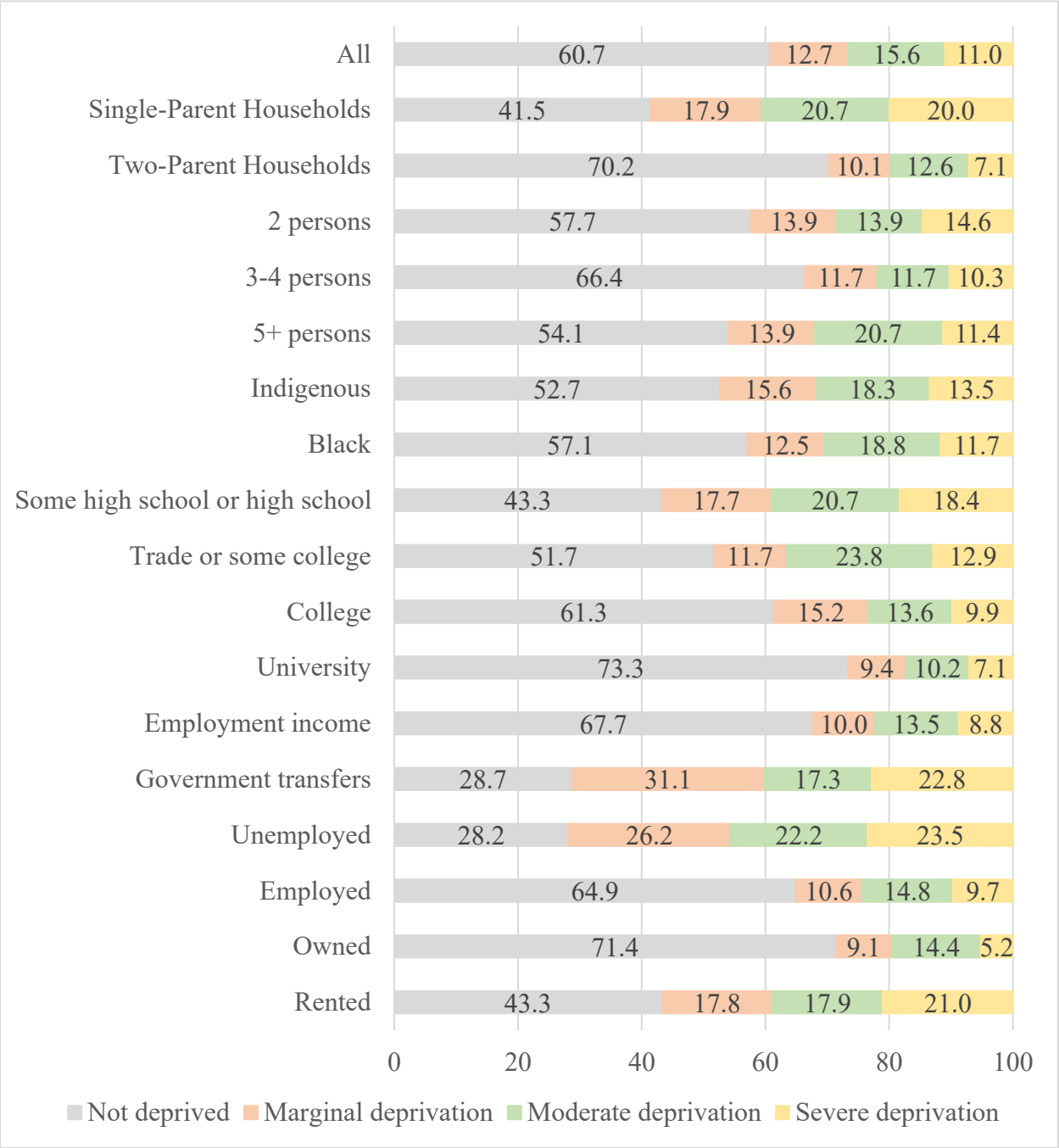
		Threshold: 1 deprivation	Threshold: 2 deprivations	Distribution
Characteristics	Category	Percent	Percent	Percent
All	All	39.3	26.6	100
Region	Atlantic	37.9	24.6	10.4
	Quebec	31.0	21.3	20.4
	Ontario	46.2	32.1	36.1
	BC	36.8	27.6	10.6
	Alberta	35.4	26.4	11.7
	Manitoba & Saskatchewan	39.8	19.3	10.9
Urban/Rural	Rural	40.1	28.7	29.8
	Urban	39.2	25.9	70.2
Household type	Single-Parent Households	58.5	40.7	31.6
	Two-Parent Households	29.8	19.7	68.2
Household size	2 persons	42.3	28.5	5.6
	3-4 persons	33.6	22.0	52.4
	5 or more persons	46.0	32.1	42.1
Number of children in household	1 child	34.0	21.7	29.8
	2 children	34.0	21.6	38.3
	3 or more children	50.6	37.2	31.9
Age category of children household	1+ children aged 0-4	44.1	30.1	43.7
	1+ children aged 5-12	43.1	29.9	66.1
	1+ children aged 13-17	45.0	31.5	48.1
Respondent: Visible Minority	Visible Minority	40.6	28.1	43.2
	Not a visible Minority	35.4	23.5	56.8
Respondent: Race / Ethnicity	White	36.8	25.1	49.5
	South Asian	45.4	33.3	7.1
	Indigenous	47.4	31.8	15.5
	Black	42.9	30.4	15.1
	Other	34.4	18.8	7.6
	Chinese	24.0	13.6	5.1
Respondent: Recent immigrant	Immigrant	39.0	28.7	15.9
	Not an immigrant	39.6	26.5	84.2
Respondent: Education	Some high school or high school	56.8	39.0	19.3
	Trade or some college	48.3	36.7	19.6
	College	38.7	23.4	21.9
	University	26.7	17.3	39.2

Income source	Employment income	32.3	22.3	79.8
	Government transfers	71.3	40.2	10.9
	Other	72.9	51.8	3.6
	Investment and retirement income	50.8	43.3	5.7
Respondent: Employment	Unemployed	71.8	45.6	6.2
	Employed	35.1	24.5	76.7
	Not in Labour Force	49.0	31.5	17.2
Homeownership	Rented	56.7	38.9	37.3
	Owned	28.6	19.5	62.7

Source: Phase Two survey, calculations by authors.

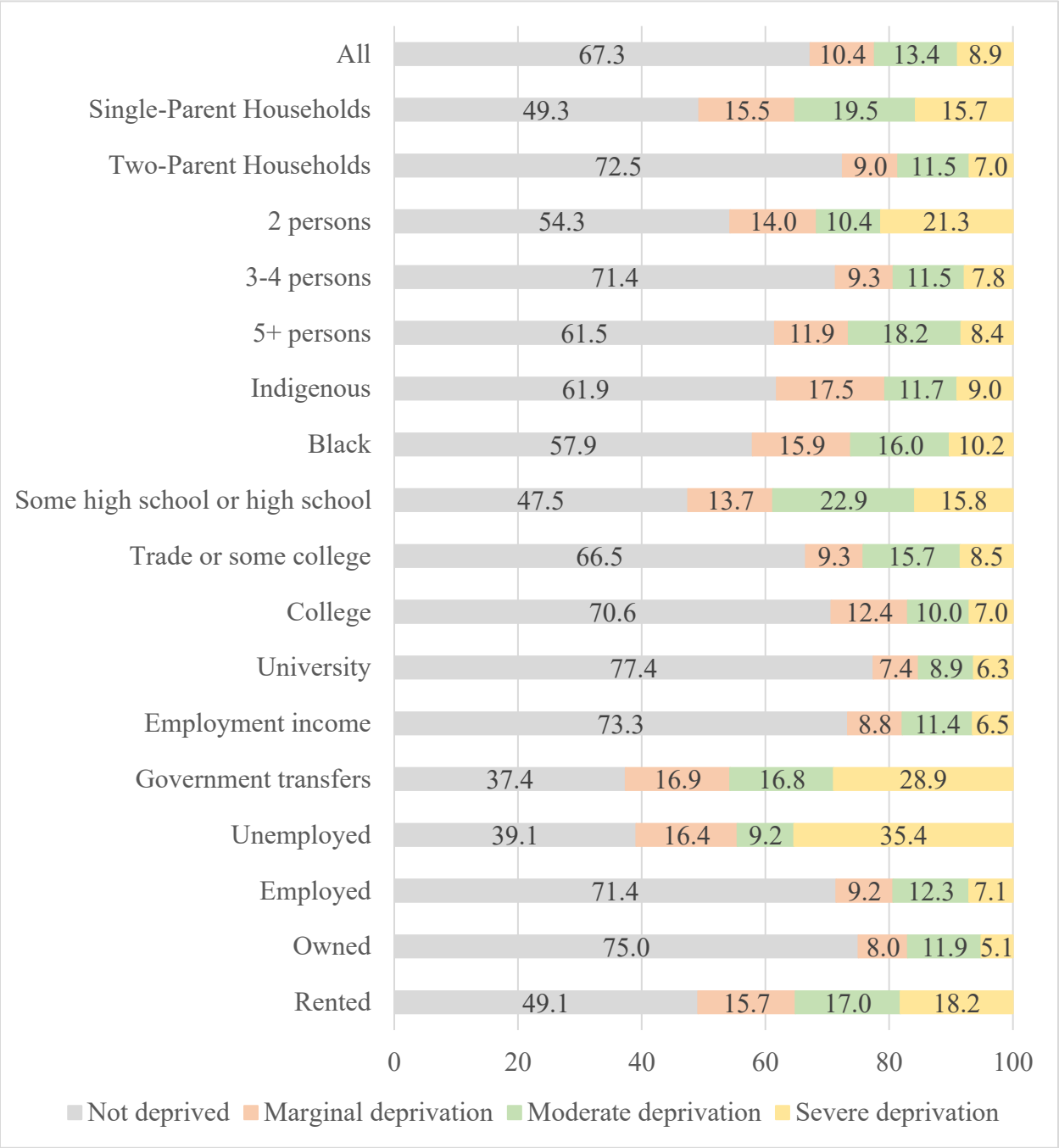
Notes: Unit of analysis: children in the sample. Characteristics indicated with "respondent" are attributes of the respondent only whereas other characteristics apply to all members.

Figure A4: Deprivation categories (percent), overall and by respondent characteristics (unit of analysis: children in sample)



Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: children in sample. Not deprived (zero deprivations), marginal deprivation (one deprivation), moderate deprivation (two or three deprivations) and severe deprivation (four or more deprivations).

Figure A5: Deprivation categories (percent), overall and by respondent characteristics (unit of analysis: respondents living with children under age 18, population weighted)



Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: respondents living with children under age 18, population weighted. Not deprived (zero deprivations), marginal deprivation (one deprivation), moderate deprivation (two or three deprivations) and severe deprivation (four or more deprivations).

Table A10: Deprivation rates and distribution (percent) by respondent characteristics and deprivation threshold (unit of analysis: respondents living with children under age 18)

	Threshold: 1 deprivation		Threshold: 2 deprivations		Distribution
Category	Percent	± CI	Percent	± CI	Percent
All	32.8	2.5	22.3	2.3	100
Atlantic	41.1	7.7	24.7	6.8	5.9
Quebec	28.4	5.4	20.1	4.4	23.6
Ontario	35.2	4.4	23.5	3.9	43.2
BC	32.5	7.6	23.6	6.6	11.7
Alberta	30.1	7.1	24.0	6.3	10.8
Manitoba & Saskatchewan	28.5	7.9	13.0	6.3	4.9
Rural	36.4	4.8	24.8	4.3	31.4
Urban	31.4	3.0	21.4	2.6	68.6
Single-Parent Households	50.7	4.6	35.2	4.2	22.6
Two-Parent Households	27.5	2.8	18.6	2.4	76.9
2 persons	45.7	8.5	31.7	7.8	7.0
3-4 persons	28.6	3.0	19.3	2.7	63.3
5 or more persons	38.5	4.9	26.6	4.4	29.8
1 child	32.2	3.4	21.6	3.1	51.8
2 children	30.4	4.2	20.3	3.7	33.4
3 or more children	40.3	7.2	29.4	6.6	14.7
1+ children aged 0-4	33.8	4.1	21.4	3.5	34.7
1+ children aged 5-12	34.9	3.3	25.0	3.2	54.3
1+ children aged 13-17	33.4	4.0	23.2	3.5	43.8
Visible Minority	32.2	4.1	21.8	3.7	37.7
Not a visible Minority	32.1	3.6	22.8	3.1	62.3
White	31.5	3.5	22.1	3.1	57.8
South Asian	35.8	9.0	23.9	8.5	10.0
Indigenous	38.2	6.8	20.7	6.0	7.5
Black	42.1	6.8	26.2	6.3	6.6
Other	28.2	9.0	22.7	7.6	13.0
Chinese	29.2	9.9	17.6	8.3	5.1
Immigrant	27.4	6.1	20.3	5.7	15.7
Not an immigrant	33.8	2.7	22.9	2.3	84.3
Some high school or high school	52.5	6.3	38.8	6.0	21.0
Trade or some college	33.5	6.3	24.2	5.6	19.1
College	29.4	5.1	17.0	4.6	25.8
University	22.6	3.5	15.2	3.0	34.1
Employment income	26.7	2.6	17.9	2.3	82.7
Government transfers	62.6	8.2	45.7	8.8	10.0
Other	65.6	14.9	33.8	15.0	2.8

Investment and retirement income	50.3	12.0	39.9	12.1	4.5
Unemployed	60.9	11.3	44.5	11.5	4.2
Employed	28.6	2.8	19.3	2.4	79.5
Not in Labour Force	46.1	6.6	32.3	6.1	16.3
Rented	50.9	4.3	35.1	4.1	29.7
Owned	25.0	2.9	17.0	2.4	70.4

Source: Phase Two survey, calculations by authors.
Notes: Unit of analysis: respondents living with children under age 18 (population weighted). Characteristics indicated with "respondent" are attributes of the respondent only whereas other characteristics apply to all members.
CI: Bootstrapped confidence intervals in percentage points.