Child poverty in Ontario:

The value added of material deprivation indicators for comparative policy analysis in North America

11 May 2015

Accepted for publication in Journal of Comparative Policy Analysis

Geranda Notten

Graduate School of Public and International Affairs

University of Ottawa

Ottawa

Abstract

North America lags behind in the use of outcome-based indicators such as material deprivation to study child poverty. Instead income indicators dominate research and policy-making. A large body of international research concludes that income poverty and material deprivation are complementary indicators because each measures specific but related aspects of material well-being. For children this distinction is even more pertinent because children have specific needs and their material circumstances affect both their current and future well-being. This research uses Ontario data to investigate whether material deprivation also contributes to a better understanding of child poverty in North America. It shows that the choice of poverty indicator affects estimates of the level of child poverty, its correlates, and the success of policy interventions in reaching poor children.

Keywords

Poverty measurement, comparative, child poverty, material deprivation, income poverty, socioeconomic status (SES), Ontario

Biography

Geranda Notten is Assistant Professor in Comparative Public Policy at the Graduate School of Public and International Affairs. Her research focuses on poverty and social policy in the context of developed and developing economies.

Introduction

Understanding child poverty is important. All North American countries signed the Convention of the Rights of the Child and therefore have a moral responsibility to uphold children's rights (White et al. 2003). A vast literature documents the determinants and consequences of childhood poverty, finding that a child's current and future well-being is intrinsically linked. Childhood poverty increases the chances of poverty during adulthood through a myriad of pathways between poverty, missed opportunities and child development (Brooks-Gunn, Duncan 1997, Duncan et al. 1998, NICHD 2005, Oshio et al. 2010, Lee 2011). Moreover, child well-being is multidimensional (Lipina et al. 2011) implying that, in addition to unmet needs (material, emotional, environmental), poverty can also have psychological (stress, confidence, self-esteem) and social effects (exclusion, risky behaviours) (White et al. 2003, Evans 2004, Lee 2011). This paper focuses on the material dimension of child poverty and compares income poverty and material deprivation indicators. A materially deprived person cannot afford consumption goods and activities deemed typical for a society (Townsend 1979). An income poor person has an income below an established monetary standard in a given society (Alkire, Santos 2009).

In comparison to Europe and Australia, North America lags behind in the use of non-monetary poverty indicators such as material deprivation to study poverty, and child poverty in particular. Instead income indicators dominate research and policymaking. Statistics Canada and the US Census Bureau routinely report low income statistics calculated at various thresholds and income definitions while information on material well-being outcomes is limited (Statistics Canada, US Census Bureau). For Ontario, material deprivation information has been collected annually since 2009 but data collection has been discontinued since 2014. For the USA material wellbeing

information is collected irregularly in the Survey of Income and Program Participation (six times since 1992) or in special surveys (Siebens, 2013, Cancian, Meyer 2004,). Consequently, child poverty analyses are based on monetary poverty indicators, primarily using income-based indicators (Tiehen et al. 2012) and sometimes expenditure-based indicators (Crossley, Curtis 2006).

A large body of international research concludes, however, that income poverty and material deprivation are complementary indicators because each measures specific but related aspects of material well-being (Cancian, Meyer 2004, Förster 2005, Fusco et al. 2011). Cross-validating results based on income poverty with material deprivation is not only relevant for research on poverty but also for research using income as a proxy for socio-economic status (SES) such as analyses of child development, well-being and the evaluation of interventions (Pampalon et al. 2009, McEwen, Stewart 2014).

This paper investigates whether combining material deprivation and income poverty indicators also improves our understanding of child poverty in North America. This paper uses the Survey of Labour and Income Dynamics (SLID) and the Ontario Material Deprivation Survey (OMDS) to analyze child poverty in terms of material deprivation and its relation to income poverty. Using four common income poverty indicators in Canada, the Ontario findings are compared to similar studies elsewhere. The analysis focuses on the level of disagreement between income poverty and material deprivation indicators in identifying poor children and the implications for research relying on such indicators.

The next section discusses the relation between income poverty and material deprivation indicators and their respective strengths and weaknesses. The methodology and findings for child poverty in Ontario are discussed in the following sections. The analysis compares how often such poverty indicators disagree and whether this disagreement is sufficient to affect multivariate analyses of poverty correlates and the success of interventions in reaching poor children. The conclusion discusses the implications of such poverty identification errors for the study of child poverty in North America.

Measuring child poverty

Poverty is an adverse material outcome resulting from a lack of (financial) means. Poverty indicators are classified according to three conceptual distinctions: monetary versus nonmonetary, direct versus indirect, resource versus outcome (Townsend 1979, Ringen 1988). Income poverty indicators are monetary, indirect, and resource-based. Material deprivation indicators are nonmonetary, direct, and outcome-based. These distinctions are the conceptual roots for the different strengths and weaknesses of income poverty and material deprivation indicators.

Income is a sensible but imperfect poverty indicator. It is an important, but not the only, source for financing material needs. Savings or credit help meet expenses (Brandolini et al. 2010). If access to public services is subsidized, more income is left for other expenses (Paulus et al. 2010). Social networks can also help (Kalil, Ryan 2010). Access to alternative resources may explain why someone with low income can avoid adverse material outcomes. Moreover, the experience of poverty is an outcome. Someone with a somewhat higher income may still face

adverse material outcomes because conditions such as chronic illness or disability require more resources to satisfy needs (She, Livermore 2007). Similarly, debt payment obligations reduce the finances available for current needs (Pressman, Scott 2009). Using income to study child poverty is even more problematic because a child's material well-being is affected by income and consumption decisions predominantly made by adult household members (Neubourg de et al. 2012). Finally, both administrative and survey income data suffer from reporting errors (Rendtel et al. January 2004).

These measurement issues may explain why governments prefer labelling such poverty statistics as 'low income' (Statistics Canada). While such nuance correctly acknowledges a problem it does not suffice as a solution. Some persons identified as low income are not identified as poor using an alternative indicator and vice versa. Moreover, such identification errors affect a significant part of the population (Cancian, Meyer 2004, Fusco et al. 2010). This problem has consequences beyond an uncertain diagnostic regarding poverty. Some population groups are more at risk of erred identification than others (Nolan, Whelan 2011). The correlates of poverty may thus differ between poverty indicators. When poverty reduction is (one of) the policy goal(s), the identification problem also affects evaluations of interventions. Effectiveness is reduced when a poor person is mistakenly identified as non-poor; efficiency is reduced when resources are spent on a person who does not have low income (Atkinson 1998).

The shortcomings of income poverty indicators can thus affect the assessment of a problem, its correlates and the efficiency and effectiveness of policy solutions. Complementing income poverty with a non-monetary, direct, and outcome-based indicator such as material deprivation could be a solution. Material deprivation indicators measure whether a family or person, for

financial reasons, is missing an item or aspect considered normal in their society (Townsend 1979, Guio 2009). Deprivation indicators circumvent the shortcomings of income indicators because they focus on material outcomes. Child-specific indicators may additionally capture children's needs such as age appropriate toys and access to services such as day care, schools, and health centres (Neubourg de et al. 2012). However, selecting deprivation items implies that one presumes that persons have a common prioritization of needs (McKay 2004). Justifiable differences in needs by minority groups may thus be overlooked. Adaptive preferences are another concern: adverse circumstances can lower a person's aspirations to the degree that she responds to not having an item because she does not want it (Guio 2009). Finally, shame can induce underreporting (Breunig, McKibbin 2011). Material deprivation indicators thus also make poverty identification mistakes. As the ultimate risk is one of poor populations being excluded from analyses and policies, it makes sense to use both resource- and outcome-based poverty indicators.

Methodology

Material deprivation

This study adopts Townsend's (1979) concept of material deprivation which is the intellectual basis for official European, Australian and Ontario deprivation indicators. Someone is deprived if she lacks the financial resources to acquire 'social necessities', that is, items and activities that no one in that society should go without. Knowledge about such items is obtained from opinion surveys (European Union (EU): Guio 2009) and/or focus groups (Ontario: Matern et al. December 2009).

This study uses data from the Survey of Labour and Income Dynamics (SLID) and the Ontario Material Deprivation Survey (OMDS).[1] Both surveys include the same supplemental deprivation module. The 2009 SLID holds 7,235 households, of which 1,865 households have 3,352 children under the age of 18 and no missing information on material deprivation. Similarly, the 2010 SLID holds 7,235 households, of which 1,705 households have 3,008 children under the age of 18. The OMDS is a supplemental module to the March-May 2009 Labour Force Survey and holds 10,652 households, of which 3,249 households have 5,834 children under the age of 18. Both surveys are used because the SLID has better quality income data while the OMDS has a larger sample size.

The deprivation indicators were developed by non-government organizations by means of a community-based approach (Matern et al. 2009). Table 1 lists the material deprivation questions, which were answered by a knowledgeable adult of the household. The analysis includes nine of ten indicators because the 'clothes' question does not apply to children.

[Insert Table 1]

Item deprivation rates vary considerably. In the 2009 SLID very few children are reported to live in households that cannot afford to get around in their community (0.6%), live in a house free of pests such as cockroaches (0.7%), have meat, fish or a vegetarian equivalent at least every other day (1.8%), or give small gifts for family and friends at least once a year (2.7%). It is more common that households cannot afford to have fresh fruits and vegetables every day (4.8%), to have friends or family over once a month (4.5%), to have a hobby or leisure activity for every

[1] The public use SLID files (slid-75M0010XCB-E-2009 and slid-75M0010XCB-E-2010) and OMDS files (omds_75M0012_E_2009) were downloaded from the ODESI digital repository.

family member (5.0%) or to replace a broken appliance (5.7%). Deprivation is highest for needed dental care (9.2%). The pattern is similar for other surveys except that deprivation rates for appliances and hobbies are higher in the OMDS.

Such large differences in item deprivation rates are common. Data for EU countries with a comparable living standard to Ontario show deprivation rates well below 10 per cent for items such as the affordability of meat every second day and of keeping the home warm (Guio 2009). Other items have deprivation rates up to 30 per cent, such as the ability to afford an unexpected expense of about $1,100 US. The selection of deprivation items influences the composite deprivation index. A study using EU micro-data for France, Germany, Netherlands and the UK shows that the composite index can change 9 to 19 percentage points (Notten, Roelen 2012). As the highest item deprivation rate in Ontario is much lower than in the European countries (9.2 versus 30 per cent), the sensitivity of a composite index to the selection of items is lower than in Europe.

Ontario's deprivation items are appropriate to scale the underlying concept of material deprivation. For the OMDS and the 2010 SLID Cronbach's coefficient of reliability is 0.73, which is above the commonly used reliability threshold of 0.7. For the 2009 SLID the value is 0.69. Excluding the 'around' or 'pest' item increases the value slightly; excluding other items reduces it.[2]

A shortcoming of the Ontario data is that all deprivation items apply to the household. The 2009 and 2013 waves of the European micro-data (EU-SILC) include a special module with child-

[2] See Table A1 in Online Appendix on author's website: http://gerandanotten.wordpress.com/.

specific deprivation items reflecting aspects particularly or exclusively relevant for children such as the affordability of toys, age appropriate books, school trips, and festivities such as birthdays. Another shortcoming is that reference periods for income and material deprivation differ: the deprivation questions are phrased in the implied present while income is on an annual basis (OMDS: 2008, SLID 2009: 2009, SLID 2010: 2010). This is a common problem, which cannot be solved with the current data (Fusco et al. 2010).

This paper primarily uses a headcount index reflecting the percentage of deprived children. The index adds the number of deprivations per child and uses a threshold of two deprivations. The Government of Ontario uses the same threshold for its Ontario Deprivation Index (Government of Ontario 2008).[3] Ease of interpretation is the key strength of a headcount index, which explains its popularity as a tool for policy making. This paper's child index is also very similar to that used in UNICEF's 2012 Child Report Card (UNICEF Innocenti Research Centre 2012). UNICEF's index uses 14 child-specific indicators and a threshold of two deprivations to compare child deprivation between 29 European countries. Indices such as these differ from area-based indices as they use information from the same individual rather than aggregate statistics (Pampalon et al. 2009, Canadian Index of Well Being 2012).

This paper also calculates the adjusted headcount index, which additionally accounts for the number of deprivations a deprived child experiences. It does not have an intuitive interpretation. Children lacking many items are likely worse off than those lacking a few and may thus have a higher policy priority; improving their situation may also be more challenging and may require a

[3] Other than having nine indicators rather than ten, this child index is the same as the Ontario Deprivation Index.

different policy response (Notten, Roelen 2012). A well-known example is the Multidimensional Poverty Index (MPI) which monitors poverty in developing countries (UNDP).

Indices are sensitive to setting the deprivation threshold. Guidelines exist (Alkire, Santos 2009, Guio 2012) but the final choice always involves some arbitrariness. Table 2 shows how sensitive both indices are to alternative thresholds.[4] For the 2009 SLID, the deprivation headcount index is 8 per cent for a threshold of two, 18.3 per cent for a threshold of one and 4 per cent for a threshold of three. The adjusted headcount index is 3.1 for a threshold of two deprivations per cent and varies from 4.2 to 0.8 per cent for other thresholds. Setting a deprivation threshold is by far the most influential decision.[5] Sensitivity analyses using European data have shown that the values of headcount indices can vary up to 88 percentage points; for adjusted headcounts this range is 50 to 70 percentage points (Notten, Roelen 2012).

[Insert Table 2 here]

In choosing an index there is a trade-off between its sensitivity and communicability. The appropriate balance depends on the purpose of the index. With its intuitive interpretation, the headcount is a suitable headline indicator for monitoring differences between population groups and over time. Examples are the above-mentioned material deprivation indices used to monitor progress on poverty reduction goals in Ontario and the EU. An adjusted headcount could be a complement, verifying that persons with more deprivations are also seeing improvements (Notten, Roelen 2012). In scientific research the balance often tilts towards reducing the impact of discontinuities in the distribution of the raw material deprivation information. Axiomatic

[4] See Table A2 in Online Appendix.
[5] Choosing weights for index items has a relatively modest effect on the index values (Notten, Roelen 2012).

approaches favour indices that take more aspects of the raw information into account such as breadth and depth of deprivation (Alkire, Foster 2011). Statistical approaches such as factor and principal component analysis use correlations between items to convert the raw information into a single value with a continuous distribution (Pampalon et al. 2009). Statistical approaches are often used when material well-being is an explanatory variable and/or when the research focuses on inequality rather than poverty. Given their prominence in policy, this paper uses the headcount index.

Income poverty

The SLID holds four income poverty indicators: the Low Income Cut-Off (LICO), before and after taxes; the Low Income Measure (LIM); and the Market Basket Measure (MBM) (Statistics Canada). The LICO threshold depends on the expected income share a household spends on necessities such as food, shelter, and clothing in comparison to the average household. This threshold is either compared to household income before taxes (LICO before taxes) or after taxes (LICO after taxes). The LIM is based on a relative threshold set at 50 per cent of national median income. Household after tax income is adjusted for differences in household size using the square root of household size. The MBM threshold is based on the costs of a modest basket of goods and services and compared to a household's disposable income. [6] In comparison to after tax income, disposable income does not include payroll taxes and out-of-pocket costs for child care and prescription drugs. In 2009 (SLID), the child poverty rates for Ontario were 13.9 (LICO before taxes), 9.1 (LICO after taxes), 13.1 (LIM), and 9.2 (MBM). In 2010 (SLID), the child poverty rates for Ontario were 15.2 (LICO before taxes), 9.7 (LICO after taxes), 14.4 (LIM) and

[6] The SLID public use files use the 2008 basket.

9.5 (MBM). In 2008 (OMDS), the child poverty rates for Ontario were 16.5 per cent (LICO before taxes).[7] The substantially higher LICO before taxes in the OMDS is partly due to the lower quality of the income variable, which relies on retrospective information provided by the respondent rather than tax files (Government of Ontario 2011).

Correlates of poverty

Children are not equally at risk of poverty. Poverty analyses thus also assess how and how much certain characteristics are correlated with poverty. This research tests whether well-known poverty characteristics differ between income and material deprivation indicators (Förster 2005, Neubourg de et al. 2012). It focuses on the following characteristics labelling higher risk characteristics with a star: dwelling (owned or rented*), type of economic family (dual/single/no earner*, single parent*, other*), unemployed family members (number: 0, ≥1*), education of highest earner (graduated secondary education or lower*, some Post-Secondary Education (PSE) or a PSE certificate / diploma, university degree of BA or higher), immigration status (landed before/after 1999*), rural* / urban (including three population sizes of urban) and the main source of income (wage, self-employment, government transfers*, other*). Table 4 summarizes the population shares for each characteristic. A Probit model is used to compare size effects of these correlates between the income poverty and material deprivation indicators. Due to missing values for the explanatory variables in the 2009 SLID 3,330 children of 3,352 are included; for the OMDS only 4,762 children of 5,681 are included.

Do interventions reach the poor?

[7] Own calculations with SLID and OMDS.

Whether interventions are specifically aimed at the poor or not, a key use of poverty indicators is to assess whether interventions are effective and efficient in reaching and assisting children living in poor households (Nolan 2006). Poor children may be a target group or a priority sub-set of a target group and poverty indicators identify the target group (Atkinson 1998). As preventing and reducing poverty is a key goal of social protection policy (Barr 2012), this paper examines whether it matters which poverty indicator is used to assess income transfer programs. Both surveys hold information on unemployment insurance, child benefits, and social assistance (further detailed below).[8] Program coverage, the percentage of recipients in the target group, is used to assess efficiency and effectiveness. A transfer is pro-poor when coverage of poor children is higher than that of non-poor children (adopted from Duclos, Araar 2006).

Child poverty in Ontario

Income poverty and material deprivation indicators yield different poverty estimates. In the SLID the child material deprivation levels are about 8 per cent while the child income poverty rates vary from 9 to 15 per cent, depending on the income indicator used. In the OMDS material deprivation rates are 12 per cent while income poverty is about 17 per cent (LICO before taxes). These differences are comparable to those found elsewhere (Fusco et al. 2010, Neubourg de et al. 2012). Differences in poverty levels, however, mask other problems.

They may not be the same children

[8] The Social Security Administration's overview on Canada (2009) describes these programs in more detail (www.ssa.gov/policy/docs/progdesc/ssptw/ accessed on 5 January 2015).

Poverty indicators often disagree about a child's poverty status (Neubourg de et al. 2012). This raises uncertainty about the magnitude of poverty and expected government spending on poverty reduction. Table 3 shows the scope of the problem in Ontario. The indicators disagree about the poverty status of 13 to 17 per cent of children.[9] For the LICO after taxes, for instance, 6 per cent are poor according to the material deprivation indicator, 7 per cent are poor according to the income indicator and only 2 per cent are poor according to both (SLID 2009). Rather than having child poverty rates of 8 to 15 per cent the actual scale of the problem thus lies somewhere in between 15 and 20 per cent.[10] [11]

[Insert Table 3 here]

For the reasons discussed earlier, some of these children are erroneously identified as poor. Such mistakes are likely more prevalent for children on which the indicators disagree. Nonetheless, because each indicator focuses on different aspects of poverty, a child can be poor even if only one indicator says so. Using both a resource-based and an outcome-based indicator does not simplify the analysis but it better maps existing uncertainty and thereby includes children who would otherwise mistakenly be identified as non-poor.

Children's risk levels may not be the same

[9] The pairwise correlation between income and material deprivation indicators in Ontario is low (between 0.14 and 0.16) but significant at a 1 per cent level (own calculations using the 2009 SLID).
[10] While part of the disagreement is simply due to differences in the stringency of the threshold, it is still 12-13 per cent when the material deprivation rates and income poverty rates are similar (LICO after taxes and MBM).
[11] These patterns are similar for the OMDS (see Table A4 in Online Appendix).

Poverty indicators may also disagree about the risk levels associated with children's characteristics (Neubourg de et al. 2012, Notten, Roelen 2012). Such characteristics help explore reasons why some children are more at risk of poverty or whether poverty explains certain child outcomes. As the targeting of poverty-alleviation policies is often linked to these characteristics, children's access to programs may also be affected. Table 4 compares the marginal effects of characteristics in a child's environment to the likelihood of living in a deprived or an income poor household using the before and after tax LICO's. For instance, living in a rented dwelling is associated with an increase in the probability of after tax income poverty by 0.018. For material deprivation this is 0.076, about four times higher. The likelihood that the income and material deprivation coefficients are the same is below 1 per cent (indicated by the grey shading of the income coefficients).

Characteristics typically associated with an increased poverty risk tend to be positive for both income and material deprivation indicators (rented dwelling, single-parent family, non- dual-earner family, low education, and reliance on government transfers or nonwage income).[12]Nonetheless, for the SLID the coefficients of seven out of 13 characteristics differ significantly (below 5%) while five out of 15 characteristics are different for the OMDS. Often the income coefficient is higher than the material deprivation coefficient. Children living in households mainly relying on income other than wages have a higher risk of income poverty than material deprivation. The difference is particularly large for government transfers. In the SLID the three coefficients of urban areas are significantly higher for income poverty. In the OMDS, single parents are more at risk of income poverty. However, earners with some or

[12] Though the characteristics explain considerably more of the observed variation for income poverty (see Pseudo R-squared in Table 4).

completed non-university PSE training (SLID, LICO before taxes) and unemployed persons in the household (OMDS) are more at risk of material deprivation. For rented housing the income and deprivation coefficients are statistically different but the direction of the effect differs between surveys.

[Insert Table 4 here]

Considering that these differences arise in a sample in which the dependent variables only disagree on about 13 to 17 per cent of the population, more pronounced differences can be expected when focusing on less advantaged population groups. Table 5 illustrates this by focusing on the disagreement between poverty indicators for high poverty risk characteristics. Of children with these characteristics, 26 to 66 per cent are either income poor, materially deprived, or both. This is much higher than the average of 15 per cent for all children (Table 5, second column). In comparison to the average child, the indicators are more likely to disagree about their poverty status. Whereas the poverty indicators disagree about 13 per cent of children in Ontario, they disagree on 22 to 52 per cent of children in high poverty risk groups (LICO after taxes). While this is a mathematical consequence of focusing on high poverty risk characteristics, it nonetheless shows that the choice of poverty indicator particularly matters for children with such characteristics. The group of children that is identified as only materially deprived comprises 20 to 44 per cent of potentially poor children. If only an income poverty indicator is used these children may erroneously be considered as non-poor and non-deserving beneficiaries of anti-poverty interventions.

[Insert Table 5 here]

Differences in poverty risk between indicators arise because of differences in families' specific material circumstances and indicator-specific measurement error. Government transfers targeted at low income families may not be sufficient to lift a family above the poverty line but access to (subsidized) goods and services may help prevent adverse material outcomes. Income information, alternatively, may be less reliable when earnings are irregular and/or low. Families with unemployed members can have above poverty line income but they may lack funds for other basics after paying the rent. Families living in rented housing may spend a larger part of their income on repaying debts.

An intervention's performance may be evaluated differently

Income poverty and material deprivation indicators may consequently disagree on the success of interventions to reach poor children and/or their well-being improvements. This section tests whether the choice of poverty indicator influences the assessment of how successful income transfer programs are in reaching poor (families with) children. Focusing exclusively on poverty reduction as a policy goal, effectiveness is reduced when a poor child is excluded; efficiency is reduced when a non-poor child is included. The analysis takes two perspectives. The first checks whether it makes a difference if only income poverty (Poor Y) or only material deprivation (Poor MD) is used. This perspective tests whether the common practice of using a single indicator leads to different evaluations. The second perspective combines the indicators into four groups: poor for both indicators (Poor MD Y); poor for one indicator (Poor MD only / Poor Y only); and not poor for both indicators (Not Poor). This perspective separates groups for which one is more certain that they (do not) belong to the target group (poverty indicators agree) from those for which one has less certainty (poverty indicators disagree). It tests whether combining two

poverty indicators changes the evaluation. Figures 1 to 3 summarize both single and combined indicator perspectives for program coverage of transfer programs using the LICO before taxes as a benchmark for income poverty. The findings using the LICO after taxes (SLID) and OMDS were highly similar.[13] Similar trends were found comparing program performance for similar income transfers in six West European countries (Notten 2013).

Social assistance includes provincial programs such as Ontario Works (OW) and the Ontario Disability Support Program (ODSP). Both programs are non-contributory, aim to support households with low financial resources, and identify eligibility by means of income and asset tests. The first perspective (Figure 1, left panel) shows that these programs are pro-poor covering 44 or 40 per cent of poor children compared to 10 or 8 per cent of non-poor children. Coverage does not vary significantly between poverty indicators. The second perspective (figure 1, right panel) shows that coverage varies significantly between poverty groups. Coverage is very high among income poor and materially deprived children (65%). It is lower for the groups on which the indicators disagree: 34 per cent for children in materially deprived only households and 30 per cent for children in income poor only households. Coverage among non-poor children is 7 per cent. Social assistance clearly targets the poor but spending appears much more efficient and effective when only comparing population groups on which the poverty indicators agree (Poor Y MD & Not Poor).

[Insert Figure 1 here]

[13] For OMDS, see Figures A1-A3 in online appendix.

The Canada Child Tax Benefit (CCTB) is a federal income-tested benefit administered through the tax system that targets low and middle income families with children under the age of 18. The federal Universal Child Care Benefit (UCCB) is administered similarly but applies to all children under the age of six. UCCB receipt is automatic for beneficiaries of the CCTB. The first perspective (Figure 2, top left panel) shows that poor children are more likely to receive the income-tested CCTB than non-poor children (98-99% versus 80-79%). Differences between poverty indicators are not statistically significant. In line with what can be expected with its design, coverage levels for the UCCB do not differ statistically between poor and non-poor children under age six (Figure 2, bottom left panel). The below 100 per cent coverage may be due to non-take up (tax authorities require the completion of an additional form).

The second perspective (Figure 2, right panels) shows that differences in CCTB coverage of non-poor children is significantly lower but this does not hold for differences between the other three groups. For programs aiming to exclude well-off households as opposed to excluding non-poor households, these findings suggest it does not matter very much which poverty indicator is used. They also illustrate the effects of using weak rather than strict financial selection criteria to determine program access: by casting a wide(r) net, fewer poor are excluded (Atkinson 1998).

[Insert Figure 2 here]

Employment Insurance (EI) is a contributory social insurance program providing income support to workers that have paid contributions sufficiently long and lost their job. This program does not explicitly aim to reduce (child) poverty but households with EI recipients are more likely to have children. The first perspective (Figure 3, left panel) shows that coverage among materially

deprived children is much higher (49%) than among income poor children (19%) and non-poor children (27% and 31%). The second perspective (Figure 3, right panel) shows that coverage is significantly higher for children living in households that are only identified as materially deprived (56%) or that are poor according to both indicators (33%). While EI benefits may be high enough for some beneficiaries to prevent income poverty, the internationally low income replacement rate (55% of maximum annual insurable earnings of $42,300) are clearly associated with an increased risk of material deprivation. If unemployment is relatively recent and/or expected to be temporary, households may decide to make large(r) cuts in flexible spending items such as fresh fruit and vegetables while continuing spending on less flexible items such as rent and mortgage.

[Insert Figure 3 here]

These results illustrate two points, both of which support the argument that income poverty and material deprivation indicators are complements. Firstly, when both types of information are available for the same individual, the information can be used for triangulation as poverty identification errors bias estimates of a program's efficiency and effectiveness. As such measurement issues result in identification errors in both indicators, distinguishing between populations for which one is relatively certain they are (not) part of the target group from those for whom one is less certain improves the reliability of the program evaluation estimates. Secondly, programs may be more or less successful in reaching out to certain poverty groups and the level of success interacts with the program's design. The results suggest that the choice of poverty indicator does not lead to large differences in performance assessment when interventions are universal (UCCB) or apply lenient targeting (such as the CCTB). However,

when targeting is more strict (social assistance) or when poverty reduction is not the primary goal of the program (Employment Insurance) the choice of poverty indicator can affect the evaluation significantly.

Conclusion

This paper investigated whether evidence from the literature on (child) poverty in rich countries also applies to Ontario and, by extension, to other North American jurisdictions. The paper used household level income poverty and material deprivation information from the SLID (2009, 2010) and OMDS (2009). These data limit the analysis in two ways. Firstly, the literature recommends that part of the material deprivation information be child specific. Secondly, the different reference periods for income (annual) and material deprivation (current) information may influence the results.

In line with international evidence, this research showed that income poverty and material deprivation indicators often disagree about the poverty status of individuals. This disagreement arises because of differences in families' specific material circumstances and indicator-specific measurement error. While both indicators capture the material dimension of poverty, income focuses on a single resource and material deprivation focuses on adverse material outcomes resulting from insufficient financial resources. Each indicator has different strengths and weaknesses in measuring poverty: income indicators neglect other financial resources, special needs and may suffer from a downward bias due to underreporting; deprivation indicators assume that everyone prioritizes similar necessities while shame or adverse circumstances might affect a person's response to the deprivation questions.

This research showed that material deprivation indicators in Ontario behave similarly as those used in Europe. Depending on the specific income indicator used, material deprivation and income poverty indicators disagree about the poverty status of 13 to 17 per cent of the child population and they agree that 2 to 4 per cent of children are poor. The multivariate analyses showed that poverty correlates differ significantly between the two poverty indicators (SLID: seven out of 13 coefficients; OMDS: five out of 15 coefficients). Combining indicators also benefits the evaluation of programs' poverty reduction effects. Firstly, using both indicators improves the reliability of the program evaluation estimates through triangulation. Social assistance, for instance, appears more successful in reaching poor children and excluding non-poor children for the children on which both indicators agree. It appears less successful for groups on which the poverty indicators disagree and this is in part due to poverty identification errors rather than program failure. Poverty identification errors thus result in underestimating an intervention's success. Secondly, combining indicators enabled a more thorough analysis of the interaction between a program's design and its effect on poverty. Materially deprived families with children were significantly more likely to receive Employment Insurance than income poor families but they were equally likely to receive the income-tested Child Care Tax Benefit.

Concluding, this research has shown that the choice of poverty indicator affects estimates of the level of child poverty, its correlates, and the success of interventions in reaching poor children. These findings thus also suggest that one cannot simply assume that the relationship between a child's social economic status (SES) and other well-being outcomes is insensitive to the choice of how SES is measured. Using two indicators does not simplify the analysis but it better maps existing uncertainty and thereby includes children who would otherwise mistakenly be identified as non-poor. The paper therefore concludes that also in North America it is important to

complement income poverty with outcome-based poverty indicators such as material deprivation.

Acknowledgements

Statistics Canada employees Andrew Heisz and Stephanie Lalonde were very helpful in answering data queries. I am grateful for the feedback I received from anonymous reviewers, Rosa Martinez, John Richards, Annie McEwen, Ainslie Cruickshank, and participants in the Child Poverty panel at the 2014 conference of the Canadian Economics Association.

References

Alkire, S. and Foster, J., 2011, Counting and multidimensional poverty measurement. *Journal of Public Economics,* 95, pp. 476-487.

Alkire, S. and Santos, M.E., 2009, Poverty and Inequality Measurement, in: S. Deneulin and L. Shahani, (Eds) *An introduction to the human development and capability approach: freedom and agency*, (London: Earthscan), pp. 121-161.

Atkinson, A.B., 1998, *Poverty in Europe,* (Oxford: Blackwell).

Barr, N.A., 2012, *The Economics of the Welfare State,* 5th edn, (Oxford: Oxford University Press).

Brandolini, A., Magri, S. and Smeeding, T.M., 2010, Asset-based measurement of poverty. *Journal of Policy Analysis and Management,* 29(2) pp. 267-284.

Breunig, R. and McKibbin, R., 2011, The effect of survey design on household reporting of financial difficulty. *Journal of the Royal Statistical Society: Series A (Statistics in Society),* 174(4), pp. 991-1005.

Brooks-Gunn, J. and Duncan, G.J., 1997, The Effects of Poverty on Children. *The Future of Children,* 7(2), pp. 55-71.

Canadian Index of Well Being 2012, How are Canadians Really Doing? The 2012 CIW Report. Canadian Index of Wellbeing and University of Waterloo.

Cancian, M. and Meyer, D.R., 2004, Alternative measures of economic success among TANF participants: Avoiding poverty, hardship, and dependence on public assistance. *Journal of Policy Analysis and Management,* 23(3), pp. 531-548.

Crossley, T.F. and Curtis, L.J., 2006, Child poverty in Canada. *Review of Income and Wealth,* 52(2), pp. 237-260.

Duclos, J. and Araar, A., 2006, *Poverty and equity: Measurement, policy, and estimation with DAD,* (New York: Springer).

Duncan, G.J., Yeung, W.J., Brooks-Gunn, J. and Smith, J.R., 1998, How Much Does Childhood Poverty Affect the Life Chances of Children?, *American Sociological Review,* 63(3), pp. 406-423.

Evans, G.W., 2004, The Environment of Childhood Poverty. *American Psychologist,* 59(2), pp. 77-92.

Förster, M.F., 2005, The European Social Space Revisited: Comparing Poverty in the Enlarged European Union. *Journal of Comparative Policy Analysis: Research and Practice,* 7(1), pp. 29-48.

Fusco, A., Guio, A. and Marlier, E., 2011, Income poverty and material deprivation in European countries. Working Paper, No 2011-04, CEPS/INSTEAD, Luxembourg, pp. 1-56.

Fusco, A., Guio, A. and Marlier, E., 2010, Characterising the income poor and the materially deprived in European countries, in: Atkinson, Anthony Barnes and Marlier, Eric, (Eds) *Income and living conditions in Europe,* (Luxembourg: Office for Official Publications of the European Communities (OPOCE)), pp. 133-153.

Government of Ontario, 2011, Poverty Reduction Strategy. Annual Report. Toronto, Ontario.

Government of Ontario 2008, Breaking the Cycle: Ontario's Poverty Reduction Strategy. Government of Ontario, Cabinet Committee on Poverty Reduction, Toronto, Ontario.

Guio, A., 2012, Measuring material deprivation in the EU: indicators for the whole population and child-specific indicators, European Union, Luxembourg.

Guio, A., 2009, What can be learned from deprivation indicators in Europe. Methodologies and working papers, 2009 edition, European Commission, Luxembourg.

Kalil, A. and Ryan, R.M., 2010, Mothers' Economic Conditions and Sources of Support in Fragile Families. *The Future of Children,* 20(2), pp. 39-61.

Lee, J., 2011, The Effects of Persistent Poverty on Children's Physical, Socio-emotional, and Learning Outcomes. *Child Indicators Research,* 4(4), pp. 725-747.

Lipina, S.J., Simonds, J. and Segretin, M.S., 2011, Recognizing the child in child poverty. *Vulnerable Children and Youth Studies,* 6(1), pp. 8-17.

Matern, R., Mendelson, M. and Oliphant, M., December 2009, Developing a Deprivation Index: the Research Process. Daily Bread Food Bank and the Caledon Institute of Social Policy.

McEwen, A. and Stewart, J.M., 2014, The Relationship between Income and Children's Outcomes: A Synthesis of Canadian Evidence. *Canadian Public Policy,* 40(1), pp. 99-109.

McKay, S., 2004, Poverty or preference: what do 'consensual deprivation indicators' really mean?. *Fiscal Studies,* 25(2), pp. 201-223.

Neubourg de, C., Bradshaw, J., Chzhen, Y., Main, G., Martorano, B. and Menchini, L., 2012, Child deprivation, multidimensional poverty and monetary poverty in Europe. Innocenti Working Paper, IWP-2012-02, Innocenti Research Centre, Florence.

NICHD, 2005, Duration and Developmental Timing of Poverty and Children's Cognitive and Social Development From Birth Through Third Grade. *Child development,* 76(4), pp. 795-810.

Nolan, B. and Whelan, C.T., 2011, *Poverty and Deprivation in Europe,* (Oxford: Oxford University Press).

Nolan, P., 2006, Tax relief for breadwinners or caregivers? The designs of earned and child tax credits in five Anglo-American countries. *Journal of Comparative Policy Analysis: Research and Practice,* 8(2), pp. 167-183.

Notten, G. 2013, Measuring Performance: Does the Assessment Depend on the Poverty Proxy?. ImPRovE Working Paper, 13/13, University of Antwerp, Antwerp.

Notten, G. and Roelen, K., 2012, A New Tool for Monitoring (Child) Poverty: Measures of Cumulative Deprivation. *Child Indicators Research,* 5(2), pp. 335-355.

Oshio, T., Sano, S. and Kobayashi, M., 2010, Child Poverty as a Determinant of Life Outcomes: Evidence from Nationwide Surveys in Japan. *Social Indicators Research,* 99(1), pp. 81-99.

Pampalon, R., Hamel, D., Gamache, P. and Raymond, G., 2009, A deprivation index for health planning in Canada. *Chronic Diseases in Canada,* 29(4), pp. 178-191.

Paulus, A., Sutherland, H. and Tsakloglou, P., 2010, The distributional impact of in-kind public benefits in European countries. *Journal of Policy Analysis and Management,* 29(2), pp. 243-266.

Pressman, S. and Scott, R., 2009, Consumer Debt and the Measurement of Poverty and Inequality in the US. *Review of Social Economy,* 67(2), pp. 127-148.

Rendtel, U., Nordberg, L., Jäntti, M., Hanisch, J. and Basic, E., January 2004, Report on quality of income data, the change from input harmonization to ex-post harmonization in the national samples of the European Community Household Panel – Implications on data quality. *Chintex working paper,* 21, 1-75.

Ringen, S., 1988, Direct and indirect measures of poverty. *Journal of social policy,* 17(3), pp. 351-365.

She, P. and Livermore, G.A., 2007, Material Hardship, Poverty, and Disability Among Working-Age Adults. *Social Science Quarterly,* 88(4), pp. 970-989.

Siebens, J., 2013, Extended Measures of Well-Being: Living Conditions in the United States: 2011. U.S. Census Bureau. Available: https://www.census.gov/prod/2013pubs/p70-136.pdf [2015, 13/2]

Statistics Canada, *Low income*. Available: http://www.statcan.gc.ca/search-recherche/bb/info/low-faible-eng.htm [2014, 7/2].

Tiehen, L., Jolliffe, D. and Gunderson, C., 2012, *Alleviating poverty in the United States: The critical role of SNAP benefits*, (Washington D.C.: U.S. Department of Agriculture).

Townsend, P., 1979, *Poverty in the United Kingdom: A survey of household resources and standards of living,* (Harmondsworth: Penguin).

U.S. Census Bureau, *Poverty main*. Available: http://www.census.gov/hhes/www/poverty [2014, 12/15].

UNDP, *Multidimensional Poverty Index*. Available: http://hdr.undp.org/en/statistics/mpi [2014, 5/26].

UNICEF Innocenti Research Centre, 2012, Measuring child poverty: New league tables of child poverty in world's richest countries. UNICEF Innocenti Research Centre, Florence.

White, H., Leavy, J. and Masters, A., 2003, Comparative Perspectives on Child Poverty: A

review of poverty measures. *Journal of Human Development,* 4(3), pp. 379-396.

Table 1: Survey questions used to construct the material deprivation items and item deprivation rates (%)

Item	Question	SLID 2009	SLID 2010	OMDS 2009
Pest	Is your house or apartment free of pests, such as cockroaches?	0.7	0.4	1.1
Do you and your family:				
Fruit	Eat fresh fruit and vegetables every day?	4.8	5.4	5.7
Meat	Eat meat, fish or a vegetarian equivalent at least every other day?	1.8	1.3	1.9
Clothes	Have appropriate clothes for job interviews?	0.6	0.3	0.5
Hobby	Have a hobby or leisure activity?	5.0	4.9	8.1
Are you and your family able to:				
Friends	Have friends or family over for a meal at least once a month?	4.5	3.5	5.5
Gifts	Buy some small gifts for family or friends at least once a year?	2.7	2.1	3.0
Dental	Get dental care if needed?	9.2	10.7	10.6
Around	Get around your community, either by having a car or by taking the bus or an equivalent mode of transportation?	0.6	0.3	0.5
Appliances	Replace or repair broken or damaged appliances such as a vacuum or a toaster?	5.7	7.8	11.7

Notes: For every item, this question followed: “Is this because you cannot afford it, or for some other reason?” Respondents answering “no” to the first question

and “yes” to the affordability question are deprived. The pairwise correlation between items is generally moderate (varying from 0.22 to 0.51 for most pairs) but lower and, sometimes, zero for some pairs involving items ‘pest’, ‘dental’ and ‘around’.

Source: Statistics Canada (questions), own calculations SLID (2009, 2010) and OMDS (item deprivation rates).

Table 2: Sensitivity of index value to setting deprivation threshold

Deprivation threshold (number of items)	1+	2+	3+	4+	5+
SLID (2009)					
- Child Material Deprivation Index	18.3	**8.0**	4.3	1.9	1.3
- Adjusted Child Material Deprivation Index	4.2	3.1	2.2	1.3	0.8
- Average number of deprivations (all children: 0.37)	2.0	3.1	3.9	4.8	5.5
SLID (2010)					
- Child Material Deprivation Index	19.2	**8.2**	5.3	2.3	0.8
- Adjusted Child Material Deprivation Index	3.9	2.8	2.1	1.2	0.7
- Average number of deprivations (all children: 0.35)	2.0	3.1	3.9	4.9	5.7

Notes: The Child Material Deprivation Index (CMDI) is a headcount while the adjusted CMDI is an adjusted headcount. This paper focuses on the CMDI with a threshold of two (printed in bold).

Source: Own calculations SLID (2009, 2010).

Table 3: Disagreement between material deprivation and income poverty indices (% of children)

Income indicator	Neither	Deprived only (lacking 2+ items)	Income poor only	Both
SLID (2009)				
- LICO after taxes	84.8	6.2	7.2	1.9
- LICO before taxes	80.7	5.4	11.3	2.6
- LIM after taxes	81.3	5.5	10.7	2.5
- MBM (2008 base)	84.8	6.1	7.2	1.9
SLID (2010)				
- LICO after taxes	85.0	5.3	6.8	2.9
- LICO before taxes	80.5	4.4	11.3	3.8
- LIM after taxes	81.5	4.2	10.4	4.0
- MBM (2008 base)	85.2	5.3	6.6	2.9

Source: Own calculations SLID (2009, 2010).

Table 4: Comparison of risk characteristics between child poverty indicators

		SLID 2009				OMDS 2009	
Characteristics	%	MD	$LICO_{bt}$	$LICO_{at}$	%	MD	$LICO_{bt}$
Dwelling, Omitted: Dwelling owned							
- Dwelling rented	22.3	0.076^{01}	0.057^{01}	0.018^{05}	22.0	0.112^{01}	0.153^{01}
Type of economic family, Omitted: Two-parent family (SLID) / Two-earner couple (OMDS)							
- One-earner couple	n.a.	n.a.	n.a.	n.a.	23.7	0.104^{01}	0.126^{01}
- No-earner couple	n.a.	n.a.	n.a.	n.a.	4.5	0.254^{01}	0.263^{01}
- Single-parent family	12.6	0.026^{05}	0.010	0.005	17.1	0.143^{01}	0.260^{01}
- Other family types	10.6	0.041^{05}	-0.033^{01}	-0.014^{01}	2.4	0.023	0.112^{05}
# unemployed persons, Omitted: None							
- One or more	29.4	0.040^{01}	0.010	0.009^{05}	14.8	0.041^{05}	-0.010
Education highest earner, Omitted: University BA or MA degree							
- Graduated secondary education or less	21.0	0.023^{10}	0.016^{05}	0.016^{05}	26.5	0.087^{01}	0.042^{05}
- Some PSE or PSE certificate or diploma	50.2	0.011	-0.011^{01}	-0.003	40.8	0.075^{01}	0.034^{05}
Major earner's immigration status, Omitted: Landed before 1999 or never been a landed immigrant							

- Landed in 1999 or later	8.9	0.001	0.012	0.010	10.0	0.038	0.072[05]
Population of urban areas, Omitted: Rural areas							
- Urban, population to 99,999	15.5	-0.018	0.098[01]	0.039[05]	14.3	0.016	0.048
- Urban, population of 100,000 to 499,999	25.5	-0.017	0.046[01]	0.034[01]	22.8	0.008	0.050[10]
- Urban, population of 500,000 or more	53.9	0.002	0.134[01]	0.071[01]	55.8	0.015	0.077[05]
Main source of income, Omitted: Wages and salaries							
- Income from self-employment	5.7	-0.007	0.092[01]	0.031[10]	13.2	0.009	0.156[01]
- Government transfers	12.9	0.054[01]	0.551[01]	0.312[01]	5.1	0.058[10]	0.403[01]
- All other	2.1	0.006	0.233[01]	0.056	3.0	0.023	0.179[01]
Pseudo R-squared		0.1281	0.4513	0.4444		0.2029	0.4002

Notes: Dependent variable: materially deprived (MD); income poor, LICO before taxes (LICObt) and after taxes (LICOat). Marginal effect estimated at mean. Estimating with a Probit using poverty status (1/0) as dependent variable, constant (not reported) and robust standard errors. Coefficients are statistically significant from zero at a 1% ([01]), 5% ([05]) and 10% ([10]) level. The shaded cells indicate that the income and material deprivation coefficients differ significantly with a p-value less than 1% (grey), 5% (vertical lines) and 10% (horizontal lines).

Source: Own calculations SLID (2009) and OMDS.

Table 5: Overlap between child poverty indicators for selected high risk characteristics (%)

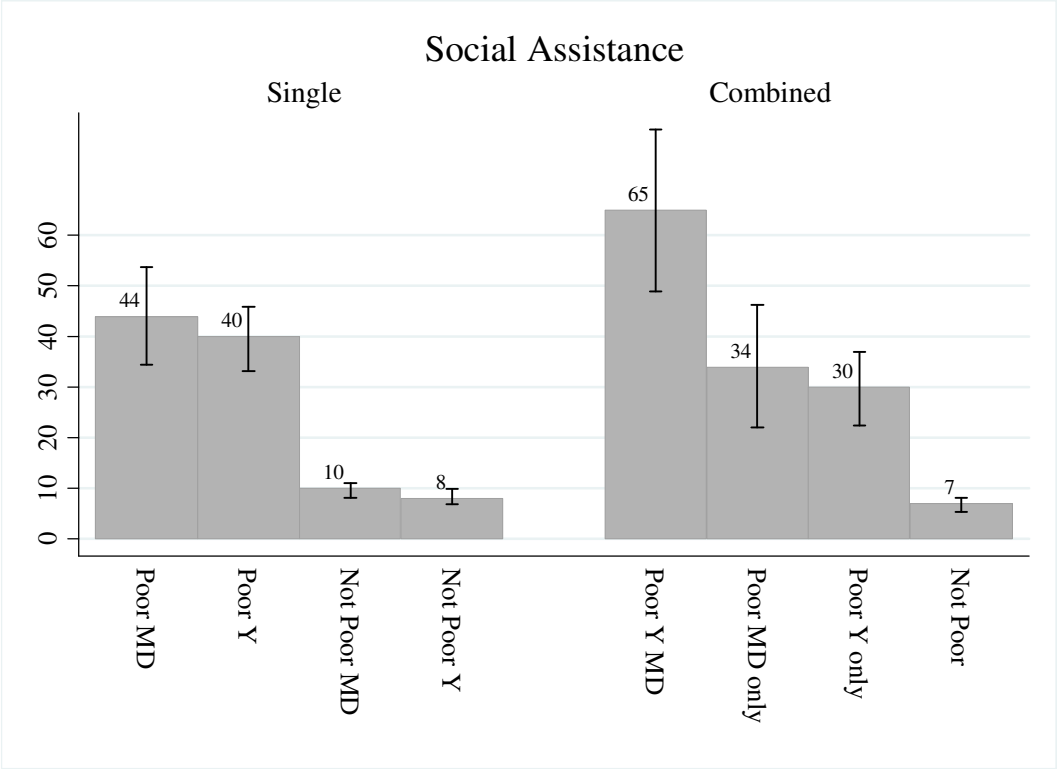
	Poverty groups			
	Poor children	Deprived only (lacking 2+ items)	Income poor only (LICO after taxes)	Both
All children				
- children	15.2	6.2	7.2	1.9
- poor children		41	47	13
Rented dwelling				
- children	43.1	15.6	21.1	6.4
- poor children		36	49	15
Single-parent family				
- children	28.7	8.1	14.1	6.5
- poor children		28	49	23
One or more unemployed family member(s)				
- children	25.5	11.2	11.8	2.4
- poor children		44	46	9
Low education (Graduated secondary education or less)				
- children	26.9	7.7	14.0	5.3
- poor children		29	52	20
Immigration status: Landed in 1999 or later				
- children	37.2	11.0	22.9	3.4

- poor children		30	62	9
Main income source: Government transfers				
- children	65.7	13.0	39.1	13.7
- poor children		20	60	21

Notes: Due to rounding the sums of the 'poor children' rows do not always add to 100 per cent.

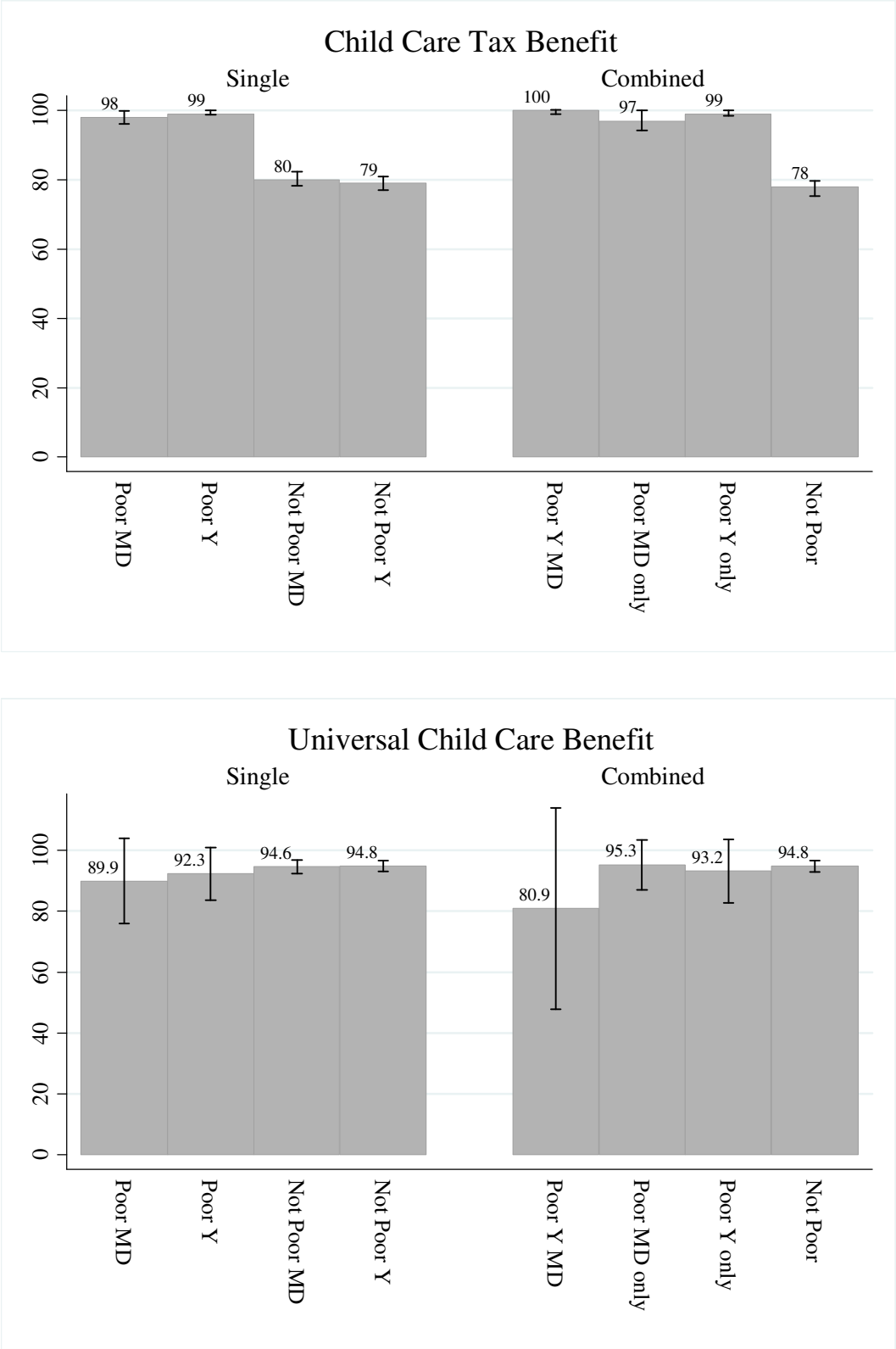
Source: Own calculations SLID (2009).

Figure 1: Children living in households receiving Social Assistance (%)



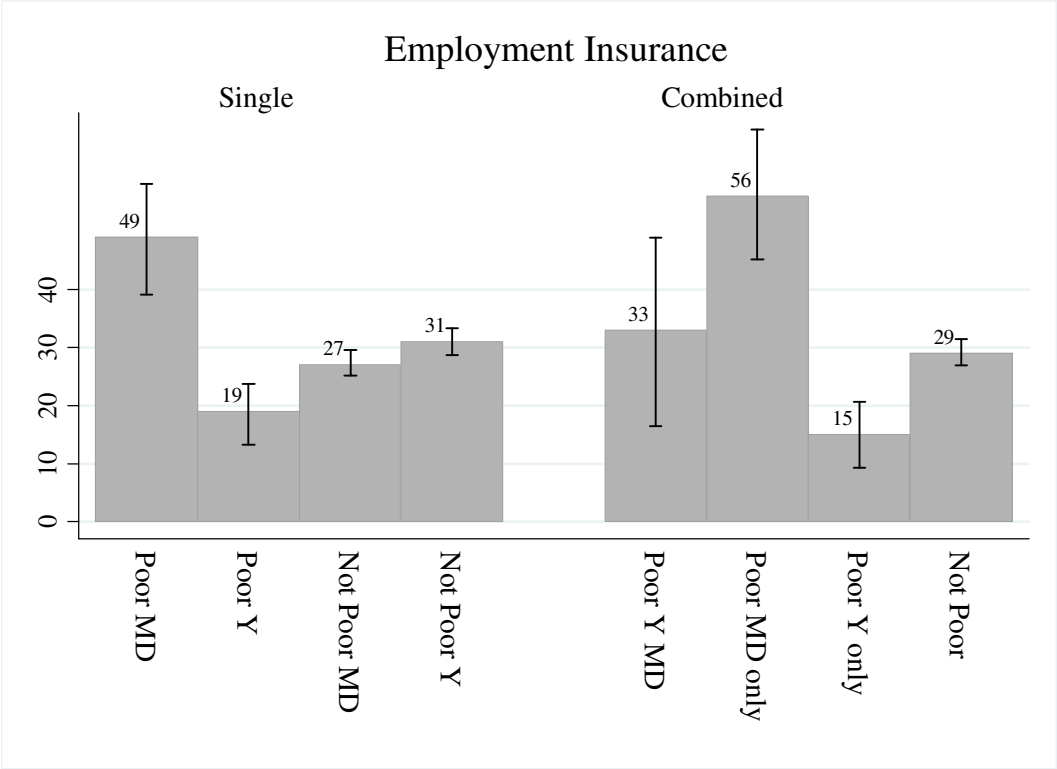
Source: Own calculations SLID (2009) using LICO before taxes, 95% confidence intervals.

Figure 2: Children living in households receiving child benefits (%)



Source: Own calculations SLID (2009) using LICO before taxes, 95% confidence intervals.

Figure 3: Children living in households receiving Employment Insurance (%)



Source: Own calculations SLID (2009) using LICO before taxes, 95% confidence intervals.