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Abstract

This paper uses longitudinal microdata from the Statistics Canada National Longitudinal Survey of Children and Youth (NLSCY) spanning the years 1994 through 2004 to study patterns of family income experienced by a cohort of 7163 Canadian children for most of their childhood. Five principal questions are addressed: 1) What trends in the level of real family income are apparent?; 2) What happens to inequality of income among this group of children as they grow up?; 3) Are the same children always the ones to be 'stuck at the bottom' or, alternatively, 'secure at the top' of the relative income distribution?; 4) What are the characteristics of the children who are most likely to ever or always be in the bottom (or top) of the distribution?; 5) What changes in characteristics are associated with movements up or down the income distribution?

In this paper we use nationally representative longitudinal microdata from the Statistics Canada National Longitudinal Survey of Children (NLSCY) to study family income over a 10-year period for a cohort of children who were aged 0 through 7 in 1994 and thus 10 through 17 in 2004. The NLSCY provides a relatively large sample of children (over 7000 observations) as well as the longest longitudinal panel yet available in Canada.

We ask five main questions about family income. First, what happens to average levels of real income experienced by Canadian children as they grow from pre-schoolers to teenagers over this ten-year span? Is family real income growth the same for relatively affluent and relatively poor children? The first substantive section of the paper calculates levels of real family income in each year for our cohort of children from ages 0 to 7 in 1994 until ages 10 to 17 in 2004. Means are computed over-all and at different points of the income distribution (e.g., for each income decile). While straightforward, these results are novel in a Canadian context, since longitudinal data spanning ten years has not previously been available.

Second, what happens to inequality of family income as this cohort of children grows up? To date, there have been relatively few studies of income inequality for children (the focus has rather been on child poverty), and those studies that have been carried out (e.g., Oxley, 2001; Phipps and Lethbridge, 2006; Smeeding and Rainwater, 2002) have used series of cross-sections rather than longitudinal data. Results from these earlier papers suggest that inequality of income among children in Canada is 'middle of the road' by international standards (e.g., less than in the United States but more than in Norway, for example) and that, while market income inequality increased between 1973

and 1997, post-tax and transfer income inequality experienced by Canadian children remained fairly constant (in contrast with increasing income inequality experienced by children in the United States and United Kingdom, for example).

Although these earlier studies provide useful context for our work, notice that when we use longitudinal data rather than a series of annual cross-sections to study changes in family income inequality over time, we are asking a different question. That is, we are following the same set of children as they get older, rather than a different set of children in each cross section but who are always representative of children in the same age range. Specifically, the second major section of our paper uses the NLSCY to compute standard measures of inequality for each year (e.g., gini coefficient, Theil index, Atkinson index) in order to see whether income inequality increases or decreases for a representative sample of Canadian children over their childhood years. We ask, as well, about the degree of inequality in 'permanent' (i.e., multi-year average) income as compared to annual income.

Third, and perhaps most innovatively, in addition to looking at summary measures to describe the data year by year, we take advantage of the longitudinal nature of the NLSCY to ask how much movement up or down the income distribution takes place? We calculate, for example, the fraction of children who start at the bottom and stay at the bottom of the distribution, the number who move up the distribution as well as how far they go, and the fraction of children who begin in a position of relative advantage and remain so throughout their childhood years. We also estimate 'exposure' to low income (or affluence) over the child-hood years. That is, what percentage of children are 'ever' at the bottom of the relative income distribution?

In the fourth section of the paper, we use multivariate techniques to ask which starting point (1994) characteristics are associated with a higher risk that the child will ever or always be at the bottom (or top) of the income distribution during the 1994 through 2004 period. Finally, we estimate conditional logit models to ask which changes in family characteristics are most likely to be associated with movements of children up or down the income distribution.

The final section of the paper provides a summary and conclusions.

I. Data

The data set employed for this analysis is the National Longitudinal Survey of Children and Youth (NLSCY), a long-term study of Canadian children carried out by Statistics Canada and Human Resources and Social Development Canada (HRSDC). The NLSCY follows the development and well-being of Canadian children from birth to early adulthood; the survey thus has a longitudinal design (and longitudinal survey weights). The target population is the non-institutionalized civilian population, aged 0 to 11 at the time of selection, living in the ten Canadian provinces. All respondents were selected from the Labour Force Survey sampling frame.[1] There are several components to the NLSCY; for this project we use only information obtained from both the 'person most knowledgeable' about the child (the mother in over 90 percent of cases). This component

[1] The Labour Force Survey (LFS) sampling frame is used by Statistics Canada to select respondents for many population-based Canadian surveys. It is a cross-sectional survey carried out each month and used to calculate unemployment rates; participation is mandatory for Canadians. The LFS is representative of the non-institutionalized Canadian population aged 15+ living in the ten Canadian provinces. Excluded from coverage are individuals living on reserves or in Aboriginal settlements, individuals living in institutions or members of the Armed Forces. This excludes only 2 percent of the Canadian population. Households with children aged 0 to 11 were identified from the Labour Force Survey.

of the survey is carried out by a trained Statistics Canada employee, in the respondent's home, using computer-assisted interviewing.

We select children who were present in all years of the panel, with currently available data stretching from 1994 through 2004 (with interviews every two years). We further restrict our sample to children who were 0 through 7 in 1994 and thus 10 through 17 in 2004. This allows us to track a cohort of children from early childhood until they are on the brink of adulthood – that is, across their 'growing up' years.

We exclude children with missing responses to any variables key to our analysis. In particular, we require income and family size for each year – 7,163 children have complete data for these items. The NLSCY measure of family income includes transfer income, but unfortunately does not exclude taxes (direct or indirect). Pmk's are asked "What is your best estimate of your total household income from all sources in the past 12 months, that is the total income from all household members, before taxes and deductions?"

All analyses employ longitudinal sampling weights.[2] Further, since the NLSCY uses a complex survey design, reported standard errors are calculated using bootstrap weights provided by Statistics Canada (we use 1000 replicates).[3]

II. Trends in Levels of Family Income

The first question addressed is how levels of family income change as a cohort of Canadian children grow from pre-schoolers (0 to 7 in 1994) to teenagers (10 to 17 in 2004). What would we expect to find? Real income profiles for children will depend on

[2] We use the NLSCY 'funnel weights' which are appropriate when analysis requires the child to be present in every survey year, as we do.
[3] To preserve confidentiality, Statistics Canada does not provide cluster i.d.s.

family structure (e.g., marital status of parents, number of siblings) as well as labour force participation and age-earnings profiles for (potentially) two parents. Life-cycle models predict that family incomes should on average increase for children if parents finish school, find a good job match, settle into the labour market, and progress along career paths, obtaining higher wages and lower risks of lay-off. As well, as children reach school age, mothers who had stayed home during the pre-school years may return to paid work or increase from part-time to full-time hours.

On the other hand, if new children are born, the same family income will have to be stretched further, reducing standard of living for the original child. If parents divorce or separate, standard of living for the child will almost certainly fall. Some parents will not obtain 'good jobs' but rather may experience on-going periods of unemployment and/or stagnant real wages. Other parents may encounter health problems that limit their capacity to do paid work. Such factors may limit the extent to which average standards of living for a cohort of Canadian children increase as the children grow up.

We thus begin, in Table 1, with some background data on changes in family characteristics for our cohort of children to provide some contextual background for the subsequent discussion of trends in family income levels. Notice, first, that average family size is relatively constant over time, ranging from a low of 4.2 to a high of 4.4 members. On the other hand, the probability that the child lives in a lone-parent family increases steadily from a low of 14.3 percent in 1994 when children are 0 to 7 years of age, to a high of 20.4 percent when they are 10 to 17. More parents participate in paid work as children grow older. For example, only 41.1 percent of lone parents are observed with positive paid hours in 1994 compared with 84.8 percent by 2004; 55.7

percent of two-parent families have two earners in 1994 when the child is 0 to 7 years compared to 83.8 percent by 2004 when the child is 10 to 17. Intensity of parental labour market participation in paid work also increases steadily over the growing up years of the children in our sample. On average, paid work supplied by lone parents increases from 14.1 hours per week in 1994 to 32.8 hours per week in 2004; total hours of paid work supplied by mother and father together in two-parent families increases from 59.1 hours per week in 1994 (mother's hours plus father's hours) to 73.1 hours per week in 2004.

Table 2 reports mean and median levels of family income across the 'growing up years' for our cohort of Canadian children. We first present means for total family income, unadjusted for differences in need for families of different size (all dollar values are expressed in 2004 Canadian dollars). However, since the same dollar income will not purchase an equal standard of living for a larger family as for a smaller family, we next present trends in average 'equivalent income.' Equivalent income adjusts for differences in needs of families of different size by dividing dollar income by an appropriate household equivalence scale. We use the Luxembourg Income Study, or LIS, equivalence scale which is equal to the square root of family size. Thus, for example, a family of four with dollar income of $50,000 has 'equivalent' income equal to $25,000.

Regardless of measure, Table 2 indicates growth in real family income in almost every year[4] as children become older and parents become more settled in the labour market (with some mothers returning to paid work after an initial period of absence and/or increasing paid hours from part-time to full-time). Total family income increases from a mean of $60,528 in 1994 when children are aged 0 through 7 to a mean of $77,945 when children are aged 10 through 17 (i.e., 28.8 percent real growth from 1994

[4] One exception is that total real income falls between 2002 and 2004.

to 2004). Equivalent income increases from a mean of $29,918 in 1994 to $38,276 in 2004 (real growth of only 21.8 percent). Table 2 reports median as well as mean income for each year of the survey. Median equivalent income increases from $26,223 to $33,980 (or, 29.5 percent real growth).

Figure 1 illustrates patterns of growth in real income for children at different places[5] in the income distribution for families with children (see also the data for this figure in Table 2). Recent Canadian research documents increases in income inequality in Canada, driven by growth in incomes at the very top of the income distribution (see, for example, Saez and Veall, 2003 or Osberg, 2007 for a discussion). Are the richest children in our cohort also 'pulling away' from their peers over the 1994 to 2004 period? That is, do we also see relatively higher growth in family income for children located at the top of the family income distribution?[6] Figure 1 does not, in fact, suggest that this is the case. Although there is a large gap between equivalent incomes experienced by children at the top and bottom of the distribution, growth is not particularly higher over the 1994 to 2004 period for families with children in the top decile of the distribution; nor is, for example, the ratio of top decile income to bottom decile income increasing over this period.

[5] We use the NLSCY to identify 'cut points' of the relative income distribution in each year for our cohort of children. Thus, when we refer to children in the bottom decile, etc., we are talking about the poorest ten percent of children from that cohort in that year. We have also conducted all analyses comparing our cohort of children to full Canadian population. Results are qualitatively similar, though, of course, since our cohort of children is 10 years older at the end of the study period, while a cross-section for the Canadian population is not, they have, as a group, moved 'up the Canadian income distribution.'

[6] Although research for the population as a whole emphasizes that inequality growth has been driven by increases in real income for the top 1 percent of the Canadian income distribution, we do not have sufficient sample to analyse what has happened to family income of the richest 1 percent of Canadian children.

III. Trends in Inequality of Family Income

In this section of the paper we ask whether family income inequality increases or decreases for a cohort of children during their growing up years. On the one hand, we might expect increasing aggregate inequality if some parents 'make it' in the labour market, obtaining good jobs with high wage growth and stability of employment while others are left behind in 'dead-end' jobs with low wages and precarious job security. On the other hand, differences in family income may lessen over time as some parents finish their educations and obtain paid jobs, and/or some mothers who stayed at home during pre-school years re-join the paid labour market. Parental divorce/re-marriage patterns will also, of course, be critical. Family income for children whose parents remain continuously married, for example, may increase relative to family income for children whose parents divorce/separate, increasing inequality of income among children (especially if financial stress experienced by lower-income families increases the probability of divorce).

Table 3 presents a set of standard measures of income inequality computed for each year of our panel using real equivalent family income.[7] We focus for the remainder of the paper on real equivalent income as a better measure of the standard of living experienced by the child than total dollar income. Again, to be clear, these inequality measures describe changes in inequality *among* the children in our cohort as they grow up.

The measures of inequality presented are standard ones: the Gini coefficient, coefficient of variation (C.V.), Theil index and Atkinson index (epsilon=2). In addition

[7] We have also computed all measures using total dollar income. Patterns are basically similar.

to providing comparability with other research, we choose these particular measures from the wide array available because they are sensitive to changes in income inequality occurring at different places in the income distribution. The Gini coefficient is particularly sensitive to the middle of the income distribution, the C.V. is sensitive to the top end of the distribution, the Atkinson index (with epsilon =2) to the bottom end. The Theil index has the useful property that it allows the de-composition of over-all inequality into inequality attributable to 'within-group' inequality plus inequality attributable to 'between-group' inequality.

In general, research has suggested that there is less inequality of income among children than exists in the full population (see, for example, Phipps and Lethbridge, 2006). However, since the measure of income available in the NLSCY is a pre-tax measure and the Canadian income tax system is progressive, we find slightly higher values for all measures of inequality than are reported, for example, in the Luxembourg Income Study Key figures for equivalent years. For example, in 2000, the Gini coefficient reported for the full Canadian population using after-tax and transfer equivalent income computed using the same LIS equivalence scale we have chosen here is 0.315 whereas our measure for children using after-transfer but not after-tax income in the same year is 0.339.[8]

However, our key question in this section of the paper is: "what happens to inequality of family income among a cohort of children over their growing up years?" The basic story we take from Table 3 is that there is no clear trend toward either increased or reduced inequality among our cohort of children during their growing up

[8] On the other hand, Phipps and Lethbridge, 2006 report that using after-tax and transfer equivalent income in both cases, the 1997 Gini for all children was 0.276 – less than the Gini for the population of 0.291.

years. The middle-of-the-distribution sensitive Gini index is perhaps most stable across cycles. The bottom-of-the-distribution sensitive Atkinson index suggests a 'u-shaped' pattern, with inequality lowest in the middle years of the period studied. The high-end sensitive C.V. suggests, on the other hand, an 'inverted u' pattern, with inequality highest in the middle years.

Table 3 also presents each of the inequality measures computed using long-run average real equivalent income. That is, equivalent income is averaged across the six cycles for each child, then inequality measures are computed using the 'long-run average,' proxying family 'permanent' income over much of the child's life. Not surprisingly, when year-to-year fluctuations are averaged out, measured inequality appears much lower regardless of inequality index employed.

The Theil index further allows us to break total inequality down into that attributable to 'within group' inequality and 'across group inequality.' In our application, 'within-group' means 'for the same child across 6 cycles' while 'across group inequality' means 'across different children.' Using the de-composability property of the Theil index, we compute that 75 percent of total observed inequality among this cohort of children was due to differences in 'permanent' income.

IV. Moving Up and Down the Income Distribution

In the previous two sections of the paper, we have compared changes in levels of income for children in lower deciles of the distribution with levels of income for those in higher deciles and have measured changes in income inequality among a cohort of Canadian children as they grow up. But, inequality measures computed on a year-by-

year basis are anonymous as to which children are rich and which are poor; they measure only the degree of inequality in a particular year and not whether it is the same group of children who are always rich or always poor. Thus, an important point is that while the children being studied are the same in each year, it has not so far been the case that the children in each decile have remained the same across time. That is, for example, 'bottom decile' children in 2004 could be an entirely different set of children than 'bottom decile' in 1994; the same is true for 'top decile' children. Yet, from the child's (or society's) perspective, it may not be the same thing to have every child experience being at the bottom of the income distribution just once as it would be to have a small set of children who are the ones always stuck in the bottom position. Similarly, it is presumably not the same outcome to have some children always the ones who have the highest standards of living as it would be if every child had some experience of richness.

In this section of the paper, we ask to what extent children who are at the bottom (or top) of the distribution in 2004 are *the same* children as those who were in that position in 1994. That is, for example, are some children 'stuck' at the bottom of the distribution, while others never experience low income? Or, is being at the bottom an experience occasionally shared by many children? At the other end of the income spectrum, are some children always secure in their position at the top of the income distribution or is high income occasionally experienced by a much larger number than cross-sectional data might suggest? In sum, this section of the paper attempts to assess how much movement up and down the income distribution occurs for our cohort of Canadian children.

IVa. Transition Matrices[9]

Table 4 presents a first simple way to look at this issue. In this table, we illustrate beginning (1994) to end of period (2004) movement of children across income quintiles. Quintiles for each year are constructed using the NLSCY. Thus, there are, by definition, always 20 percent of children in each quintile. If all children remained in the same quintile of the income distribution (i.e., if all the children who were in the bottom quintile of the family income distribution in 1994 remained in the bottom decile in 2004, while all children in the 2nd quintile remained in the second decile, etc), then all diagonal entries in Table 4 would be '1' while all off-diagonal entries would be '0.' If, on the other hand, where a child ends up in 2004 is completely unconnected to where he/she starts out in 1994, then all entries in Table 4 would be 0.20.

Considerable 'stickiness of position' is apparent in Table 4. Of children who were in the bottom quintile of the income distribution in 1994, 51 percent were also observed in the bottom quintile in 2004; 25 percent had moved up to the 2nd quintile; only 4 percent had moved to the top quintile. On the other hand, of children whose family equivalent income placed them in the top quintile in 1994, 58 percent were again observed in the top quintile in 2004; 24 percent had dropped to the 4th quintile; only 3 percent were observed in the bottom quintile.

IVb. Lenses

Focussing only on income position at the beginning and end of the study period obviously misses what happens during intervening years. Figure 2 provides a more

[9] The literature on intergenerational transmission of economic status (e.g., Corak, 1998) uses similar techniques.

complete description of the extent to which children 'ever' or 'always' over their growing up years have a family income that place them in any particular part of the relative income distribution for Canadian children. To be clear, we use the terms 'ever' and 'always' as a short-hand way of describing data collected every two years so that we have six observations spanning a 10-year period. (The data used to construct the lenses are reported in Table 5.) The upper portion of the income 'lens' illustrates the percentage of children who have 'ever' (in any year) had a family equivalent income less than the 10th percentile for all children in that year, less than the 20th percentile, less than the 30th percentile, etc.[10] In a sense, the top half of the lens illustrates children's 'exposure' to different income positions. For example, we can see that 26 percent of children 'ever' during the six cycles for which we observe them, had a family equivalent income that would place them in the bottom decile of the distribution; 42 percent were 'ever' in the bottom 20 percent; 54 percent were ever in the bottom 30 percent. Thus, many more children experience low income occasionally than would be suggested by income position in any one year.

The bottom half of the lens, on the other hand, illustrates the percentage of children who have 'always' (in every period) had a family income less than the 10th percentile, less than the 20th percentile, etc. We might thus think of this curve as illustrating the extent to which some children are 'permanently stuck' in any part of the income distribution. In this case, we see that only 1 percent of children were always in the bottom decile, 5 percent were always in the bottom quintile, 10 percent always had family equivalent incomes less than the 30th percentile. From these data we conclude that

[10] We have repeated this analysis using cut-points from the population income distribution. The resulting 'lens' looks very similar. See Appendix 2.

many fewer children are 'stuck' at the bottom of the relative income distribution of their cohort than 'ever' experience that position. Nonetheless, an important minority of children have faced *chronic* economic disadvantage. A better understanding of who these children are and how they might best be helped is thus extremely important for policy formulation.

Figure 2 can also be used to understand the other end of the income distribution -- that is, percentages of children who have 'ever' had family equivalent income higher than the 80th or 90th percentile or percentages of children who have 'always' had family income in these ranges. While we might not be particularly concerned that some children occasionally experience high income, anyone interested in income inequality might be more worried that some children are privileged 'always' to be advantaged relative to their peers. We can see from Figure 2 (or it is perhaps easier to read this from column 4 of Table 5) that 3 percent of children have always had family income in the top decile of the distribution; 7 percent have always been in the top quintile.[11]

V. Probit Models of Characteristics Correlated with Being 'Stuck at the Bottom' or 'Secure at the Top'

In this section of the paper we present simple multivariate regressions designed to help describe the characteristics of the children who are ever/always at the bottom (20 percent) compared to the characteristics of children who are ever/always at the top (20 percent) of the income distribution. We first estimate probit models of the probability that a child has a family equivalent income that is 'ever' in the bottom quintile relative to

[11] The '% ever above' equals 100 – '% always below.' Thus, columns 2 and 3 sum to 100. The '% always above' equals 100 – '% ever below.' Thus, columns 1 and 4 sum to 100.

his/her peers, is 'always' in the bottom quintile, 'ever' has income over the 80th percentile or 'always' has income over the 80th percentile, respectively. We choose to focus on the top and bottom 20 percent to ensure sufficient sample for the 'always above' and 'always below' regressions. Although we use information about the child's full income history (i.e., in order to know if he or she was 'ever' or 'always' in a particular income position), we do not, in this section, use longitudinal estimation techniques (since estimating, for example, fixed effects models, would eliminate characteristics of interest such as visible minority or immigrant status).

We choose to estimate models of 'risks' associated with particular starting point (i.e., 1994) characteristics. Our set of explanatory variables is quite basic, including: region[12] of residence, pmk's[13] education level,[14] pmk's age (mean = 32.7), whether pmk is an immigrant (15.6 percent), non-white (8.9 percent) a lone parent (14.3 percent), did no paid work (42.0 percent), or was a student (8.9 percent). We also include child's age (mean = 3.5) and number of siblings present (mean = 1.2). Means for all explanatory variables are reported in Table 6.[15]

Table 7 reports regression results for these probit models. Notice, first, the strong association between income position and province of residence in 1994. Children from the Atlantic provinces, Quebec, Manitoba/Saskatchewan or BC are more likely than children from Ontario to have 'ever' had family equivalent income in the bottom quintile, with the size of the association largest for children living in the Atlantic region. While

[12] The omitted category is Ontario.
[13] While pmk is in most cases the biological mother, this can change across time if family structure changes or even, occasionally, if the father rather than the mother chooses to answer the survey in a given year. We have chosen to use information about the pmk in 1994.
[14] The omitted category is 'high-school.'
[15] Notice that sample size falls slightly – to 7066 given non-response for some explanatory variables.

children living in Manitoba/Saskatchewan or BC are not significantly more likely to have 'always' been at the bottom of the income distribution, there is a significant negative relationship with living in Quebec and a very large association between the probability of 'always' having income in the bottom quintile and living in Atlantic Canada. If we consider probit estimates of the probability of 'ever' or 'always' being at the top of the income distribution for children, most of these patterns reverse themselves.

Pmk's 1994 level of education also, not surprisingly, has strong associations with the probability that the child will ever be exposed to low income. If the child's pmk had less than a high school level of education in 1994, the child is more likely to have ever been at the bottom of the income distribution; if the child's pmk had a university degree in 1994, he or she is less likely to have ever had income in the bottom quintile and much less likely to have always had income in the bottom quintile. Having a pmk with a university degree in 1994 has very large and positive associations with the probability that the child experiences a 'privileged' standard of living (ever or always). Children whose pmk's attended school while parents are markedly less likely to have always been in the bottom quintile.

Pmk's age in 1994 is negatively related to the probability of ever (but not always) being in the bottom quintile and positively associated with the probability of being in the top quintile. Given pmk's age, children who were older in 1994 (though recall that child's age can only vary between 0 and 7) are less likely to have always been in the bottom quintile, perhaps because participation in paid work is more difficult when children are very young. Child's age is otherwise not statistically significant, given pmk's age.

Having a pmk who is an immigrant is associated with a higher probability that the child will ever (but not always) have been at the bottom of the income distribution. However, children with immigrant pmk's do not differ from children whose parents were born in Canada in the probability that they are ever (or always) at the top of the income distribution. Having a non-white pmk is correlated with a higher probability of always being at the bottom of the income distribution and with a lower probability of ever or always being at the top. If the pmk did not do paid work in 1994, the probability of the child ever (or always) being in the bottom of the distribution is higher; the probability that he or she is ever or always at the top of the distribution is lower.

Finally, marital status of the pmk in 1994 has a very large and highly significant association with the child's position in the income distribution. Indeed, having a pmk who is a lone parent in 1994 is the single most important predictor of whether the child ever or always has family income in the bottom quintile of the distribution. At the other end of the scale, having a pmk who is a lone parent in 1994 is among the largest (negative) correlates of the probability that the child is ever or always privileged to have a 'top twenty percent' income. In fact, having a pmk who was a lone parent in 1994 is again the single largest correlate of the probability that the child will always have been at the bottom of the income distribution. Living in the Atlantic region or being non-white both have larger negative associations with 'ever' having been at the top of the income distribution, but the estimated size of association for lone parent status is similar (though opposite in sign) to that estimated for having a pmk with a university degree.

VI. Conditional Logit Models

As well as knowing which beginning of period (1994) characteristics are associated with a higher risk of ever or always experiencing low relative income across the six cycles of data, we would like to understand which changes in explanatory variables are associated with movements into or out of the bottom quintiles (and, analogously for moving into or out of the top quintile). To this end, we estimate conditional logit models. Estimation of conditional logit models necessarily involves dropping any children who have never moved into or out of the bottom quintile (or, into or out of the top quintile, respectively). Over the six cycles, we have 14,790 movements into or out of the bottom quintile; we have 12,864 movements into or out of the top quintile. Explanatory variables are now also all change variables, so we lose any variables such as visible minority status that do not change and some loss of precision is apparent for variables with limited change (for example, migration into or out of regions with smaller populations).

Conditional logit estimates are reported in Table 8. Region remains an important correlate of position in the relative income distribution. Moving into the Atlantic, Manitoba/Saskatchewan, Quebec or BC is associated with an increase in the probability of moving into the bottom quintile; or, perhaps what is more relevant is that moving out of these provinces, perhaps through a move to oil-rich Alberta, is associated with an increased probability of moving out of the bottom quintile.

In fixed effects estimates that use the log of equivalent family income as the dependent variable (reported in Appendix Table 1),[16] these regional dummies (with the exception of BC) are also strongly statistically significant. For example, moving into the Atlantic is associated with a 27.5 percent reduction in real household equivalent income (and vice versa).

Becoming a lone parent is, by far, the change that most increases the probability of moving into the bottom quintile (or out of the top quintile). If the pmk returns to school, if number of siblings in the family increases, or if the pmk withdraws from paid work or loses her job, the probability of falling into the bottom quintile of the distribution increases. Completing a university education is associated with a lower probability of falling into the bottom quintile. Results are symmetric for moving out of the top quintile and are also consistent with fixed effects estimates for changes in (the log of) family equivalent income (reported in Appendix Table 1).

VII. Conclusion

This paper uses longitudinal microdata from the Statistics Canada National Longitudinal Survey of Children and Youth (NLSCY) to study patterns of family income experienced by a cohort of children who were aged 0 to 7 in 1994 until they are 10 to 17 in 2004. We find, first, that average real levels of annual income have increased for this cohort of children as they have grown from pre-schoolers to teen-agers. While there is considerable inequality of annual income apparent, the level of income inequality has neither increased nor decreased *for this group of children* over the ten year period

[16] We do not emphasize these results since, unlike all other regression results discussed in the paper, standard errors have not been bootstrapped to account for the complex survey design of the NLSCY. We do, however, use longitudinal sampling weights.

studied. If indices of income inequality are computed using a long-run average measure of family income, measured inequality is, not surprisingly, considerably lower. Using the de-composability property of the Theil index, we compute that approximately 75 percent of over-all inequality observed among this cohort of children can be attributed to 'permanent' inequality (as compared to year-to-year variation experienced by a given child).

Using the longitudinal data to track children's movements up and down the income distribution, an important point for policy is that we find considerable 'stickiness' of position. For example, about half of the children who were in the bottom quintile of the group's income distribution in 1994 were again observed in the bottom quintile in 2004; only 4 percent of these children had moved up to the top quintile by 1994. At the same time, if we ask how many children have ever been exposed to a position of low income, it is also policy relevant that we find much higher rates than cross-sectional data might suggest. For example, 26 percent of children in our cohort 'ever' (in one of six cycles of data) had a family income that would place them in the lowest ten percent for their cohort.

From the perspective of policy, it also seems important to know which children are particularly likely to be 'stuck' throughout childhood at the bottom of the income distribution. Indeed, experiencing low income year after year has been described as an important aspect of 'social exclusion' (see, for example, Atkinson, 1998); moreover, longer-term measures of family income have been found to have stronger relationships with non-monetary aspects of child well-being such as health and happiness (see Burton and Phipps, 2008; or Phipps, 2003 for a survey). Multivariate analyses suggest that the

key correlates of the probability of *always* being in the bottom quintile of the relative income distribution include, in order of size of association, living in a lone-parent family, having a parent without paid work, living in one of the Atlantic provinces, or having a parent who is non-white. The most important *changes* associated with movements up or down the income distribution include, again in order of size of association, divorce/re-marriage of parents, regional migration, changes in employment status of parents, having a parent return to or complete school, changes in the number of siblings present.

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Table 1. Changing Family Characteristics for a Cohort of Canadian Children. 1994-2004.

	1994	1996	1998	2000	2002	2004
Child Age Range	0-7	2-9	4-11	6-13	8-15	10-17
Percent Lone Parent	14.3	15.5	14.9	16.8	19.0	20.4
Mean Household Size	4.2	4.3	4.4	4.4	4.3	4.2
Percent Two-earner, for Two-Parent Families	55.7	71.4	76.2	79.8	79.6	83.8
Mean Weekly Paid Hours in Two-Parent Families (Mother + Father hours)	59.1	65.4	68.5	70.1	70.9	73.1
Percent Lone Parents with Paid Work	41.1	66.5	75.4	81.7	84.2	84.8
Mean Paid Hours in Lone Parent Families	14.1	23.3	26.3	30.7	32.1	32.8
Percent with ‘High’ Parental Paid Hours	18.3	22.4	27.4	31.9	32.9	36.5

Table 2: Levels of Real Family Income for a Cohort of Canadian Children, 1994-2004.[1]

	1994	1996	1998	2000	2002	2004
Child Age Range	0-7	2-9	4-11	6-13	8-15	10-17
Mean Dollar Income	60,528	62,725	71,085	77,549	78,165	77,945
Median Dollar Income	54,971	52,946	62,119	66,163	68,949	68,560
Mean Equivalent Income	29,918	30,706	34,373	37,403	38,082	38,276
Median Equivalent Income	26,223	26,309	29,603	31,713	33,490	33,980
Equivalent Income by Decile						
1	7,774	7,892	9,378	10,740	10,012	9,961
2	11,929	12,317	15,120	16,580	16,801	16,977
3	16,445	17,083	19,401	20,818	21,722	22,392
4	20,586	20,500	23,795	25,028	26,411	27,144
5	24,326	24,444	27,710	29,485	31,119	31,598
6	28,808	28,331	31,925	33,699	35,954	36,001
7	33,261	33,274	36,679	38,387	41,045	40,993
8	38,732	38,790	42,628	44,497	47,796	47,256
9	47,049	47,720	50,952	54,872	57,293	57,746
10	73,258	78,745	86,611	100,362	93,113	93,491
Number of Observations = 7163						

[1]Incomes are expressed in real 2004 dollars.

Table 3: Inequality of Equivalent Family Income for a Cohort of Canadian Children, 1994-2004.

	1994	1996	1998	2000	2002	2004	Long-run Average Income
Coefficient of variation	0.679	0.788	0.753	0.801	0.716	0.701	0.622
Gini coefficient	0.334	0.345	0.328	0.339	0.325	0.321	0.293
Atkinson (eps =2)	0.335	0.340	0.317	0.314	0.326	0.328	0.247
Generalized Entropy (alpha=0)	0.195	0.207	0.188	0.196	0.188	0.186	0.144
Theil	0.188	0.214	0.196	0.214	0.189	0.186	0.150
Number of Observations	7,163						

Table 4: Beginning to End of Period Quintile Movements.

	Bottom Quintile 2004	2nd Quintile 2004	3rd Quintile 2004	4th Quintile 2004	Top Quintile 2004
Bottom Quintile 1994	0.51	0.25	0.14	0.06	0.04
2nd Quintile 1994	0.26	0.28	0.25	0.14	0.07
3rd Quintile 1994	0.12	0.25	0.30	0.23	0.10
4th Quintile 1994	0.07	0.14	0.22	0.34	0.24
Top Quintile 1994	0.03	0.08	0.08	0.24	0.58

Table 5: Children 'Ever Exposed to' and 'Chronically Stuck in' Different Relative Income Positions. 1994-2004.

	% Ever Below 'Exposed'	% Always Below 'Chronically Stuck'	%Ever Above[1] 'Exposed'	%Always Above[2] 'Securely Privileged'
Income Decile				
1	26.1	1.3	98.7	73.9
2	42.2	4.7	95.4	57.8
3	54.3	9.9	90.1	45.7
4	65.1	16.6	83.4	34.9
5	73.9	24.2	75.8	26.1
6	81.9	34.8	65.2	18.1
7	87.8	46.5	53.5	12.2
8	92.9	60.9	39.1	7.1
9	97.0	78.2	21.8	3.0
10	100	100.	0	0

[1] The '% ever above' equals 100 – '% always below.' Thus, columns 2 and 3 sum to 100.

[2] The '% always above' equals 100 – '% ever below.' Thus, columns 1 and 4 sum to 100.

Table 6: Means for Explanatory Variables.

Province in 1994[1]	
Atlantic%	7.7
Quebec %	24.1
Ontario%	38.5
Manitoba/Saskatchewan %	7.4
Alberta %	10.0
British Columbia %	12.3
Pmk Education in 1994	
Less than High School %	15.3
High School	18.8
Some Post-Secondary %	28.8
University %	37.1
Pmk Age in 1994	32.7
Pmk Non-white %	8.9
Pmk Immigrant %	15.6
Lone parent in 1994 %	14.3
Pmk a student in 1994 %	8.9
Pmk No Paid Work in 1994 %	42.0
Child age in 1994	3.5
Number of siblings in 1994 %	1.2
Number of Observations	7066

Table 7. Probit Estimates of the Correlates of 'Ever' or 'Always' Being at the Bottom or Top of the Child Relative Income Distribution.

	'Ever' Bottom Quintile	'Always' Bottom Quintile	'Ever' Top Quintile	'Always' Top Quintile
Region[1]				
Atlantic	0.377*** (0.081)	0.766*** (0.156)	-0.655*** (0.076)	-0.657*** (0.140)
Quebec	0.201** (0.089)	0.374** (0.180)	-0.429*** (0.090)	-0.315** (0.150)
Manitoba/Saskatchewan	0.284*** (0.092)	0.084 (0.229)	-0.261*** (0.083)	-0.459** (0.179)
Alberta	0.054 (0.115)	-0.038 (0.291)	-0.085 (0.101)	-0.018 (0.191)
BC	0.244** (0.101)	0.165 (0.232)	-0.159 (0.110)	-0.592*** (0.169)
Pmk Education				
Less than High School	0.681*** (0.111)	0.253 (0.198)	-0.183 (0.116)	-0.532 (0.336)
Some Post-Secondary	-0.191** (0.089)	-0.204 (0.193)	0.146 (0.090)	0.237 (0.212)
University	-0.293*** (0.092)	-0.411* (0.236)	0.596*** (0.087)	0.786*** (0.205)
Pmk Age	-0.293*** (0.092)	-0.002 (0.012)	0.040*** (0.006)	0.061*** (0.010)
Child age	-0.017 (0.013)	-0.047** (0.020)	-0.000 (0.014)	-0.002 (0.020)
Pmk non-white	0.168 (0.182)	0.574* (0.294)	-0.733*** (0.177)	-0.634* (0.343)
Pmk Immigrant	0.460*** (0.123)	0.315 (0.264)	0.010 (0.129)	-0.183 (0.242)
Lone mother	1.300*** (0.100)	1.051*** (0.133)	-0.593*** (0.109)	-0.870*** (0.324)
Pmk student	-0.063 (0.120)	-0.630*** (0.243)	0.199 (0.129)	-0.046 (0.188)
Number of siblings	0.147*** (0.034)	0.164** (0.067)	-0.259*** (0.034)	-0.172*** (0.058)
Pmk no paid hours	0.651*** (0.067)	0.922*** (0.157)	-0.466*** (0.066)	-0.865*** (0.140)
Constant	-0.111 (0.204)	-2.831*** (0.469)	-1.053*** (0.199)	-3.295*** (0.395)
Number of Obs.	7066			

[1] All explanatory variables are set to 1994 values.

*** indicates statistically significant at the 1 percent level; ** indicates statistically significant at the 5 percent level; * indicates statistically significant at the 10 percent level

Table 8. Conditional Logit Estimates of the Correlates of Moving into the Bottom or Top of the Child Relative Income Distribution.

	Bottom Quintile	Top Quintile
Region		
Atlantic	1.413* (0.802)	-1.611 (1.303)
Quebec	0.187 (13.650)	-3.009 (8.210)
Manitoba/Saskatchewan	2.369*** (0.855)	-0.455 (1.014)
Alberta	0.928 (0.843)	0.596 (1.076)
BC	1.671* (0.858)	0.097 (1.085)
Pmk Education		
Less than High School	0.047 (0.238)	0.072 (0.289)
Some Post-Secondary	-0.113 (0.173)	0.292 (0.192)
University	-0.377** (0.187)	0.632*** (0.186)
Lone parent	2.834*** (0.145)	-2.949*** (0.319)
Pmk student	0.446** (0.177)	-0.342** (0.170)
Number of siblings	0.266*** (0.079)	-0.612*** (0.084)
Pmk no paid hours	0.932*** (0.141)	-1.094*** (0.220)
Cycle 2	0.302** (0.151)	0.022 (0.129)
Cycle 3	0.306* (0.167)	0.114 (0.132)
Cycle 4	0.309** (0.147)	0.185 (0.133)
Cycle 5	0.249* (0.151)	0.032 (0.137)
Cycle 6	0.330** (0.145)	0.006 (0.131)
Number of obs.	14790	12864

*** indicates statistically significant at the 1 percent level; ** indicates statistically significant at the 5 percent level; * indicates statistically significant at the 10 percent level

Figure 1. Changes in Real Equivalent Income for a Cohort of Canadian Children. 1994-2004.

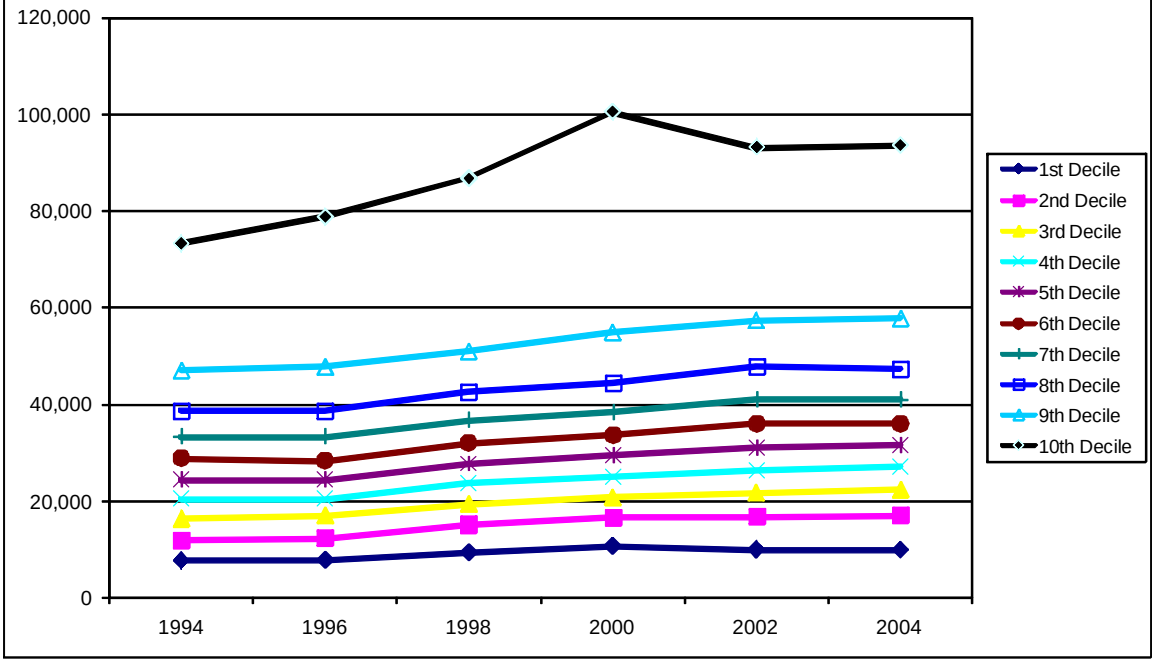
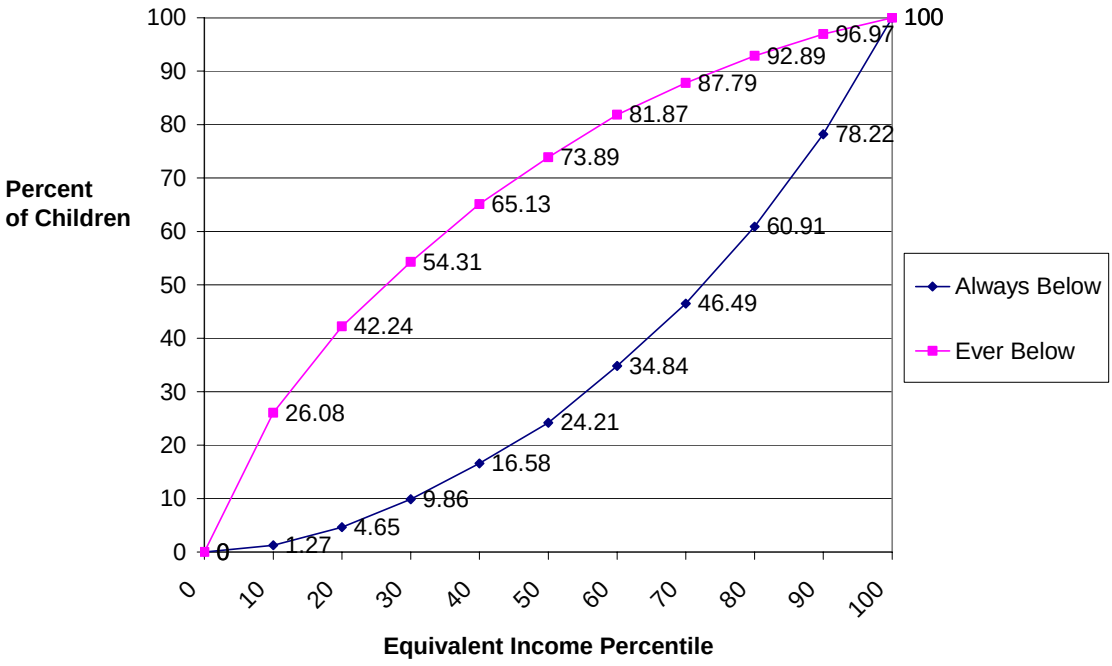


Figure 2. Relative Income "Lens"



Appendix Table 1. Fixed Effects Estimates of the Correlates of Equivalent Household Income.[1]

	Log of Equivalent Household Income
Region	
Atlantic	-0.275*** (0.047)
Quebec	-0.145 (0.111)
Manitoba/Saskatchewan	-0.258*** (0.054)
Alberta	-0.122** (0.059)
BC	-0.085 (0.059)
Pmk Education	
Less than High School	-0.024 (0.023)
Some Post-Secondary	0.015 (0.015)
University	0.063*** (0.014)
Lone parent	-0.502*** (0.018)
Pmk student	-0.091*** (0.014)
Number of siblings	-0.057*** (0.007)
Pmk no paid hours	-0.165*** (0.011)
Cycle 2	-0.003 (0.010)
Cycle 3	0.123*** (0.009)
Cycle 4	0.200*** (0.009)
Cycle 5	0.225*** (0.011)
Cycle 6	0.223*** (0.010)
Constant	10.407*** (0.038)
Number of obs.	40530

[1]Standard errors for this fixed effect regression have not been bootstrapped to account for survey design.

*** indicates statistically significant at the 1 percent level; ** indicates statistically significant at the 5 percent level; * indicates statistically significant at the 10 percent level