Poverty and Child Well-Being in Canada and the United States: Does it Matter How We Measure Poverty?

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Abstract

In this paper we examine the robustness of conclusions about the association between poverty and children's well-being to alternative choices about how we measure poverty. In particular, we focus upon the influence of data set chosen, sample selected and poverty line used. Throughout, the analysis is conducted for children in both Canada and the US, both to emphasize that the issues are not unique to the Canadian situation and to point out the influence of these measurement choices upon our understanding of Canada/US comparisons of children's poverty and/or well-being. We find that estimates of the incidence of child poverty are very sensitive to measurement choices. For example, we can come to conclusions as diverse as: 1) the incidence of child poverty is 10 percentage points higher in the US than in Canada; 2) there is no difference in the incidence of child poverty in the two countries. Reassuringly, however, these quite differences in estimates of the level of child poverty do not carry over so dramatically to estimates of the association between child poverty and child outcomes. In almost all cases, child poverty, regardless of how it is measured, is associated with worse outcomes for children (we consider body mass index, peabody picture vocabulary scores, trouble concentrating and hyperactivity); these associations are stronger in the United States than in Canada. While estimated magnitudes of these associations are not the same across alternative measures of poverty, we argue that they are not generally significantly different in either a statistical or economic sense. The exception to this conclusion is that if poverty is measured using official US poverty lines, there is sometimes no relationship apparent between children's outcomes and poverty.

Key words:
child poverty, child health, child well-being, children's outcomes, poverty measurement, Body Mass Index, hyperactivity, school readiness

Reducing child poverty is currently very high on the national policy agenda in Canada. For example, the issue received enormous attention in December of 1999 when media and child poverty activists pointed out that the incidence of child poverty has actually increased in Canada since all parties agreed to the elimination of child poverty by the year 2000. There seems to be a popular belief that living in poverty is associated with worse outcomes for children, though this opinion is somewhat in conflict with current academic literature on the subject. In both Canada and the US, there have been studies of the association between child well-being and family poverty and/or income status which find relationships that are small in magnitude or sometimes even insignificant (for example, see Blau, 1998; Curtis et.al., 1998; Dooley, et. al., 1998a, b, Korenman, et.al., 1995; Mayer, 1997). If such findings are correct, the policy implication is that the attention paid to reducing child poverty may be mis-directed and resources might better be channelled to children in ways other than through income transfers. This would be a strong conclusion and one which clearly warrants much careful study before it is taken.

In this paper, we examine whether the finding of small or insignificant associations between poverty and child well-being is robust to how we choose to measure poverty.[1] There is a large literature in the economics of poverty measurement which emphasizes how sensitive estimates of poverty can be to seemingly esoteric measurement choices such as the 'equivalence scale'[2] which is embodied in the poverty lines (see for example, Buhmann, et.al., 1988; Jorgenson,

[1] In a companion paper, also funded by HRDC, we examine whether current income and/or poverty status is the best measure of the economic resources available to children. See Curtis and Phipps, 2000.

[2] An equivalence scale indicates, for example, how much more income two people require than one. Thus, for example, if the poverty line for one person is $10,000 and the equivalence scale for two people is 1.5, then the poverty line for the two-person household would be $15,000.

1998; Phipps, 1993; Ruggles, 1990; Triest, 1998). It may thus also be true that poverty measurement choices affect estimates of the association between child outcomes and poverty status.

In Canada, the most common approach to measuring 'low-income' is through the Statistics Canada Low-Income Cutoffs (LICO's). The LICO's are derived using an 'Engel methodology' which judges households to be living with low-income if they devote 20 percentage points more than the average Canadian family to the purchase of necessities. While Statistics Canada is very careful to note that the LICO's measure 'low income' and not 'poverty,' public discussion very much treats the LICO's as official poverty lines.

Thus, the LICO's have a high level of credibility in Canadian policy discussions, and these are the poverty lines used in the Canadian studies of the link between poverty and child health carried out to date (Curtis, et.al., 1998; Dooley, et.al., 1998a,b). It should nonetheless be noted that there is no consensus even within Canada that this is the 'best' or 'only' way to measure poverty. For example, a Federal/Provincial/Territorial Working Group on Social Development Research and Information has been established by HRDC to develop a 'market-basket measure' (MBM) of poverty (Cotton, et.al., 1999). Moreover, if we move outside the Canadian context, then there are many alternatives to the LICO in use (in fact, no other country of which we are aware uses precisely the LICO approach).[3] For example, official US poverty lines were derived

[3] Phipps and Garner, 1994, used comparable Canadian and US data to estimate 'LICO's' for Canada and the US. The key finding of that research was that when exactly the same methodology for deriving equivalence scales was employed, no statistical or practical differences were discernible. Thus, it does not seem to be the case that there are inherent differences across countries which must be reflected in different equivalence, but rather that different countries have simply *chosen* different approaches.

by multiplying 'minimum adequate food budgets' for families with different composition by a factor of three. The European Community standard is to define poverty as 50 percent of median income, and this is the approach most commonly used in the academic literature (see, for example, Ruggles, 1997; Atkinson, 1998). The general point is that while the LICO's have enormous credibility within Canada and are extremely important for that reason, there is nothing otherwise which suggests that the LICO's are somehow uniquely suited to identifying poverty in Canada rather than an approach which is more widely in use elsewhere (such as a 50 percent of median income approach).[4]

In what follows, we do three things. First, we illustrate how estimates of child poverty can depend upon both choice of data set and choice of poverty line. Thus, we compare incidence estimates obtained using the National Longitudinal Survey of Children and Youth (NLSCY), which is the data set containing information about children's well-being (see Dooley, et.al., 1998), with estimates obtained using the Survey of Consumer Finance (SCF), the data source typically employed for measuring income distributions or low-income status in Canada (see Statistics Canada, 1997). We do this using five alternative poverty lines. We also show that the sensitivity of poverty estimates to choice of both data set and choice of poverty measure is not unique to Canada by making a similar comparison using equivalent US data sets (the Current Population Survey (CPS) and the National Longitudinal Survey of Youth -- Mother Child Survey (NLSY)).[5]

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[4] Statistics Canada also reports Low-Income Measures (LIM's) which use a 50 percent of median income approach, though these receive less attention.

[5] See Blau, 1999 or Mayer, 1997. The SCF and the CPS are the data sets which are included in the Luxembourg Income Study and which thus form the basis of a substantial body of literature comparing child poverty across countries. See Bradbury and Jantti, 1999 for example.

Second, given the differences in the level estimates of poverty, we show using simple multivariate analysis, how the characteristics associated with a higher probability that a child lives in poverty vary between the NLSCY and SCF and across alternative poverty lines and we again repeat this analysis using the two US data sets. Third, we show how much choice of poverty line matters to conclusions about the importance of the association between child outcomes and child poverty. Throughout, we emphasize that poverty measurement choices affect not only our understanding of the links between poverty and child well-being within countries, but also the conclusions we will draw when making comparisons across countries.

2. Alternative Estimates of the Incidence of Child Poverty in Canada and the United States

Tables 1a and 1b illustrate 5 alternative sets of poverty lines for Canada and the US in 1994. For Canada, we first report the LICO's for 1994 (1992 base), which vary with number of persons (no distinction is made between adults and children) and size of area of residence. We next report 3 sets of poverty lines calculated as one-half median Canadian equivalent before-tax income[6], but with median equivalent income calculated using three alternative equivalence scales. Each set of scales is widely used in the literature; as mentioned earlier, the 50 percent of median equivalent income approach to establishing a poverty line is the most widely used in the economics poverty literature. The first equivalence scale is that recommended by the OECD (1982), and commonly in use in European countries. In this case, if a single adult is assigned an

[6] 'Equivalent income' is family income divided by the appropriate household equivalence scale. The idea is to adjust family income for the fact that more than one individual depends upon this income, but to acknowledge the fact that there are economies of scale available to people who live together. Note that neither of the child outcome data sets provide after-tax income data, hence we have no option but to focus on before-tax income.

equivalence scale = 1.0; then each additional adult is assumed to add 0.7 to the scale; each additional child is assumed to add 0.5 to the scale. The '40:30' scale which is used for the Statistics Canada 'Low-Income Measures' (LIM's) follows the same procedure, but each additional adult is assumed to add 0.4 to the scale; each additional child is assumed to add 0.3. Finally, the 'Luxembourg Income Study' (LIS) equivalence scale is simply calculated as the square root of the number of people living in the household. As with the LICO's, no distinction is made between adults and children. The LIS scale is very popular in academic papers (see, for example, Crossley and Curtis, 2000; Osberg, 2000). Finally, we report the US official poverty lines converted to Canadian dollars.[7]

For the US, we report the official US poverty lines for 1994. We then repeat the exercise of calculating three alternative sets of relative poverty lines constructed using '40:30', OECD '70:50' and the LIS scales. However, in this case, the poverty lines are constructed as 50 percent of US median equivalent before-tax income. Finally, we also convert one set of Canadian relative poverty lines (the OECD 70:50) into 1994 US dollars using purchasing power parities for private final consumption (CANSIM D23283).[8]

For Canada, if we compare poverty lines for a family consisting of 2 adults and 2 children, alternatives include $27,100 (OECD), $25,983 (40:30), $26,523 (LIS) and from $31,071 (LICO,

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[7] US official poverty lines are available at http://www.census.gov/hhes/poverty/threshld/thresh94.html. Conversion to Canadian funds is made using purchasing power parities for private final consumption expenditures (CANSIM D23283).

[8] It is not obvious how to apply LICO's in the US context given the variation in poverty lines by size of area of residence. Would the same population thresholds (e.g., population greater than 500,000) define a 'large urban' centre for the US?

large urban area) to $21,472 (LICO, rural area). The US official poverty line is noticeably lower at $19,024. Differences across poverty lines are larger as family size gets larger. For example, for a 6-person household consisting of two adults and 4 children, poverty lines include $37,137 (OECD), $33,778 (40:30); $32,484 (LIS) and from $38,393 (LICO, large urban area) to $26, 533 (LICO, rural area).

For the US, there are also noticeable differences among poverty lines. First, the official US lines are much lower than any of the relative (50 percent of median income) lines -- $15,029 for a family of 2 adults and 2 children versus $21,315 using the OECD 70:50 scale or $20,571 using the LIS scale, for example. If we convert the Canadian 50 percent of median income poverty line (OECD scale) into US funds, the line for a family of 4 is $21, 408, which is very similar to the OECD relative poverty line for the US. Again, differences among poverty lines are larger for larger family sizes as differences in the implicit 'economies of scale' become more important. In either country, then, it seems quite clear that some families with incomes in the range of 'poverty' could be classified as poor by one measure and 'not poor' by another.

However, our first concern in this section is to see whether estimates of poverty, using any particular poverty line, are the same if we use different data sets (i.e., the SCF versus the NLSCY in Canada; the CPS versus the NLSY in the United States). The point is that, arguably, the SCF contains the better estimates of family incomes,[9] but the NLSCY is the only data set with rich information about the well-being of children. Thus, to study the links between child well-being

[9] The SCF asks detailed questions about individual components of income and the survey is conducted near tax time so that individuals will have the necessary information available to them. The NLSCY asks only two questions about personal and household income. The survey is not timed to coincide with tax time.

and child poverty, we must use the NLSCY. However, if income is less well-measured in the NLSCY, this may be one reason for the weak links found between child health and child poverty in the Canadian literature thus far. The same arguments can be made about the CPS versus the NLSY for the US.[10]

Table 2 reports upon the incidence[11] of poverty among children aged 0 to 11 years in 1994 in Canada and the US, using the alternative poverty lines and data sets. We focus upon children aged 0 to 11 as this is the age range available in the NLSCY. The same calculation procedure is used for each data set in each country: 1) households are excluded if they do not contain any children aged 0 to 11 years or if they do not have positive income before tax; 2) children are counted as poor if they live in households with income less than the appropriate poverty line; 3) the incidence of poverty among children is computed by assigning *each child* aged 0 to 11 his or her appropriate sample weight.[12]

For both Canadian data sets and for the US CPS, we repeat all of these calculations for two samples of children: 1) all children aged 0 to 11 years; 2) all children aged 0 to 11 years whose pmk/mother is aged 29 to 37 years. Because the NLSY children's data is a supplement to the basic NLSY, all mothers are aged 29 to 37 years in 1994. Thus, the second set of calculations

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[10] Curtis, et.al., 1998 employ the Ontario Child Health Study (OCHS) rather than the NLSCY. Family income is not particularly well-measured in this survey either.

[11] We also calculated depth of poverty for each measure, but focus here only upon incidence.

[12] In the NLSCY, each child is a separate observation and may have a different weight to produce appropriate age distributions of children, though the data contain siblings (i.e., children from the same family may have different sample weights). For the SCF, we create an observation for each child aged 0 to 11 years and assign each child the income of his or her household and the sample weight of the household.

with the other 3 data sets allows for more accurate comparability across data sets, though the restricted mother age samples obviously give a less accurate picture of the incidence of poverty for children aged 0 to 11 years. One reason for presenting estimates for both samples, where available, is to investigate how important/limiting the age restriction on mothers is in the NLSY data, which has been used in several very influential studies of the link between poverty/income and children's well-being (e.g., Blau, 1999; Korenman, et.al., 1995; Mayer, 1997).

The first striking point to take from the top panel of Table 2 is that the different data sources yield rather different estimates of the incidence of poverty. Regardless of the poverty line used, the NLSCY provides higher estimates of the incidence of poverty for children (0 to 11) in Canada than the SCF (3.7 percentage points higher in the case of the LICO's; 4.7 percentage points higher using a 50 percent of median equivalent income definition of poverty and the OECD equivalence scale). To put this in perspective, there is a 6.4 percentage point gap between the highest (20.9 in 1996) and lowest incidence of child poverty in Canada (14.5 percent in 1989) over the 1980 to 1997 period (National Council of Welfare, 1999, p 11).

The bottom panel of Table 2 provides a similar comparison for the US. Interestingly, in this case, the children's data set (the Mother-Child Survey of the NLSY) yields *lower* estimates of the incidence of child poverty than the Current Population Survey (CPS, as available through the Luxembourg Income Study). The consequence is that while the incidence of child poverty for all children 0 to 11 years is estimated to be about 10 percentage points higher in the US than in Canada (depending upon the poverty measure used), when SCF and CPS data are used, this gap is essentially eliminated. This point is true whether we compare the relative incidence of poverty across the countries (e.g., two of the 50 percent of median equivalent income definitions, using

country-specific median equivalent income) or whether we make an 'absolute' comparison of the incidence of poverty by using, for example, the official US poverty lines for both the US and Canada. To give some specific numbers, consider a comparison of the incidence of poverty using the two 50 percent of median equivalent income poverty lines, with equivalent income calculated using a 'LIS' scale. If we use SCF and CPS data, the incidence of poverty in Canada is 21.2 percent while the incidence of poverty is estimated to be 30.2 percent for the US. If we use the same poverty lines, but the NLSCY and NLSY data sets, the incidence of poverty is estimated to be 24.0 percent in Canada and 24.9 percent in the United States.

Of course, as noted earlier, all mothers in the NLSY data set are aged 29 to 37 years, and it seems, based on the calculations for the other 3 data sets, that this age restriction results in considerably lower estimates of poverty (about 3 percentage points for either Canadian data sets; 4 to 5 percentage points using the CPS). However, the same qualitative points made above remain valid when we focus on the mother age-restricted samples for all the data sets: 1) the NLSCY produces higher estimates of the incidence of poverty than the SCF; 2) the NLSY produces lower estimates of the incidence of poverty than the CPS (though the two sets of US estimates are much closer once we make the mother age restriction).

Our understanding of the incidence of child poverty within countries can also be affected by choice of poverty line. For example, for Canada, there is a 2 percentage point gap between the LICO and the 50 percent of median income approach with an OECD equivalence scale, if NLSCY data are used (24.5 versus 26.5 percent). Note, on the other hand, that when SCF data are used, the incidence estimates are very close for all but the 'official US poverty lines.' The official US lines yield incidence estimates most different from the others -- using NLSCY data,

child poverty is estimated to be only 14.4 percent versus 24.5 percent with the LICO's.

Differences across poverty lines in estimates of the incidence of poverty are similarly apparent for the US. For example, using the NLSY data and the official US poverty lines, the estimated incidence of poverty is 17.5 percent while with the OECD 50 percent of median income approach, the estimated incidence of poverty is 26.4 percent.

3. Multivariate Analysis of the Probability of Child Poverty Using SCF versus NLSCY data and Alternative Poverty Lines

Given these rather striking differences in the estimated incidence of poverty, it seems appropriate to proceed to a multivariate analysis of the factors associated with an increase in the probability of a child living in poverty using the different data sets and poverty lines. Tables 3a and 3b report probit models of the probability that a child is observed to live in poverty, for Canada and the US, respectively.[13] For both Canadian data sets as well as for the US CPS, we focus on the sample of all children aged 0 to 11 years, regardless of mother age, but also report one example of a regression using the restricted mother-age sample. Estimates for the NLSY can obviously only be for the restricted age sample.

The specification employed for the probit models is extremely parsimonious both because overlap in survey content across 4 different data sets was necessary for this exercise and because the intent of the regressions is not to 'explain' poverty, but merely to check basic correlation patterns. Thus, control variables are limited to number of children aged less than 18 years and a

[13] Sample weights are employed for all regressions.

series of dummies indicating less than high-school level of education for the mother,[14] that the child is aged 7 to 11 years, that the child lives in a lone-parent family, and that the mother is aged 35 or more.

Appendix Table A1 provides sample means for the estimating samples. Note, first, that the two Canadian samples for all children appear very similar, except that a slightly larger percentage of mothers have less than high-school education in the SCF (20.3 versus 16.2). If we compare the two mother age-restricted samples for the US, sample means are quite similar. But, how do the characteristics of the age-restricted sample differ from those of the full sample? If we compare the two sets of means for the CPS, it is first, of course, true that a smaller percentage of mothers are older than 35 in the age-restricted sample (31.6 percent versus 44.6 percent). It is also true that a smaller percentage of mothers in the age-restricted sample have less than high-school education (13.3 percent versus 18.5 percent). Children are slightly older in the age restricted sample (44.1 percent versus 41.4 percent) and fewer live in lone-parent households (22.4 percent versus 26.7 percent). Over-all, it does seem important to keep in mind that NLSY data set is not entirely representative of all US children of a particular age.

This point is reinforced by examining the differences between the age-restricted and full

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[14] Observations were excluded in the event of non-response to any of the variables used in the estimating model. One difference which exists between the SCF and NLSCY samples, but which should make little difference to the results reported here, is that in the NLSCY, extensive use has been made of the 'persons most knowledgeable' (pmk) about the child. In the regressions, we use age and education of the pmk as control variables. Most, but not all pmk's are mothers. Hence, in the SCF data, we use age and education of the mother, unless the mother is not present, in which case appropriate values for father or other care-giver are substituted. While these procedures are not identical, the coefficients on the 'mother' variables are remarkably similar across data sets. For both US data sets, we use information about the mother, where available.

samples for the Canadian data sets, where most of the same patterns are apparent (e.g., mothers are less likely to have low-education in the age-restricted sample and children are less likely to be living in a lone-parent household). One cross-country difference is that for both Canadian data sets, children with mothers aged 29 to 37 are slightly less likely to be aged 7 to 11 (e.g., 38.9 percent versus 41.7 percent using the NLSCY) while the opposite is true for the US data.

Turning to the multivariate results, we consider first the two Canadian probability of poverty equations estimated using the LICO's with the SCF and NLSCY, respectively (see Table 3a). While most estimated coefficients are somewhat larger using the NLSCY than using the SCF (e.g., low education, lone-parent, number of children), the key difference between the two estimated equations is that the age of the child is not statistically significant in the case of the SCF, but being aged 7 to 11 years is associated with a lower probability of poverty when the full sample of NLSCY data is used. This pattern holds regardless of the poverty measure employed and seems reasonable since school-aged children are presumably less of an impediment to labour force participation. Note that one important difference between the SCF and NLSCY which may be relevant for this finding is that the NLSCY weighting system provides more accurate estimates of the distribution of children across age categories than the SCF (see footnote 13).

If we focus instead upon a comparison across measures of poverty rather than across data sets, one key difference is that number of children living in the family is associated with larger increases in poverty when using the OECD equivalence scale than, for example, when the LICO's are employed. This is not surprising, since the LICO's assume larger economies of scale are available to individuals who live together. Thus, at the same income, larger families are more likely to be classified as poor using the OECD than the LICO approach. This point is valid

regardless of the data set employed.

Finally, if we compare estimates obtained using the mother-age restricted sample with the full sample (using a 50 percent of median equivalent income poverty line calculated with a LIS equivalence scale), the dummy variable for older children being less likely to be poor drops to insignificance with the NLSCY.[15]

For the United States, if we compare coefficient estimates obtained with different data sets but the same measure of poverty (e.g., the US official poverty lines), it is again true that the most notable difference is for the estimated association between child age and child poverty. Using the full sample of CPS data, children aged 7 to 11 years are less likely to be poor (as was true using the NLSCY but not the SCF); using the age restricted sample and the LIS equivalence scale, there is no significant difference in the probability of poverty for older and younger children (and this was the same finding with the age-restricted Canadian samples). However, using the NLSY, older children are more likely to be poor. It is not obvious to us why this should be the case.

If we compare across poverty lines using the same data set for the US, we again find that the estimated coefficient on number of children living in the family is largest when OECD equivalence scales (assuming smaller economies of scale) are employed.

Finally, it is interesting to compare Canadian and US estimates. While it is obvious that the absolute value of coefficients involved in the comparison will be sensitive to the poverty measure chosen, in fact most of the qualitative points are true regardless of poverty measure. We focus first on the SCF and CPS estimates, using the unrestricted mother age samples. Low

[15] We estimated probits for all measures of poverty with the restricted age sample and the same conclusion was valid regardless of poverty line. We report only one set of coefficients to save space.

education of the mother and lone parenthood are associated with higher rates of poverty in both countries, though the magnitude of both effects is much larger in the United States. Additional siblings are also associated with higher probabilities of poverty in the United States than in Canada. If the mother is aged 35 or higher, the associated probability of child poverty is lower, but this is more dramatically the case for the US than for Canada. An important difference is that older children are less likely to be poor using the CPS data, but this effect is not observed using the SCF.

If we compare the age-restricted NLSCY estimates with the NLSY estimates (for the 'LIS' poverty lines), most of the points made above remain valid. That is, children living with lone parents or whose mothers have low levels of education are more likely than others to be poor, but the magnitudes of these associations are much larger in the US. Additional siblings are associated with higher probabilities of poverty in both countries, but the association is stronger in the US; children with older mothers are less likely to be poor, but more so in the US. Controlling for mother's age, there is no association between child age and poverty in the mother-age - restricted sample of the NLSCY; older children are more likely than others to be poor in the US.

Two themes have been emphasized in the paper thus far. The first is that estimates of child poverty are not the same using the NLSCY and the SCF for Canada or using the NLSY and the CPS for the United States. The SCF is generally believed to produce the best estimates of income and poverty in Canada (e.g., the SCF is the data set used by Statistics Canada to produce estimates of income distribution and low-income in Canada -- see Statistics Canada, 1997). Thus, there is reason to be more comfortable with the SCF than the NLSCY estimates. The troubling feature for the over-all purposes of this research is that to understand the links which exist

between child health and poverty, we are forced to use the income information available in the NLSCY. Perhaps future waves of data collection could focus upon improving the income content of the survey. Until that time, it remains possible that one reason for some of the current findings (e.g., of the relative unimportance of low-income status) is limited information about income. Until better income information is available in data sets concerning child well-being, this will continue to be an issue.

The second theme is that choice of poverty line can affect our estimates of the incidence and correlates of child poverty. A central question of this paper is then whether choice of poverty line may also influence our perception of whether or by how much poverty matters for child well-being and whether this is consistent for different dimensions of well-being? This is the topic of the next section.

4. Multivariate Analysis of the Implications of Alternative Poverty Lines for Our Understanding of the Association Between Child Well-being and Poverty

To examine how much choice of poverty line matters for what you conclude about the importance of child poverty for child well-being, we estimate a series of multivariate regressions using the 1994 Canadian NLSCY data (full sample and mother age-restricted sample) and 1994 US NLSY data. We focus upon 4 different child outcomes likely to be of interest to economists because each might be interpreted as an aspect of the child's 'human capital development:[16]' body mass index, hyperactivity, trouble concentrating and the Peabody Picture Vocabulary test. Body

[16] We were also limited by the requirement of comparability between Canada and the US. Relatively few outcomes are identically measured in the NLSCY and NLSY.

mass index[17] can be calculated for all children from 0 to 11 years of age and is one of the few measures of physical health available for both Canada and the US. For adults in affluent countries, it is well-established that poverty is associated with obesity and we know that obesity is associated with a variety of health problems (e.g., cardiac, diabetes see xx). It seems reasonable to suppose that the same relationship between poverty and obesity exists for children as for adults (e.g., because fresh fruits and vegetables are more expensive to buy in winter than Kraft Dinner).[18] Thus, body mass is an interesting and important child outcome with the additional advantage that it is an objective indicator available in a continuous form.

The second outcome upon which we focus is a measure of hyperactivity -- also an important dimension of health, interpreted broadly. This outcome is available for children aged 4 to 11 years in both countries. In Canada, mothers are asked "How often would you say that (your child) can't sit still, is restless, or hyperactive?" Possible answers include: 1) 'never or not true;' 2) 'sometimes or somewhat true;' 3) 'often or very true.' In the United States, mothers are asked if the statement: "He/She is restless or overly active, cannot sit still" is: 1) 'not true'; 2) 'sometimes true;' 3) 'often true.'[19] While these questions and response categories are not

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[17] Body mass index is defined as body weight (measured in kilograms) divided by body height squared (where body height is measured in metres).

[18] It is, of course, possible that very low-income children who do not get enough to eat may be under-weight.

[19] Many Canadian researchers work with the 'hyperactivity' score available in the NLSCY (as we have done in previous work) which is derived from answers to 8 different questions about dimensions of hyperactivity. The same index is not available in the US, nor is it possible to construct it as the same 8 questions are not asked. The single 'hyperactivity' question upon which we focus in this paper is one of the 8 Canadian questions used to construct the index. The correlation between the single question and the index is 0.72.

identical, we argue that they are extremely similar.[20] Note, however, that the measure we are using is the mother's subjective interpretation of the child's behaviour. As we point out in other work focussed upon Canadian children aged 10 and 11 years (Curtis, Dooley and Phipps, 2000), the child and the mother do not always agree about the child's behaviour, and mother's state of mind (e.g., depression) can influence the mother's reporting of outcomes for her child.

The third dimension of child well-being which we study in this paper is the child's ability to concentrate -- something which is likely to be very important for his/her ability to succeed at school and hence acquire human capital. Again, this measure is available for children aged 4 to 11 years in both countries. In Canada, mothers are asked "How often would you say that (your child) can't concentrate, can't pay attention for long? Possible answers include: 1) 'never or not true;' 2) 'sometimes or somewhat true;' 3) 'often or very true.' In the United States, the mother is asked whether the statement "He/She has difficulty concentrating, cannot pay attention for long" is: 1) 'not true;' 2) 'sometimes true;' or 3) 'often true.' Again, the questions are extremely similar though not identical and, again, they depend upon the mothers assessment of the child's behaviour.

The final dimension of child well-being which we study is the 'peabody picture vocabulary test' standardized score (i.e., the PPVT) which is also a 'human capital' style measure in that it is regarded as a measure of 'school readiness' which correlates well with future success at school (Baker, et.al., 1993). An advantage for our purposes is that the PPVT test score does not rely

[20] A number of outcomes for which the question asked was very similar across the two data sets had different possible answers (e.g., because the number of categories differed).

upon the parent's assessment.[21] However, test results are only available for 4 and 5 year-old children in Canada. Test results are available for children aged 3 to 6 years for the US, and we retain all of these children because the US sample would otherwise be rather small.[22] Advantages of the PPVT are that it does not rely upon the mother's assessment and that the test score is available as a continuous measure.

Table 4 reports means and/or frequencies for these 4 child outcomes for both Canada and the US. We report estimates for full samples as well as for poor and non-poor households (with poverty measured by the 50 percent of median equivalent income definition, using the OECD equivalence scale). As noted in earlier work (see Phipps, 1999), there is no significant difference between children living in Canada and the US in terms of problems with concentration; Canadian children are considerably more likely to be hyperactive. PPVT scores and BMI's are not significantly different across the countries. Note that for all outcomes, it is clear that poor children fare worse than non-poor children.

For each outcome, an extremely basic model in terms of additional controls is adopted (i.e., we include dummies for low-education status of mother; child aged 8 to 11 years[23]; female child; lone-parent family; mother greater than or equal to 35 years; and number of children in the

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[21] Children are shown a set of pictures and asked to identify the one matching the word in question. Raw scores simply compute the number of correct responses. Standardized scores allow for comparisons across children of different ages. We use standardized PPVT scores for both Canada and the US.

[22] We have 724 children aged 3 to 6 with a PPVT score for the US. A very small number of children aged 2 and aged 7+ also have PPVT scores, but we exclude these as being too different in age from the Canadian children.

[23] For body mass index, we include a continuous measure of child age.

household).[24] Means for these variables are reported in Appendix Table A1.

Our key explanatory variable is the indicator of poverty status. Keeping all other aspects of the specification the same, we estimate the model five times for Canada , with poverty status measured according to a different poverty line in each case (i.e., LICO, the three 50 percent of median income specifications: OECD, LIS, 40:30; the US official poverty lines converted to Canadian dollars). The same procedure is repeated for the US (using the official US poverty lines, the three 50 percent of US median income specifications, and the 50 percent of Canadian median income in US dollars poverty lines).[25]

Results are reported in Table 5. (To save space, we report only the poverty coefficients in Table 5. Full results are available upon request.) Since 'trouble concentrating' and 'hyperactivity' are each reported in three categories, we estimate ordered probit models for these two outcomes. OLS specifications are used for both the PPVT score and Body Mass Index.[26]

Overall, Table 5 is more reassuring than Table 2 (which reported incidence of poverty for different data sets and poverty lines). Recall that using the NLSCY data, 3 estimates of the

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[24] This is consistent with earlier Canadian work on this subject. See for example, Dooley, et.al., 1998.

[25] For Canada, we also estimated all models including 'big city' and 'rural' dummies, since one obvious major difference between the LICO's and all of the 50 percent of median income poverty lines is that the LICO's make allowances for urban/rural differences while the others do not. Conclusions about the association between child outcomes and poverty were not sensitive to the inclusion/exclusion of these variables, though the dummies themselves were statistically significant, and negative, in the hyperactivity and PPVT equations. We do not retain these variables to preserve comparability with the US specifications.

[26] We should note that for all specifications and all outcomes studied in both countries, it is possible that poverty status is partially the result rather than the cause of the child outcome (i.e., there may be an endogeneity problem here, but dealing with this issue is outside the scope of this project).

incidence of poverty for Canadian children were in the range of 24 percent (LICO, LIS and 40:30), the OECD estimate was 26.5 percent; the US official poverty line estimate was 14.4 percent. Using the NLSY, estimates of the incidence of poverty for US children ranged from 17.5 percent (official US poverty lines) to 26.4 percent (OECD). For the poverty estimates which are in the same range (even including the somewhat higher OECD estimates), the story one would take from Table 5 about the association between the child outcomes and poverty status is basically much the same.

A first point to take is that for all four outcomes studied, poverty is nearly always associated with poorer outcomes for both Canadian and US children regardless of the way in which we measure poverty. The estimated magnitudes of the association vary somewhat depending upon the poverty line chosen,[27] though we do not think the variations are large enough to be either statistically or economically important. For example, to be somewhat informal, if we add/subtract one standard error from the smallest and largest coefficients, they are basically indistinguishable. In terms of 'economic importance,' the calculated marginal effects reported in Table 6 are helpful for thinking about the ordered probit models, and again they do not suggest any markedly different stories across the alternative poverty lines.

The exception to this general conclusion is that if we measure poverty using the official US poverty lines, poverty is not significantly associated with hyperactivity in Canada or with 'trouble concentrating' or Body Mass Index in the US. This conclusion of 'no association' is

[27] For example, for both concentration and hyperactivity, the largest association between poverty and children's well-being is found using the OECD measure and the smallest association is found using the LICO. For body mass index and the PPVT score, the largest association is found using the LICO.

obviously a qualitatively different from the one which would be obtained using the other four measures of poverty.[28] Recall that the official US lines are much lower than the other poverty lines considered in this paper. Thus, many children that would be counted among the poor using, say, a LICO approach, would not be counted as poor according to the US lines. However, they would certainly be 'near-poor.' The results of this paper suggest that in a number of cases, there is not much difference in outcomes between these children and 'poor' children (i.e., given the low US lines).

It is obvious slightly arbitrary exactly where we draw the poverty line, and one way of avoiding having to do this would be to study the association between children's outcomes and income, instead. There are two reasons we do not do so in this paper. First, much of the policy discussion in Canada revolves around poverty rather than income, so the sensitivity of our conclusions about the association between poverty and children's well-being to what may seem very esoteric measurement issues can help add to that debate. Second, there are problems in using the income measure in the US data since many observations are top-coded, and estimation results are highly sensitive to this issue. Further examination of the sensitivity of estimates of the association between income and child outcomes is, however, clearly warranted in future research.

[28] In contrast, poverty as measured using the US official lines actually has a somewhat larger than average association with PPVT scores using the Canadian data.

5. Conclusions

This paper examines the robustness of our conclusions about the association between child poverty and child well-being to alternative issues of measurement. Specifically, we focus upon the sensitivity of results to choice of data set, choice of sample and choice of poverty line. Throughout the paper, we pay attention, as well, to how Canada/US comparisons are affected by these choices. Our conclusions include the following:

1. Canadian NLSCY and SCF data yield rather different estimates of the incidence of child poverty; the same is true for the US CPS and NLSY surveys. To the extent that the income estimates of the NLSCY and/or NLSY may be less reliable, some caution should be exercised in the interpretation of findings about the link between income/poverty and child health at this stage. Perhaps future waves of NLSCY data can improve upon the collection of income information. It is also worth noting that while SCF and CPS data indicate about a 10 percentage point gap in the incidence of child poverty between Canada and the US, this gap essentially disappears if we use NLSCY and NLSY data since the Canadian child outcomes data set produces higher estimates of child poverty than the SCF while the US child outcomes data set produces lower estimates than the CPS.

2. Given a particular data set, alternative common procedures for measuring poverty (e.g., the Canadian LICO versus the US official poverty lines) yield different estimates of the incidence of child poverty.

3. Correlates of child poverty differ somewhat for different data sources (i.e., NLSCY and SCF; NLSY and CPS), sample selections, and poverty lines. Specifically, child age does not have a significant relationship with poverty status using SCF data, controlling for mother's age, but being 8 to 11 years old is associated with a lower probability of being poor using NLSCY data. However, this relationship disappears if we restrict the sample to children whose mothers are aged 29 to 37 years in order to match a key sample restriction of the US NLSY data set. One important message to take from this example is that the NLSY data set is not entirely representative of all US children of a particular age, and results obtained using this data set can be sensitive to this limitation.

4. Finally, however, we find that while poverty is almost always significantly associated with worse outcomes for children regardless of how it is measured for the four outcomes we study here (body mass index, trouble concentrating, hyperactivity, peabody picture vocabulary score). Thus, our conclusions about the link between child poverty status and child outcomes appear to be less sensitive to measurement issues than our conclusions about the extent of poverty. There are, however, exceptions to this generally reassuring conclusion. For example, if we measure poverty with the US official poverty lines (which are very low by comparison with all other alternatives considered), we find no relationship between poverty and body mass index or trouble concentrating for the US; between poverty and hyperactivity for Canada.

Table 1a
1994 Canadian Before Tax Poverty Lines

	Low-Income Cutoffs					1/2 the Median Equivalent Income						
	Size of Area of Residence					OECD		40/30		LIS	US Official Poverty Lines (in Canadian $)	
	Urban Areas				Rural							
persons	500,000+	100,000 - 499,999	30,000 - 99,999	less then 30,000		1 adult	2 adults	1 adult	2 adults		1 child	2 children
1	16,511	14,162	14,063	13,086	11,410	10,037	--	12,992	--	13,262	--	--
2	20,639	17,702	17,579	16,357	14,263	15,056	17,063	16,889	18,188	18,755	12,930	--
3	25,668	22,016	21,863	20,343	17,739	20,074	22,081	20,786	22,086	22,970	15,100	15,114
4	31,071	26,650	26,465	24,626	21,472	25,093	27,100	24,684	25,983	26,523	19,666	19,024
5	34,731	29,791	29,583	27,527	24,003	30,111	32,118	28,581	29,880	29,654	23,673	22,948
6	38,393	32,931	32,702	30,428	26,533	35,130	37,137	32,479	33,778	32,484	26,946	26,390
7	42,054	36,072	35,820	33,329	29,064	40,148	42,155	36,376	37,675	35,087	31,073	30,409

LICOs obtained from Stats. Can 13-207 (base, 1992).

Table 1b
1994 United States Before Tax Poverty Lines

	US Official Lines number of kids <18			OECD		40/30		LIS	1/2 Median Cdn Income OECD Scale (US dollars)	
persons	1	2	3	1 adult	2 adults	1 adult	2 adults		1 adult	2 adults
1	--	--	--	7,895	--	10,106	--	10,286	7,929	--
2	10,215	--	--	11,842	13,421	13,137	14,148	14,546	11,894	13,479
3	11,929	11,940	--	15,789	17,368	16,169	17,179	17,815	15,858	17,444
4	15,536	15,029	15,081	19,736	21,315	19,200	20,211	20,571	19,823	21,408
5	18,702	18,129	17,686	23,684	25,262	22,232	23,243	22,999	23,787	25,373
6	21,287	20,848	20,427	27,631	29,210	25,264	26,274	25,194	27,752	29,337
7	24,548	24,023	23,657	31,578	33,157	28,295	29,306	27,213	31,716	33,302

Source US Official Lines: http://www.census.gov/hhes/poverty/threshld/thresh94.html

**Table 2
Poverty Among Children Aged 0-11 Years
Alternative Poverty Lines and Data Sets
Canada and the United States - 1994**

		Poverty Line = 1/2 the Median Equivalent Income			
Canada	LICO[1]	40:30 Scale	OECD[2] Scale	LIS[3] Scale	US Official Pover

Table 3a Probit Estimate of the Probability of Being Poor. Canadian Children, Aged 0-11 in 1994

	Survey of Consumer Finance				National Longitudinal Survey of Children and Youth			
	LICO[1]	US Offici	OECD[2]	LIS[3]	LICO[1]	US Offici	OECD[2]	LIS[3]

Table 3b
Probit Estimate of the Probability of Being Poor. US Children, Aged 0-11 in 1994

	Current Population Survey					National Longitudinal Survey of Youth-Children			
	US Official	OECD[1]	1/2 Median Cdn OECD Scale (US $)	LIS[2]		US Official	OECD	1/2 Median Cdn OECD Scale (US $)	LIS
				All	Mom aged 29-37				
Dummy =1 if PMK < High School Education	1.463* (0.040)	1.761* (0.039)	1.771* (0.039)	1.684* (0.039)	1.964* (0.065)	1.364* (0.126)	1.411* (0.120)	1.410* (0.120)	1.370* (0.123)
Dummy =1 if Child 7-11 years old	-0.246* (0.038)	-0.200* (0.033)	-0.208* (0.033)	-0.171* (0.034)	0.022 (0.049)	0.227** (0.108)	0.342* (0.093)	0.343* (0.093)	0.389* (0.096)
Dummy = 1 if Lone parent Family	2.368* (0.037)	2.153* (0.035)	2.161* (0.035)	2.296* (0.035)	2.574* (0.054)	2.963* (0.113)	2.811* (0.102)	2.809* (0.102)	3.008* (0.103)
Number of children < 18 years in household	0.465* (0.014)	0.574* (0.014)	0.573* (0.014)	0.401* (0.013)	0.491* (0.020)	0.539* (0.048)	0.676* (0.046)	0.675* (0.046)	0.549* (0.046)
Dummy = 1 if PMK>= 35 years old.	-0.792* (0.039)	-0.871* (0.034)	-0.869* (0.034)	-0.976* (0.035)	-0.511* (0.055)	-0.409* (0.123)	-0.636* (0.106)	-0.633* (0.106)	-0.608* (0.110)
Intercept	-3.470* (0.050)	-2.809* (0.044)	-2.792* (0.044)	-2.509* (0.042)	-3.331* (0.070)	-4.555* (0.177)	-3.958* (0.154)	-3.956* (0.153)	-3.872* (0.155)

*significance

Table 4

Body Mass Index						
ages 0-						
age 11 age 10 age 9 age 8 age 7 age 6 age 5 age 4 age 3 age 2 age 1 age <1					Canada	
(3.4) (3.5) (4.4) (4.1) (4.9) (3.7) (4.0) (3.8) (4.4) (5.9) (5.2) (7.0) (4.9) (3.3	(16.0)	99.3	19.3% 38.2%	6.9% 33.7%	All	
(3.5) (3.8) (4.3) (4.0) (4.9) (3.7) (3.8) (3.6) (4.2) (5.0) (5.2) (6.7) (4.7) (3.0	(16.0)	100.9	18.2% 34.5%	5.9% 32.8%	Poor	Non-
(3.3) (3.4) (4.6) (4.3) (4.8) (3.5) (3.4) (4.3) (4.9) (6.7) (6.2) (7.8) (6.5) (3.8	(15.0)	95.2	23.3% 39.6%	10.5% 36.4%	OECD	Poor
Body Mass Index difficulty						
age 11 age 10 age 9 age 8 age 7 age 6 age 5 age 4 age 3 age 2 age 1 age <1					United States	
(4.0) (4.1) (5.1) (4.9) (5.6) (5.3) (5.4) (5.7) (6.2) (6.1) (6.1) (6.9) (7.6) (5.1	(15.2) (14.5) (13.8) (7.6)	(18.9)	93.9	8.3% 33.5%	7.8% 30.0%	All
(4.0) (4.1) (5.1) (4.9) (5.6) (5.3) (5.4) (5.7) (6.2) (6.1) (6.1) (6.9) (7.6) (5.1	(15.9) (14.1) (16.7)	(18.8)	97.9	6.4% 31.4%	6.7% 29.0%	Poor
(3.8) (5.0) (6.9) (3.7) (6.3) (6.5) (6.4) (7.9) (6.4) (6.2) (5.6) (8.7) (8.8) (5.3	(19.0)	(16.5)	84.1	12.3% 37.6%	11.3% 35.2%	OECD Poor

Note: standard deviatio

Table 5
The Effect of Alternative Measures of Poverty on Child Outcomes

	Trouble Concentrating						Hyperactive					
	OECD	40/30	LIS	LICO	Can. OECD	US Official	OECD	40/30	LIS	LICO	Can. OECD	US Official
Canada All	0.171* (0.026)	0.146* (0.028)	0.117* (0.028)	0.115* (0.027)	--	0.124* (0.032)	0.117* (0.025)	0.112* (0.026)	0.097* (0.027)	0.082* (0.026)	--	0.024 (0.031)
Canada PMK aged 29-37	0.154* (0.035)	0.137* (0.037)	0.133* (0.037)	0.106* (0.037)	--	0.112** (0.045)	0.065** (0.033)	0.073** (0.035)	0.068*** (0.036)	0.045 (0.035)	--	0.020 (0.043)
US	0.110*** (0.063)	0.183* (0.065)	0.167* (0.065)	--	0.109*** (0.063)	-0.010 (0.070)	0.200* (0.062)	0.248* (0.064)	0.232* (0.064)	--	0.202* (0.062)	0.116*** (0.069)
	Peabody Picture Vocabulary Test						Body Mass Index					
	OECD	40/30	LIS	LICO	Can. OECD	US Official	OECD	40/30	LIS	LICO	Can. OECD	US Official
Canada	-3.154* (0.711)	-3.544* (0.758)	-3.509* (0.754)	-4.586* (0.739)	--	-7.036* (0.876)	0.418* (0.095)	0.529* (0.099)	0.511* (0.100)	0.604* (0.098)	--	0.615* (0118)
Canada PMK aged 29-37	-3.448* (0.920)	-3.931* (1.000)	-3.656* (1.002)	-5.569* (0.972)	--	-6.881* (1.202)	0.203 (0.125)	0.307** (0.133)	0.285** (0.134)	0.472* (0.131)	--	0.606* (0.163)
US	-6.327* (2.020)	-6.989* (2.108)	-6.391* (2.097)	--	-6.327* (2.020)	-6.990* (2.361)	1.072* (0.355)	1.135* (0.365)	1.117* (0.367)	--	1.068* (0.355)	0.298 (0.405)

note: standard errors in parentheses
* significant with 99% confidence
** significant with 95% confidence
*** significant with 90% confidence

Table 6
Marginal Effects Concentration Problems and Hyperactivity

	Concentration problems												
		OECD		40/30		LIS		LICO		Can. OECD		US Official	
		base*	poor	base*	poor	base*	poor	base*	poor	base*	poor	base*	poor
Canada	prob. of never	53.4%	46.7%	53.1%	47.3%	52.9%	48.3%	52.9%	48.4%	--	--	52.2%	47.6%
	prob. of often	8.6%	11.6%	8.8%	11.3%	8.9%	10.9%	8.8%	10.8%	--	--	9.0%	11.2%
US	prob. of never	56.3%	51.9%	56.4%	49.1%	56.4%	49.8%	--	--	56.3%	52.0%	not sig.	not sig.
	prob. of often	9.0%	10.9%	9.0%	12.3%	9.0%	12.0%	--	--	9.0%	10.9%	not sig.	not sig.
	Hyperactivity												
		OECD		40/30		LIS		LICO		Can. OECD		US Official	
		base*	poor	base*	poor	base*	poor	base*	poor	base*	poor	base*	poor
Canada	prob. of never	33.4%	29.3%	33.2%	29.3%	33.1%	29.7%	33.1%	30.2%	--	--	not sig.	not sig.
	prob. of often	25.7%	29.7%	25.9%	29.7%	26.0%	29.2%	26.1%	28.9%	-	--	not sig.	not sig.
US	prob. of never	51.2%	43.3%	51.2%	41.3%	51.2%	42.0%	--	--	51.2%	43.2%	50.7%	46.1%
	prob. of often	10.6%	14.7%	10.6%	15.8%	10.6%	15.4%	-	--	10.6%	14.7%	10.9%	13.2%

* The base case is a male child uner the age of eight who lives in a two-parent, non-poor household where the mother has a least a high school education and who is under 35 years of age. There are two kids under the age of eighteen in the house.

Appendix Table A1

Children Aged 0-11

Means for the SCF, NLS[illegible]

	Canada				United States		
	SCF		NLSCY		CPS		NLSY
	All	PMK aged 29-37	All	PMK aged 29-37	All	Mom aged 29-37	
[illegible]	20.3%	17.3%	16.2%	14.3%	18.5%	13.3%	15.5%
[illegible]	41.7%	39.5%	41.7%	38.9%	41.4%	44.1%	43.8%
[illegible]	15.8%	12.7%	15.7%	12.8%	26.7%	22.4%	25.4%
[illegible]	2.31	2.37	2.28	2.33	2.47	2.58	2.47
[illegible]	45.4%	34.1%	46.7%	34.7%	44.6%	31.6%	30.5%
[illegible]	62.5%	61.5%	63.0%	61.1%	--	--	--
[illegible]	17.4%	18.5%	17.8%	18.8%	--	--	--

Note: [illegible] ned the PMK is the

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