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RESEARCH ARTICLE

The effects of a universal income transfer on food insecurity within households

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Abstract

Using the public-use files of the Canadian Community Health Survey and a difference-in-differences methodology, we estimate the impact of a universal income transfer (the Universal Child Care Benefit) on food insecurity, separately for adults and children *within* households. The income transfer reduced the risk of overall food insecurity by 20% at the child level, and the effect was larger in households with lower education or income. The transfer also reduced the likelihood of moderate/severe food insecurity among adults in single-parent families, as well as adults and children in households with secondary education or less. These findings withstand several robustness checks.

Keywords: Children; families; food insecurity; government policy; transfer payments

JEL Classifications: I12; I38; J12; J13

Introduction

Food insecurity – defined here as the "inadequate or insecure access to food due to financial constraints" (PROOF 2021, 2) – is an important public health issue. It negatively affects diet quality and nutritional outcomes, with adverse implications for health and well-being across life stages (Gundersen and Ziliak 2015; Tarasuk 2016). Socioeconomic status is a strong predictor of food insecurity (Smith et al. 2017; Tarasuk et al. 2019; Bhawra et al. 2021), and there is evidence that income-based policy interventions have reduced the risk of food insecurity in Canada (Ionescu-Ittu et al. 2015; Loopstra et al. 2015; Li et al. 2016; McIntyre et al. 2016; Tarasuk, Li et al. 2019; Brown and Tarasuk 2019). However, these studies focus on household-level food insecurity, and it is unclear whether interventions affect adults and children differently within households. For example, adults may shield children from food insecurity when possible (Nord and Hopwood 2007; Ovenell et al. 2022). Moreover, income transfers may be differentially allocated across household members. For example, Kooreman (2000) finds that parents feel a "moral obligation" to spend child benefits on goods that benefit children, whereas Blow et al. (2012) find that an increase in child benefits leads parents to spend more on themselves.

Thus, it is important to disaggregate the household-level effects of policy interventions on food insecurity to better understand the impact on adults and children therein.

In this study, we estimate the impact of an income transfer — the Universal Child Care Benefit (UCCB) — on food insecurity within households. The Canadian federal government introduced the UCCB in 2006, providing families with a monthly taxable benefit of $100 for each child under the age of 6, regardless of their socioeconomic status. We use microdata from the public-use files of the Canadian Community Health Survey (CCHS) and a difference-in-differences methodology to estimate the impact of this universal income transfer on food insecurity, in both the full sample and vulnerable subpopulations delineated by family structure, education and income. We consider measures of overall and moderate/severe food insecurity at the adult, child, and household levels, respectively. The "eligible group" consists of households in which the youngest child is under the age of 6, and the "non-eligible group" consists of those in which the youngest child is aged six to 11 years. The pre-policy period consists of CCHS Cycle 3.1 (2005), whereas the post-policy period consists of data from 2007–2008, 2009–2010 to 2011–2012.

We find that the UCCB reduced the risk of overall food insecurity by approximately 20 percent at the child level, and the effect was larger in households with low education or income. Further, the UCCB reduced the likelihood of moderate/severe food insecurity among adults in single-parent families, as well as adults and children in households with secondary education or less. These results withstand numerous robustness checks.

Our study is aligned with Ionescu-Ittu et al. (2015), who also examine the impact of the UCCB on food insecurity. We build on their study in two important ways. First, we estimate impact of the income transfer on food insecurity *within* households. As described above, this is important because adults and children may have different experiences of food insecurity in the presence of shielding (Nord and Hopwood 2007; Ovenell et al. 2022) and income transfers may be allocated differentially across household members (Kooreman 2000; Blow et al. 2012). Second, while Ionescu-Ittu et al. (2015) focus on overall food insecurity (i.e., any such experiences), we also consider the impact of the income transfer on moderate/severe food insecurity. This is important because the negative health consequences of food insecurity increase with the degree of severity (Tarasuk et al. 2015) and income-based policy interventions may have different effects along this margin (Li et al. 2016; Brown and Tarasuk 2019).

Background

Prevalence of food insecurity and implications for health

As noted above, we estimate the impact of an income transfer on food insecurity within households. This is important because food insecurity is a widespread issue, especially among vulnerable subpopulations, with far-reaching consequences for health and well-being.

In the Canadian context, more than 12 percent of households experienced some level of food insecurity in 2017–2018, affecting approximately 4.4 million people (Tarasuk and Mitchell 2020). Moreover, there are notable disparities based on geographic, demographic, and socioeconomic characteristics. For example, compared to the national average in 2017–2018, the prevalence of food insecurity was higher among households in Nunavut (57 percent), Indigenous Peoples (28 percent), families with children (16 percent), single mothers (33 percent), single fathers (22 percent), households with less than secondary education (21 percent), those with low income (36 percent) and social assistance recipients

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(60 percent) (Tarasuk and Mitchell 2020). These estimates pertain to household food insecurity but, as described in the introduction, the experiences of adults and children within households are not necessarily equal. For example, using Canadian data from 2007 to 2018, Ovenell et al. (2022) find that shielding occurred in approximately 40 percent of food-insecure families with children.[1]

The health consequences of food insecurity extend to both adults and children in the household, even in the presence of shielding. Among adults, food insecurity is correlated with poor diet quality, low self-reported health and increased risk of chronic disease, including hypertension, heart disease, obesity, and diabetes (Vozoris and Tarasuk 2003; Kirkpatrick and Tarasuk 2008; Tait et al. 2018; Domingo et al. 2020). There is also evidence that food insecurity makes it difficult to manage chronic conditions and adhere to the necessary medications (Chan et al. 2015; Men et al. 2019). In addition to physical health, food insecurity increases the risk of anxiety, depression, mood disorders, and suicide ideation in adults (Muldoon et al. 2013; Davison and Kaplan 2015; Davison et al. 2015; Martin et al. 2016; Jessiman-Perreault and McIntyre 2017). There is also evidence that food-insecure adults are more likely to die prematurely than their food-secure counterparts (Gundersen et al. 2018; Men et al. 2020).

Among children, food insecurity is associated with poor overall health and higher risk of chronic disease, including asthma, overweight, and hypertension (Kirkpatrick et al. 2010; Dubois et al. 2011; Ke and Ford-Jones 2015; South et al. 2019). It also impairs behavioral and cognitive development (Melchior et al. 2012; Ke and Ford-Jones 2015). Likewise, food insecurity is detrimental to mental health, increasing the risk of depression and suicide ideation in children (McIntyre et al. 2013). Even when children are shielded from food insecurity, they remain at greater risk of poor mental health compared to those in food-secure households (Ovenell et al. 2022).

Universal Child Care Benefit

Past studies have shown that income-based policy interventions – such as child benefits, public pensions, and social assistance – reduce the risk of household food insecurity in Canada (Ionescu-Ittu et al. 2015; Loopstra et al. 2015; Li et al. 2016; McIntyre et al. 2016; Brown and Tarasuk 2019; Tarasuk, Li et al. 2019). We build on this literature, especially Ionescu-Ittu et al. (2015), by estimating the impact of the UCCB on food insecurity *within* households. The UCCB was implemented by the Canadian federal government in July 2006 to help with the cost of raising children (Schirle 2015; Lebihan and Mao Takongmo 2019). It was a taxable benefit of $100 per month ($1,200 per year) for each child under the age of 6. Families could decide how to spend the transfer. According to Schirle (2015), the UCCB was sizeable, representing up to 18 percent of the annual cost of raising a child. We further note that the UCCB represented 17 percent of average food expenditures in 2006, which were $7,046 per household (Statistics Canada 2008). The UCCB was a universal transfer for families with children under the age of 6 because it was not income-tested and 99 percent of eligible families received it (Human Resources and Skills Development Canada 2010). Moreover, other income-tested transfers, such as the Canada Child Tax Benefit and social assistance, were not clawed back as a result of the UCCB. There were major changes to the eligibility criteria and amount of the UCCB in 2015, and it was

[1]Ovenell et al. (2022) define "shielding" as food-secure children living with food-insecure adults, versus non-shielding households in which both children and adults experience food insecurity. Using this definition, we find that shielding occurred in 43% of food-insecure families with children in our sample.

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replaced by an income-tested child benefit in 2016. These changes are extraneous to our study period, which covers the period from 2005 to 2012.

Data

Data source and sample

We use cross-sectional microdata from the public-use files of the CCHS, which is a nationally representative survey of the Canadian population aged 12 and older (Statistics Canada n.d.a).[2] We pool observations from Cycle 3.1 (2005), 2007–2008, 2009–2010, and 2011–2012. We cannot use earlier data because measures of food insecurity are not comparable; earlier measures do not permit an examination of food insecurity within households or by degree of severity. Another limitation of the CCHS is that questions about food insecurity were "optional content" in Cycle 3.1 (2005) and 2009–2010 (and thus only asked to respondents in provinces and territories that selected them). Questions about food insecurity were "core content" in 2007–2008 and 2011–2012 (and thus asked to respondents in all provinces and territories).[3] Our sample is limited to provinces that were included in all years, such that they opted into the food insecurity questions in both Cycle 3.1 (2005) and 2009–2010, in addition to being observed when these questions were "core content" in 2007–2008 and 2011–2012. These provinces include: Nova Scotia, Quebec, Ontario, Alberta and British Columbia. We later relax this restriction as a robustness check, such that we include all provinces where questions about food insecurity were asked at some point during our study period. This includes provinces that only selected the questions in one of the two cycles in which they were "optional content" and provinces that never opted in – all of which are also observed when the questions were "core content".

Our sample consists of households with children younger than 12 years. Questions about food insecurity are asked to a household representative, and we focus on those who identify as a parent living with one or more children. Further, following past studies on the UCCB (Schirle 2015; Koebel and Schirle 2016; Lebihan and Mao Takongmo 2019), we restrict our sample to parents aged 25 to 49 as they are most likely to have children under the age of 6. This allows us to more accurately identify parents who were impacted by the policy change, as opposed to those who have young children in the household but did not receive the transfer – such as older individuals who reside with an adult child and grandchild(ren). We later relax this restriction as a robustness check.

We consider households observed in Cycle 3.1 (2005) to be in the pre-policy period, and those observed in 2007–2008, 2009–2010, and 2011–2012 to be in the post-policy period. In terms of whether households plausibly received the UCCB, we define the "eligible group" as those in which the youngest child is under the age of 6. The "non-eligible group" is defined as households in which the youngest child is aged six to 11 years. This is consistent with past studies assessing the impact of the UCCB on health and well-being (Ionescu-Ittu et al. 2015; Daley 2017; Lebihan and Mao Takongmo 2019). Our estimating sample consists of 46,210 respondents, of which 29,953 belong to the "eligible group" and 16,257 belong to the "non-eligible group." Sampling weights are used in all analyses.

[2]The CCHS excludes full-time members of the Canadian Forces, the institutionalized population, those living on First Nations reserves and residents of certain remote regions, but these exclusions represent less than three percent of the Canadian population aged 12 and older (Statistics Canada n.d.a).

[3]The "core content" of the CCHS consists of questions asked of respondents in all provinces and territories. The "optional content" allows provinces and territories to select additional questions for respondents in their jurisdictions to address local public health priorities. The CCHS – including both types of content – is administered nationally by Statistics Canada.

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Dependent variables

Our dependent variables are derived from the "Household Food Security Survey Module" of the CCHS (Health Canada 2007). The module consists of 18 questions – ten are relevant to adults and eight are relevant to children. Household food insecurity is based on the experiences of adults and children therein. Refer to Table A.1 of the Supplementary Material the list of questions.

Consistent with past studies (Loopstra et al. 2015; Li et al. 2016), we use the "Household Food Security Survey Module" to construct dichotomous measures of overall food insecurity (i.e., any degree) and moderate/severe food insecurity. In addition to the overall measure, it is important to consider moderate/severe food insecurity because of the greater negative impact on health (Tarasuk et al. 2015) and because interventions may affect food insecurity differently by the degree of severity (Li et al. 2016; Brown and Tarasuk 2019).

At the adult level, "overall food insecurity" equals 1 if there are any affirmative responses to the 10 questions pertaining to adults. It equals 0 otherwise. Likewise, "moderate/severe food insecurity" equals 1 if there are two or more affirmative responses to the adult-related questions, and it equals 0 otherwise. An analogous approach is used at the child level. Specifically "overall food insecurity" equals 1 if there are any affirmative responses to eight questions pertaining to children. It equals 0 otherwise. Likewise, "moderate/severe food insecurity" equals 1 if there are two or more affirmative responses to the child-related questions, and it equals 0 otherwise. Finally, at the household level, "overall food insecurity" equals 1 if adults and/or children therein have a value of 1 for this measure. Likewise, "moderate/severe food insecurity" equals 1 if adults and/or children in the household have a value of 1 for this measure.

Table 1 shows the prevalence of food insecurity at the adult, child, and household levels for the eligible and non-eligible groups, before and after the policy change. In the non-eligible group, the prevalence of food insecurity is consistently higher after the policy change. This is not observed in the eligible group, among whom the prevalence of overall food insecurity decreased at the adult, child, and household levels. However, there was an increase in the prevalence of moderate/severe food insecurity among children and households in the eligible group after the policy change relative to the pre-policy period (i.e., from 3.56 to 3.79 among children, and from 8.16 to 8.29 at the household level). In what follows, we examine these differences more rigorously in the context of the income transfer.

Methodology

Empirical strategy

As shown in Equation 1, we use a difference-in-differences methodology to estimate the impact of the income transfer on overall and moderate/severe food insecurity at the adult, child, and household levels, respectively.

$$\mathrm{E}\left(Y_{ipt}|Eligible_i, Treated_{it}, \boldsymbol{X}_{it}, \boldsymbol{Z}_{pt}, \boldsymbol{Province}_p, \boldsymbol{Year}_t\right) = \beta_0 + \beta_1 Eligible_i + \beta_2 Treated_{\mathrm{it}} + \alpha \boldsymbol{X}_{it} + \gamma \boldsymbol{Z}_{pt} + \boldsymbol{Province}_p + \boldsymbol{Year}_t + \epsilon_{ipt} \quad (1)$$

Y_{ipt} denotes food insecurity for household i in province p and year t (i.e., dichotomous measures of overall and moderate/severe food insecurity, respectively). $Eligible_i$ is a dummy variable that equals 1 if the household had a child under the age of 6 and thus was eligible for

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Table 1. Prevalence of adult, child, and household food insecurity among eligible and non-eligible groups, before and after the policy change

	Eligible group		Non-eligible group	
	Pre-policy ($n = 8{,}040$)	Post-policy ($n = 21{,}913$)	Pre-policy ($n = 4{,}795$)	Post-policy ($n = 11{,}462$)
Adult prevalence (%)				
Overall food insecurity	12.35	12.20	12.01	13.16
	(0.48)	(0.37)	(0.67)	(0.54)
Moderate/severe insecurity	7.93	7.81	7.71	8.79
	(0.40)	(0.31)	(0.55)	(0.44)
Child prevalence (%)				
Overall food insecurity	7.40	7.08	7.85	9.12
	(0.41)	(0.30)	(0.55)	(0.47)
Moderate/severe insecurity	3.56	3.79	3.97	5.02
	(0.28)	(0.24)	(0.38)	(0.35)
Household prevalence (%)				
Overall food insecurity	13.52	13.17	13.39	14.48
	(0.50)	(0.38)	(0.70)	(0.57)
Moderate/severe insecurity	8.16	8.29	8.05	9.33
	(0.40)	(0.31)	(0.55)	(0.45)

Note: Sampling weights are used in all analyses. Standard errors are reported in parentheses.

the income transfer. $Treated_{it}$ is a dummy variable that equals 1 if household i is expected to have received the income transfer in time period t (i.e., it indicates whether the household was eligible for the transfer in the post-policy period). $\boldsymbol{X}_{it}$ is a vector of respondent- and household-level covariates similar to those used in past studies (Ionsecu-Ittu et al. 2015; Loopstra et al. 2015; Li et al. 2016; McIntyre et al. 2016; Brown and Tarasuk 2019; Tarasuk, Li et al. 2019). Specifically, as outlined in Table A.2 of the Supplementary Material, we control for the respondent's age, sex, immigrant status, visible minority status, family structure (single parent versus two parents), household size, highest level of education in the household, income quintile, main source of income (employment insurance, social assistance or other sources versus employment income) and home ownership. $\boldsymbol{Z}_{pt}$ is a vector of province-level controls, including the annual average unemployment rate (Statistics Canada n.d.b) and all-items Consumer Price Index (Statistics Canada n.d.c). $\boldsymbol{Province}_p$ and $\boldsymbol{Year}_t$ denote province and year fixed effects, respectively.

We estimate Equation 1 using ordinary least squares regressions.[4] β_2 is the coefficient of interest (i.e., the difference-in-differences estimate), indicating the impact of the income transfer on food insecurity. It is identified on the assumption that, in the absence of the UCCB, the pre-policy difference between the eligible and ineligible groups would have

[4]We use ordinary least squares regressions with dichotomous dependent variables given the challenges associated with estimating treatment effects in non-linear models (Puhani 2012).

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persisted. This relies on the assumption that $Treated_{it}$ is exogenous, in the sense that families were not sorting into the UCCB along some dimension that is also correlated with food insecurity. We argue this is plausible because the UCCB was a universal transfer for families with children under the age of 6; it was not income-tested and 99 percent of eligible families received it (Human Resources and Skills Development Canada 2010). As such, sorting into treatment would mean that the transfer induced families to have children. It is unlikely that the UCCB induced changes in fertility because it was small relative to the cost of raising an additional child (Daley 2017) and, as reported by Schirle (2015), there was no break in the Canadian fertility trend before and after the policy change.

Robustness checks

We conduct several robustness checks to examine the sensitivity of our main estimates to changes in the sample and specification.[5] First, we consider the possibility that other child-related policies affected food insecurity during our study period (Schirle 2015; Koebel and Schirle 2016; Daley 2017). Most policies were previously established and unchanged during this time, including the Canada Child Tax Credit and National Child Benefit Supplement (implemented in 1998), weeks of paid parental leave through the Employment Insurance program (changed in 2001) and low-cost child care in Quebec (implemented in 2000 and changed in 2004). Moreover, to our knowledge, child-related benefits introduced during our study period were relatively small and paid to *all* families with children under the age of 18; they did not differentially target those with children under six (the UCCB-eligible group) or those with children aged six to 11 (the non-eligible group). Such policies included the Child Disability Benefit (implemented in 2006), as well as the Children's Fitness Tax Credit and a non-refundable child tax credit (implemented in 2007). There were, however, two notable policy changes that warrant further investigation, namely the introduction of the Ontario Child Benefit in 2007 (i.e., a non-taxable, income-tested monthly benefit for low- and moderate-income families with children under the age of 18) and the Quebec Parental Insurance Plan in 2006 (i.e., a more generous replacement for federal maternity and parental benefits). To ensure these programs are not driving our results, we re-estimate the regressions after dropping families in Ontario and Quebec, respectively. We further test the sensitivity of our results to these and other time-varying provincial drivers of food insecurity by re-estimating Equation 1 for the full sample with the addition of province-specific time trends.

Second, we drop respondents who were surveyed during the Great Recession of 2008–2009 to assess whether the impact of the income transfer was different under adverse economic conditions. To do so, we drop respondents from 2007–2008 to 2009–2010 because the date of interview is not observed in the public-use files of the CCHS.

Third, recall that questions about food insecurity were "optional content" in Cycle 3.1 (2005) and 2009–2010, whereas they were "core content" in 2007–2008 and 2011–2012. Our main sample is limited to provinces that were included in all years. As a robustness check, we extend the sample to all provinces where questions about food insecurity were asked at some point during our study period. This includes provinces that only

[5]In addition to the robustness checks presented in the paper, we re-estimated the regressions without the control for household income because it could be a pathway through which the UCCB affected food insecurity. A similar robustness check was conducted by Men et al. (2021) in their study on the impact of provincial policies and economic conditions on food insecurity. Unfortunately, we do not have a continuous measure of income in the public-use files of the CCHS. However, our results are robust to removing the control for income quintile.

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participated in the "Household Food Security Survey Module" in one of the two cycles in which it was "optional content" and provinces that never opted in – all of which are also observed when questions about food insecurity were "core content."

Finally, following past studies on the UCCB, our sample is limited to parents aged 25 to 49 (Schirle 2015; Koebel and Schirle 2016; Lebihan and Mao Takongmo 2019). However, Ionescu-Ittu et al. (2015) do not restrict their sample in this way. Since our study directly builds on Ionescu-Ittu et al. (2015), we remove the age restriction as a robustness check, to ensure it does not impact our results.

Heterogeneity analysis

To explore heterogeneity in the impact of the income transfer on food insecurity, we construct subsamples by family structure, education, and income. Specifically, we consider single-parent families versus two-parent families. We then stratify the sample based on the highest level of education in the household: secondary or less versus post-secondary. Finally, we compare households in the third quintile or lower versus those with higher income.

Results

Main results

In Table 2, we present ordinary least squares estimates showing the impact of the policy change on food insecurity (i.e., the difference-in-differences estimates). At the child level, the income transfer reduced the likelihood of overall food insecurity by 1.45 percentage points (approximately 19.6 percent based on the pre-policy prevalence in Table 1). There was, however, no discernable effect on moderate/severe food insecurity among children, nor did the income transfer impact food insecurity at the adult or household levels.

In Table A.3 of the Supplementary Material, we provide estimates in which moderate and severe food insecurity are examined separately. These estimates are similar to the combined moderate/severe measure in terms of sign and (lack of) statistical significance, and the magnitudes are additive. Furthermore, in Table A.4 of the Supplementary Material, we examine whether the impact of the UCCB changed across time by replacing $Treated_{it}$ with interactions between $Eligible_i$ and indicators for each post-policy period (i.e., 2007–2008, 2009–2010, and 2011–2012, respectively). The impact on overall food insecurity at the child level is generally stable across time, although it is not statistically significant at conventional levels. Further, relative to our main estimates, the reduction in overall food insecurity among adults and households is larger and statistically significant in 2009–2010, which corresponds to the Great Recession.[6]

[6]To complement the dichotomous dependent variables, we construct a continuous measure of food insecurity akin to the "Household Food Insecurity Access Scale" (Coates et al. 2007). Depending on the nature of the question asked in the CCHS (i.e., polar or frequency), we assign a value of 0, 1, or 2. For example, if the question asks whether household members skipped meals, then we assign a value of 0 if the response is negative and 1 if the response is affirmative. Similarly, if the question asks about the frequency of skipping meals, then we assign a value of 0 if the response is "never," 1 if the response is "sometimes," and 2 if the response is "often." The continuous measure of food insecurity ranges from 0 to 15 for adults, 0 to 12 for children, and 0 to 27 for households. Higher scores indicate a greater degree of severity. In general, our results are robust to using the continuous measure of food insecurity as the dependent variable. As shown in Table A.5 of the Supplementary Material, the income transfer reduced the risk of food insecurity at the child level, but it did not have a statistically significant effect on adults. There was, however, a reduction in the

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Table 2. Ordinary least squares estimates showing the impact of the policy change on food insecurity at the adult, child, and household levels, respectively. Main estimates ($n = 46{,}210$)

	Overall food insecurity	Moderate/severe food insecurity
Adults	−0.0096	−0.0087
	(0.0095)	(0.0079)
Children	−0.0145*	−0.0075
	(0.0080)	(0.0059)
Households	−0.0111	−0.0084
	(0.0099)	(0.0080)

Note: Sampling weights are used in all analyses. We include a full set of covariates in all regressions. Standard errors are reported in parentheses. Statistical significance is given by $^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$.

Results from the robustness checks

Our robustness checks are presented in Table 3, with the main estimates repeated in the top panel for comparison. Focusing on children, we find that the reduction in overall food insecurity is similar in magnitude but not statistically significant when dropping Ontario (a 43 percent reduction in the sample). On the other hand, it is similar in magnitude and remains statistically significant when dropping Quebec (a 25 percent reduction in the sample). Likewise, the effect on children is robust to the inclusion of province-specific time trends. Table 3 further shows that improvements in overall food insecurity among children are smaller in magnitude and not statistically significant when dropping households that were surveyed during the Great Recession (a 49 percent reduction in the sample), suggesting that the impact of the income transfer was particularly salient during adverse economic conditions. Finally, the reduction in overall food insecurity among children is robust in terms of size, sign, and statistical significance when we extend the sample to all provinces that participated in the "Household Food Security Survey Module" during our study period (i.e., "Add provinces") and when we remove the age restriction like Ionescu-Ittu et al. (2015).

In terms of adults and households, Table 3 indicates that our main estimates are generally robust to changes in the sample and specification, except there is a statistically significant reduction in the risk of overall food insecurity at the household level when Ontario is dropped. This is consistent with findings derived from the continuous measure of food insecurity as described in Footnote 6 and shown in Table A.5 of the Supplementary Material.

Results from the heterogeneity analysis

Next, we present results from the heterogeneity analysis by family structure, education, and income (Table 4). Again, the main estimates are repeated in the top panel for comparison. We find that the income transfer had a sizeable impact on food insecurity among children in single-parent families (compared to the main estimates), but it is not statistically significant. There was, however, a large and statistically significant reduction in

likelihood of food insecurity at the household level, perhaps reflecting more marginal changes that were not captured by the dichotomous measures.

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Table 3. Ordinary least squares estimates showing the impact of the policy change on food insecurity at the adult, child, and household levels, respectively. Robustness checks (with main estimates for comparison)

	Overall food insecurity	Moderate/severe food insecurity
Main estimates ($n = 46{,}210$)		
Adults	−0.0096 (0.0095)	−0.0087 (0.0079)
Children	−0.0145* (0.0080)	−0.0075 (0.0059)
Households	−0.0111 (0.0099)	−0.0084 (0.0080)
Drop Ontario ($n = 26{,}176$)		
Adults	−0.0201 (0.0128)	−0.0104 (0.0103)
Children	−0.0132 (0.0109)	−0.0097 (0.0078)
Households	−0.0233* (0.0133)	−0.0090 (0.0105)
Drop Quebec ($n = 34{,}668$)		
Adults	−0.0042 (0.0108)	−0.0070 (0.0092)
Children	−0.0164* (0.0092)	−0.0064 (0.0069)
Households	−0.0047 (0.0112)	−0.0079 (0.0093)
Add province-time trends ($n = 46{,}210$)		
Adults	−0.0103 (0.0095)	−0.0091 (0.0079)
Children	−0.0146* (0.0081)	−0.0076 (0.0059)
Households	−0.0118 (0.0099)	−0.0087 (0.0080)
Drop Great Recession ($n = 23{,}746$)		
Adults	−0.0086 (0.0131)	−0.0112 (0.0110)
Children	−0.0139 (0.0114)	−0.0055 (0.0087)
Households	−0.0097 (0.0136)	−0.0129 (0.0111)
Add provinces ($n = 58{,}260$)		
Adults	−0.0099 (0.0086)	−0.0086 (0.0071)
Children	−0.0151** (0.0073)	−0.0072 (0.0054)
Households	−0.0117 (0.0089)	−0.0087 (0.0072)
Remove age restriction ($n = 57{,}575$)		
Adults	−0.0082 (0.0084)	−0.0028 (0.0070)
Children	−0.0135* (0.0072)	−0.0047 (0.0053)
Households	−0.0097 (0.0088)	−0.0015 (0.0072)

Note: Sampling weights are used in all analyses. We include a full set of covariates in all regressions. Standard errors are reported in parentheses. Statistical significance is given by *$p < 0.10$, **$p < 0.05$ and ***$p < 0.01$.

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Table 4. Ordinary least squares estimates showing the impact of the policy change on food insecurity at the adult, child, and household levels, respectively. Heterogeneity analysis by family structure, education and income (with main estimates for comparison)

	Overall food insecurity	Moderate/severe food insecurity
Main estimates ($n = 46{,}210$)		
Adults	−0.0096 (0.0095)	−0.0087 (0.0079)
Children	−0.0145* (0.0080)	−0.0075 (0.0059)
Households	−0.0111 (0.0099)	−0.0084 (0.0080)
Single-parent families ($n = 6{,}224$)		
Adults	−0.0354 (0.0382)	−0.0702* (0.0370)
Children	−0.0467 (0.0367)	−0.0258 (0.0319)
Households	−0.0467 (0.0384)	−0.0622* (0.0373)
Two-parent families ($n = 39{,}986$)		
Adults	−0.0107 (0.0098)	−0.0063 (0.0079)
Children	−0.0138* (0.0081)	−0.0085 (0.0058)
Households	−0.0119 (0.0102)	−0.0063 (0.0080)
Secondary education or less ($n = 6{,}714$)		
Adults	−0.0084 (0.0300)	−0.0416* (0.0252)
Children	−0.0456* (0.0252)	−0.0461** (0.0202)
Households	−0.0061 (0.0311)	−0.0427* (0.0256)
Post-secondary education ($n = 39{,}496$)		
Adults	−0.0104 (0.0098)	−0.0034 (0.0082)
Children	−0.0081 (0.0084)	−0.0007 (0.0060)
Households	−0.0123 (0.0102)	−0.0021 (0.0083)
Third income quintile or lower ($n = 27{,}090$)		
Adults	−0.0143 (0.0150)	−0.0121 (0.0127)
Children	−0.0224* (0.0130)	−0.0107 (0.0097)
Households	−0.0157 (0.0156)	−0.0112 (0.0128)
Above third income quintile ($n = 19{,}120$)		
Adults	−0.0027 (0.0066)	−0.0041 (0.0041)
Children	−0.0022 (0.0040)	−0.0026 (0.0021)
Households	−0.0040 (0.0070)	−0.0045 (0.0042)

Note: Sampling weights are used in all analyses. We include a full set of covariates in all regressions. Standard errors are reported in parentheses. Statistical significance is given by *$p < 0.10$, **$p < 0.05$ and ***$p < 0.01$.

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the risk of moderate/severe food insecurity at the adult and household levels – in both single-parent families and those with secondary education or less. Among the latter, for example, the transfer reduced the likelihood of moderate/severe food insecurity by approximately 4.2 percentage points at the adult and household levels. There were also sizable reductions in overall and moderate/severe food insecurity among children in such households, by about 4.6 percentage points. Similarly, the transfer reduced the risk of overall food insecurity among children in the third income quantile or lower.[7] On the other hand, the transfer had little effect on those with post-secondary education or income above the third quantile. There was, however, a reduction in the likelihood of overall food insecurity among children in two-parent families – by 1.38 percentage points, which is similar to the main estimates.

Discussion

Food insecurity is an important public health issue, with far-reaching consequences for health and well-being (Gundersen and Ziliak 2015; Tarasuk 2016). Socioeconomic status is a strong predictor of food insecurity (Smith et al. 2017; Tarasuk, Fafard St-Germain and Mitchell 2019; Bhawra et al. 2021) and research efforts have focused on evaluating the impact of income-based policy interventions on food insecurity at the household level (Ionsecu-Ittu et al. 2015; Loopstra et al. 2015; Li et al. 2016; McIntyre et al. 2016; Brown and Tarasuk 2019; Tarasuk, Li et al. 2019). We contribute to this literature by examining the impact of a universal income transfer on food insecurity *within* households (i.e., considering the experiences of adults and children therein). This is important because adults may shield children from food insecurity (Nord and Hopwood 2007; Ovenell et al. 2022) and/or income transfers may be distributed differentially across household members (Kooreman 2000; Blow et al. 2012). Using the public-use files of the CCHS (2005–2012) and a difference-in-differences methodology, we find that the UCCB reduced the risk of overall food insecurity at the child level by 1.45 percentage points (19.6 percent based on the pre-policy prevalence). However, it did not have a statistically significant effect on overall food insecurity at the adult or household levels. We believe this to be consistent with shielding such that the average Canadian parent used the positive income shock to improve the food situation of their children instead of their own.[8] In addition, our results withstand several robustness checks, which further suggest that the income transfer may have been protective of food insecurity during the Great Recession. The impact of income-based policy interventions during adverse economic conditions should be explored in future work, especially in terms of food insecurity within households.

[7]In Table A.6 of the Supplementary Material, we show that this may be driven by the third quintile. The reduction in overall food insecurity among children in the second quintile is similar in magnitude but not statistically significant. Moreover, the transfer had little effect on food insecurity in the first quintile regardless of measure (i.e., overall, moderate/severe) or level (i.e., adult, child, household). We hypothesize that these very vulnerable families benefitted from the transfer, but it was not enough to move them across the threshold of our dichotomous food insecurity measure. Available from the corresponding author upon request, this conjecture is supported by difference-in-differences estimates for families in lower income quintiles using the continuous measure of food insecurity. Although not statistically significant, the favorable impact of the policy change on food insecurity is larger at the bottom of the income distribution, especially at the adult and household levels.

[8]Focusing on food-insecure families with children, we re-estimated Equation 1 using ordinary least squares with shielding as the dependent variable. The difference-in-differences estimate was 0.071 with a p-value of 0.075, indicating that the UCCB increased the likelihood of shielding in such families.

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Past Canadian studies have shown that income-based policy interventions reduce the risk of household food insecurity in the range of 7 to 50 percent depending on the nature and size of the transfer, measure of food insecurity and subpopulation of interest (Ionescu Ittu et al. 2015; Loopstra et al. 2015; Li et al. 2016; McIntyre et al. 2016; Brown and Tarasuk 2019; Tarasuk, Li et al. 2019). In the context of the UCCB, Ionescu Ittu et al. (2015) find a 25 percent reduction in the likelihood of overall food insecurity at the household level. Unlike Ionescu-Ittu et al. (2015), who use the master files of the CCHS, we do not have controls for rural/urban status or the daily average bank rate in Canada (date of interview is not observed in the public-use files). Likewise, Ionescu-Ittu et al. (2015) observe food insecurity in the Northwest Territories and Nunavut, but this is not possible with the public-use files; Northwest Territories and Nunavut are combined with Yukon, which did not select the optional food insecurity module in all years. Nevertheless, using the public-use files from Cycle 1.1 (2001) to 2010, we can replicate their finding that the UCCB reduced overall food insecurity at the household level by 2.4 percentage points, which is equivalent to a 25 percent reduction based on the pre-policy prevalence. In our study, the UCCB similarly reduced the risk of overall food insecurity among children (i.e., approximately 20 percent), suggesting that improvements within households may have been concentrated at this level.

While Ionescu Ittu et al. (2015) focus on overall food insecurity, we further consider the impact of the income transfer on moderate/severe food insecurity. This matters because the health consequences of food insecurity intensify with the degree of severity (Tarasuk et al. 2015). Moreover, the impact of income-based policy interventions may differ by the degree of severity (Li et al. 2016; Brown and Tarasuk 2019). We do not find compelling evidence that the UCCB affected moderate/severe food insecurity among adults or children in the full sample. However, it reduced the risk of moderate/severe food insecurity in more vulnerable subpopulations – adults in single-parent families, as well as adults and children in households with secondary education or less. Our heterogeneity analysis further revealed that the income transfer reduced the likelihood of overall food insecurity (i.e., the risk of having any experiences of food insecurity) among children in families with relatively low levels of education or income, in addition to benefitting children in two-parent families.

Taken together, our results suggest that income-based policy interventions reduce the risk of food insecurity, even if recipients are not required to spend the transfer in this regard. Our results during the Great Recession also highlight the role that reliable income transfers can play in allowing vulnerable households to cope with economic shocks without sacrificing the food and nutritional security of their members. Furthermore, when assessing the impact of such policies on food insecurity, it is important to consider the degree of severity and differential effects within households. Finally, consistent with Ionescu-Ittu et al. (2015), the impact of the UCCB was salient in vulnerable subpopulations, such as single-parent families and those with comparatively low education or income. However, it was insufficient to move the most vulnerable families across the threshold of our dichotomous food insecurity measure (i.e., those in the first income quintile). Larger, more targeted transfers may help such families (Men et al. 2023). Indeed, the UCCB was replaced by an income-tested child benefit in 2016, but we caution policymakers that inaccurate targeting may fail to identify families who are most in need of the transfer.

Limitations

Several limitations should be noted. First, our pre-policy period is restricted to Cycle 3.1 (2005) because the "Household Food Security Survey Module" was not used in earlier data. The measures used in earlier data do not permit an examination of food insecurity within households or by degree of severity. Second, the public-use files of the CCHS do not

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contain the number of children in the household, so we cannot assess whether the policy change had a differential impact on families with multiple young children; such households would have received an additional $1,200 annually for each child under the age of 6. However, past studies have shown that the impact of the UCCB on maternal health and well-being is generally robust to replacing $Eligible_i$ (i.e., the dummy variable used to indicate the presence of young children in the difference-in-differences methodology) with the number of children under the age of 6 (Daley 2017; Lebihan and Mao Takongmo 2019). Finally, the public-use files of the CCHS do not contain information on the birth year of the youngest child in the household. Past studies have used this information to test whether the expected duration of benefits had an additional impact, such that families with younger children would have expected to receive the transfer over a longer period. Daley (2017) finds that the expected duration of benefits had little impact on maternal self-reported health, whereas Lebihan and Mao Takongmo (2019) find that it affected maternal body weight. Given these mixed results and because the expected duration of benefits has not been considered in past studies on food insecurity, it is unclear how it might affect our estimates. Our results should be interpreted with this caveat in mind.

Conclusion

Despite these limitations, our study expands the literature by estimating the impact of a universal income transfer on food insecurity among adults and children within households, considering both overall and moderate/severe measures. The income transfer reduced the risk of overall food insecurity by approximately 20 percent at the child level, and the effect was larger in households with comparatively low education or income. Moreover, the transfer reduced the likelihood of moderate/severe food insecurity among adults in single-parent families, as well as adults and children in households with secondary education or less. This is consistent with past studies showing the importance of income-based policy interventions on food insecurity, particularly in more vulnerable subpopulations. However, we further demonstrate the importance of looking beyond household-level estimates to consider the impact on adults and children therein.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/age.2024.4

Data availability statement. Public-use files of the Canadian Community Health Survey (2005–2012) were obtained from Statistics Canada. For more information about the Canadian Community Health Survey, refer to https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getInstanceList&Id=29539. Data on the provincial unemployment rate (https://doi.org/10.25318/1410009001-eng) and Consumer Price Index (https://doi.org/10.25318/1810000501-eng) were also obtained from Statistics Canada. This acknowledgment does not constitute an endorsement by Statistics Canada of this product.

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Competing interests. The authors declare none.

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