An Exploration of Intergenerational Income Mobility Using the Longitudinal and International Study of Adults for Canada

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Abstract

The Longitudinal and International Study of Adults (LISA) is a Canadian longitudinal household survey program started in 2012, which comprises about 24,000 individuals linked to a substantial set of administrative data, mostly from the Canadian personal tax system. This is the first study to investigate the potential of a set of administrative data consisting of tax information about the parents of LISA respondents, which has recently been added to the LISA. This new information can be combined with survey information already gathered on family background as well as respondent characteristics, to paint a detailed portrait of origin and subsequent life events for LISA respondents. This allows us to describe intergenerational transmission of income in ways that previous Canadian data has not permitted.

The study uses transition matrices and regression models to describe the factors underlying intergenerational transmission of income. First, we are able to replicate estimates obtained in existing studies, despite our much smaller sample size. Second, we consider factors associated with the intergenerational transmission of income. For the 1963-1981 birth cohort, our findings highlight the importance of parental income even after accounting for other family background characteristics. Educational attainment accounts for a large portion of the correlation between parent and child income. In addition, we find that there is virtually no association between parent and child income among union members in our sample.

Résumé

L'Enquête longitudinale et internationale des adultes (ELIA) est une enquête canadienne longitudinale auprès des ménages débutant en 2012. L'enquête comprend environ 24,000 individus couplés à un nombre important de bases de données administratives, tirées principalement de données fiscales individuelles canadiennes. La présente étude est la première à s'intéresser au potentiel offert par de nouvelles données administratives incluant données fiscales des parents des répondants de l'ELIA. Cette nouvelle information peut être combinée avec les données de l'enquête sur le contexte familial et les caractéristiques des répondants afin de peindre un portrait détaillé des origines et du parcours de vie des répondants. Cela nous permet de décrire la transmission intergénérationnelle du revenu d'une nouvelle manière par rapport aux données canadienne existantes.

Cette étude utilise des matrices de transitions et des modèles de régression pour décrire les facteurs qui sous-tendent la transmission intergénérationnelle du revenu. Premièrement, nous reproduisons avec succès les estimés obtenus par les études existantes, malgré la petite taille de notre échantillon. Deuxièmement, nous nous intéressons aux facteurs associés à la transmission intergénérationnelle du revenu pour les cohortes nées entre 1963 et 1981. Nos résultats mettent en lumière l'importance du revenu parental, même lorsque nos modèles incluent d'autres variables sur le contexte familial des répondants. Le niveau d'éducation capture une large part de la corrélation entre le revenu des parents et celui des enfants. Par ailleurs, nous montrons que l'association entre le revenu des parents et celui de leurs enfants est essentiellement nulle chez les enfants qui occupent un emploi syndiqué une fois ayant atteint l'âge adulte.

Introduction

There is an abundant and growing literature informing the effect of pre-natal, early childhood and school-age conditions and outcomes on later-life outcomes; in particular on labour market outcomes, which are a central determinant of economic well-being in adulthood. Parental characteristics and parental outcomes constitute the most important of such conditions. In most families, parents are the main caregivers and providers for children and, as children grow, parental resources, financial and otherwise, determine the opportunities afforded to children.

More broadly, the correlation between parents' and children's outcomes, in particular their labour market outcomes, constitutes an "interesting characterization of society" (Corak and Piraino, 2011). As such, it has been the focus of a lot of work, of which a great deal has sought to establish the correlation between parental and children's permanent incomes (Solon, 1992; Zimmerman, 1992; Corak & Heisz, 1999; Corak 2017; Chetty et al., 2014a, 2014b; Mitnik et al., 2014); that is, between the economic well-being or social status of parents and that of their children.

With the advent of increasingly rich data sets, research has been moving from the measurement of income correlations to the investigation of the mechanisms that underlie these relationships. However, this work is still in its infancy in Canada, mostly because of data limitations. In particular, much of the existing work has relied either on survey data, typically characterized by small numbers of parent-child pairs (eg. Fortin and Lefebvre, 1998), or on administrative data (eg. Corak and Heisz, 1999; Chen et al., 2017). The latter lack important covariates that might allow to capture the pathways or mediators of the intergenerational transmission of income: skills, education, health, employment, and job characteristics.

In this context, our contribution is three-fold. First, we demonstrate that a new Canadian data set, the Longitudinal Survey of Adults (LISA) can be used to study intergenerational mobility. Despite using a smaller sample than studies based on purely administrative data, we are able to reproduce existing estimates of mobility along the income distribution. Second, we investigate the role of education in intergenerational income mobility. Although we cannot distinguish selection from causation, we find that factors associated with both parental income and education account for almost half of relative mobility. Finally, we exploit survey variables to explore factors that may be associated with the relationship between parent and child income, net of the education effect. In particular, we focus on job characteristics, and find that only literacy and communication skills use appear to account for some of the association between parental and child income, either directly or through education.

Education, skills, and networks as pathways for the intergenerational transmission of income

Existing work on the intergenerational transmission of (dis)advantage has found Canada to be fairly mobile, standing somewhere between the very mobile Scandinavian countries and the United States. The correlation between fathers' and sons' earnings in Canada is approximately half as high as in the United States, but 30% higher than in Finland, Norway or Denmark (Corak, 2013).[1] Apart from the role of wealth

[1] Recent work by Corak (2017) has also found important within-Canada regional variation in intergenerational mobility, with higher mobility areas being typically characterized by lower poverty and income inequality, and a greater proportion of immigrants. Connolly, Haeck and Lapierre (2018) compare cohorts born between 1963 and 1985, and estimate that mobility has decreased over the period in Canada.

and inheritance, children born to high- (low-) income parents themselves have high (low) income in adulthood if being born in a high-income family is associated with the development of characteristics that are rewarded on the labour market; for instance, abilities, human capital, social networks, and health. As such, the effect of parental income on children's income results from the cumulative and complementary interactions of pre- and post-natal environments (Björklund et al., 2006; Corak, 2013; Cunha et al., 2006). This paper seeks to provide a better understanding of the association between parents' and children's incomes, focusing on the contribution of children's education to this relationship.

Parental income impacts child education directly as well as indirectly: higher-income parents may have more opportunities to invest in their children's education; and may possess characteristics that contribute to higher educational attainment. In turn, these same investments and characteristics can affect income through education, or by helping children develop skills, attitudes and habits that contribute directly to employment. Our analysis takes this into account. First, we document the contribution of children's education to the estimated effect of parental income rank on child income rank. Second, we take advantage of the LISA survey's detailed variables on job characteristics to investigate the extent to which selection into or access to different types of work is correlated with the effect of education on intergenerational income mobility.

Our paper is closest to Bowles and Gintis (2002) and Blanden et al. (2007) who document the role of different factors in the intergenerational transmission of income (eg. education, cognitive and non-cognitive skills, etc.). Bowles and Gintis (2002) find that a little under half of the relationship cannot be explained by the combination of education and cognitive skills. Similarly, Blanden et al. (2007) find that 54% of the association between parental and child income in a cohort of British children born in 1970 is accounted for by education, cognitive and non-cognitive skills, and labour market experience. This leaves about half of the association unexplained. Note that the results showed education to be the most important variable, although the study found a sizeable but indirect contribution of cognitive and non-cognitive skills. Our work distinguishes itself from these papers as it discusses the role of education in the context of the employment that respondents later secure. It is also an important contribution to an otherwise sparse literature on the role of education in the intergenerational transmission of income in Canada. Aydemir et al. (2013) compared the intergenerational transmission of education in families with foreign- and Canadian-born parents, and found it to be substantially larger in the latter.

Parental investment in children skills

Becker and Tomes (1979, 1986) provide an early theorization of the impact of parental investment in human capital development on the intergenerational transmission of income. In the presence of credit constraints, lower-income parents are less likely to be able to invest in their children's skills. The literature indeed finds gaps between low-income and high-income families in their level of parental expenditures in child education (Kaushal et al., 2011; Kornrich and Furstenberg, 2013; Schneider et al., 2018). These include financial resources to cover school costs, including tertiary education; "shadow curriculum" activities, such as test preps (Bray, 1999); and other resources, like books and computers (Duncan and Murnane, 2011; see also Corak, 2013). Higher income and more educated parents are also likely to spend more time with their children (Ramey and Ramey, 2010; Schneider et al., 2018).

Furthermore, there is evidence that differences in parental investments do lead to disparities in children's skills and abilities, starting early on. Several studies highlight the relationship between family income early in one's life course and educational attainment (Bailey & Dynarski, 2011; Belley & Lochner, 2007) as well as cognitive and non-cognitive skills (Cunha & Heckman, 2007; Knudsen et al., 2006; Waldfogel & Washbrook, 2011). Disadvantage manifests itself as a result of family environment early in one's life course. In turn, early cognitive and non-cognitive skill development matters for later skill acquisition and educational success (Cunha et al., 2006). The importance of the timing of investment opportunities is reflected in the limited impact of credit constraints when they are faced during children's teenage years (eg. Carneiro and Heckman, 2002).

Education has therefore been identified by economists as an important pathway for the intergenerational transmission of income, as well as the skill development life phase in early childhood that precedes it (for a review, see Corak, 2013). Social stratification scholars in sociology have likewise focused on the association between parental socioeconomic status and a child's educational attainment, emphasizing the importance of educational attainment in the transmission of socioeconomic status from parents to children (Blau & Duncan, 1967; Bourdieu and Passeron 1964; Wanner & Hayes, 1996).[2]

As mentioned before, the effect of parents on their children's education may also operate through the parents' own human capital. A large literature has investigated the intergenerational transmission of education, with an increasing focus on producing causal estimates (see Black and Devereux (2011) for a review). Results vary with the identification strategy, and have generally been found smaller than non-causal estimates. However, the literature broadly finds that parental education is important among post-natal environment factors (eg. Björklund et al. (2006) and Holmlund et al. (2011) in Scandinavia; De Haan (2011) and Oreopoulos et al. (2006) in the United States); that its effect is lasting (Dickson et al., 2016); and that mother's and father's education don't necessarily have the same effect (Black et al., 2005; Björklund et al., 2006). Although they could not identify causation, Aydemir et al. (2013) find positive correlation between parents and children's education among Canadians, especially among those whose parents were also born in Canada. Other forms of human capital transmission have also been studied; for instance, Currie and Moretti (2003, 2007) have found a positive impact of mothers' education and health on their children's health.

Beyond education and skills

As suggested by Blanden et al. (2007), there are factors other than education, skills, and attitudes that account for part of the intergenerational transmission of income, such as social network effects. Sons born from higher income fathers are more likely to be employed at the same firm where their father was employed (Corak & Piraino, 2011; Lindquist et al., 2015; Kramarz and Nordström Skans, 2014). In addition, studies of hiring for "elite" positions in investment banking, management consulting and law show a desire to consider individuals with certain cultural, status, and network markers. These signal an upper

[2] Research in sociology predominantly relies on class-based measures of status attainment (see Erikson & Goldthorpe 1992). Occupation prestige scales ranking occupations based on their average wage level and educational attainment of incumbents are also common (Blau & Duncan, 1967). The use of these measures is often justified by the fact that they provide permanent measures of socioeconomic status that vary little over one's life course after a certain age.

middle-class background as being a "better fit" (Rivera, 2015), in addition to selection on credentials and skills. This suggests that children born from higher income families are more likely to be employed, and especially, they are more likely to be employed in good jobs.

This paper therefore makes use of a set of measures of job characteristics, including the skill intensity of one's job, to see if the association between parental and child income unaccounted for by educational attainment is likely to be mediated by a child's employment status; and, for those employed, by their job skill level and other job characteristics (unionization and permanent contract).

Data

Our paper uses the Longitudinal and International Study of Adults (LISA), which is constituted of three sets of files: first, the longitudinal survey itself; second, the administrative records of survey respondents; and third, the administrative records of survey respondents' family members, thereafter the family files. Data for the longitudinal survey was first collected from November 2011 to June 2012 (Wave 1), then from January 2014 to June 2014 (Wave 2). The LISA sample was designed to be representative of the population of the Canadian provinces at the time of the first wave, in 2012; it is not limited to the working age population, and children of original sample members are added to future waves of the survey as they turn 15 years old. 32,100 people were surveyed in Wave 1, 25,500 of which continued on to Wave 2. Each wave of the longitudinal survey incorporates core subjects, as well as feature modules which change from one wave to the next, including questions on education and training, family background and life events, marital and fertility histories, and cognitive (PIAAC) and non-cognitive skills. Furthermore, for both respondents and their family members, administrative records include T1 Family Files (T1FF), from 1982 to 2013, T4 files and Pension Plans in Canada (PPIC) files, from 2000 to 2013, and the Immigrant Longitudinal Database (IMDB), which started collecting data on immigrants in 1980.

Parent-child pairs

The family files include data for past and current family members; that is, for spouses and common-law partners, parents, children, and siblings. The present paper focuses on the pairs formed by LISA respondents and their parents. In other words, survey respondents correspond to the children in the intergenerational relationships. Both the linkages between and the income information for respondents and family members are drawn from the T1 Family Files (T1FF). The T1FFs are created by Statistics Canada from the personal income tax files received from the Canada Revenue Agency, or T1s. These are processed to identify individuals who belonged to a same family in a given year, producing the T1 Family Files. T1FF processing creates a Family Identification Number (FIN), which groups together the SINs of family members, and a small number of T1FF processing variables which identify the nature of the relationship of family members to each other. The concept of family used is close to the Census family, with the exception that family members must necessarily have a fiscal relationship. This includes partners, married or common-law, and dependents, such as children for whom parents claim the Child Tax Benefit.

In this context, LISA respondents are successfully linked with a parent only if the following two conditions are met. First, both the parent and their child filed a T1 in the same fiscal year, in at least one year between 1982 and 2013. Second, the parent and their child resided at the same address (as reported in the T1 file)

on a year they both filed a T1. Children may be linked to more than one parents. Parents in two child-parent pairs first observed on the same year form a couple (married or common-law), and are both identified as parents (for two child-parent pairs to be observed on the same year, both parents must reside at the same address). When only one parent is observed on the year the first child-parent pair is observed, we consider this parent to be a single parent. We assume that the first observed child-parent pair or pairs are the "real" parents of the children in our sample. Consistent with previous research, any parent subsequently paired with a child are discarded.

The bars in Figure 1 show the percentage of first observed child-parent pairs that were observed for the first time at different age (when two pairs are observed on the same year, they are counted as one) for the 1963-1981 birth cohorts (this cohort choice is further discussed below). The line shows the share of all first observed child-parent pairs observed at each age, regardless of whether they have been previously observed or not (a first observed parent might have been observed for the first time at 15 years old, and then again at each age between 16 and 22). The first child-parent pair is observed between the ages of 15 and 21 for the majority of LISA respondents. This means that in cases of divorces or separations, the first observed parents might not correspond to the biological parents of children, or the parents or guardians that children have spent most of their time with until 15 years old. These decisions and assumptions also have implications for the way in which the sample of respondents used for the analysis is selected. Indeed, inclusion in the sample depends on the tax filing behaviour of parents and their children, and on whether or not they were still cohabitating at the time the child started working. This is further discussed below.

Linkage rate

The linkage design has implications for the share of respondents that we are able to link with their parents. In the LISA, respondents must both consent to the administrative linkage and be successfully found in tax records to be associated with their T1FF data. When given the opportunity to object to the administrative linkage, very few Wave 2 respondents did. In turn, approximately 95% of those who consented were successfully linked to the T1FF for at least one year. The linkage rate for LISA respondents is carefully described in Hemeon (2016). Among LISA respondents linked to the T1FF, the percentage of LISA respondents linked to the T1FF record of at least one parent is around 60% for the 1963-1981 birth years. However, our sample includes several immigrants who arrived in Canada as adults, often without their own parents. Because it is unlikely that a parent-child linkage can be established for them, the linked sample is not representative of that segment of the immigrant population. Furthermore, their parents are likely to be observed for insufficiently many years, making it impossible to build the measure of parental income used for Canadian-born respondents and immigrants who arrived as children. Figure 2 illustrates how the linkage rate to the T1FF and the linkage rate to parents in the T1FF change across birth years. For most cohorts, the linkage rate is between 60% and 70%. Since most parent-child linkage occur between 15 and 21 years old, we calculate a linkage rate for a sample restricted to Canadian-born respondents and foreign-born respondents who arrived in Canada before 16 years old. Linkage rates for this subsample are presented in Figure 3. Figures 3.1 and 3.2 present the results separately for men and women. In this case, the proportion of respondents linked to a T1FF record and for which we could find at least one child-parent link is higher, at around 80% except for older cohorts, with a slightly higher rate for men, especially in the older birth cohorts. We use that restricted sample for the multivariate analysis in the results section of the paper.

Selection

Corak and Heisz (1999), Oreopoulos (2003) and Oreopoulos et al. (2008) have all looked at the potential under-representation of children from low-income families when using administrative records similar to ours for the study of intergenerational mobility. With the data at their disposal, they found no evidence of sample selection bias. Likewise, we find no difference that would suggest a selection bias when comparing the total pre-tax income distribution of parents in our dataset and the one obtained from a sample of parents of children born between 1963 and 1981 drawn from the Longitudinal Administrative Database (LAD). The LAD is a 20% sample of all Canadian tax filers. It includes imputed children that were not tax filers, but whose presence can be inferred from T1 data. It therefore allows to assess the impact of restricting our sample only to children that were tax filers while living with their parents.

In another paper (Simard-Duplain and St-Denis, n.d.), we further explore the sample selection that results from reliance on tax records. Unlike most previous analyses of selection, LISA data allows us to consider a broad range of variables beyond income. We find that people for whom we established a parental link are 10 percentage points more likely to be men. This is unsurprising given that finding a parent is a function of personal income tax filing, and thus of labour market participation. Consistent with this, respondents with a parent-child link are almost nine percentage points more likely to be employed in Wave 2 (87% compared to 79%). They are also 15 percentage points more likely to live in a single-detached home, which we consider a proxy for wealth and for stability in place of residence. In addition, there are economically large differences in family living arrangements at birth: only 3% of those with a parental linkage didn't live with both parents, compared to 5% of those for whom such a link could not be established. The former are also 10 percentage points more likely to have lived with both parents at age 15. Finally, respondents with parental linkages reported better-educated mothers and fathers. For instance, mothers were 13 percentage points less likely to have obtained less than a high school degree, and fathers were seven percentage points more likely to have obtained some post-secondary education.

Furthermore, we find some regional differences in the success of parental-child linkages, mostly consistent with known tax filing patterns. Respondents with parent-child links are eight percentage points more likely to live in rural areas. Oreopoulos (2003) observes a similar result when comparing the IID to the LAD, and attributes this to the greater presence of immigrants in urban centres. Indeed, respondents who have a parent-child link are more than twice as likely to be born in Canada themselves, or to report their mother or father as Canadian-born.[3] Relatedly, only 11% of respondents who have a parent-child link self-identify as members of visible minority groups, against 48% among respondents without a parental link.

In general, the relationship between successful linkage to a parent and characteristics associated with tax filing behaviour should be kept in mind throughout in interpreting the results of the paper; especially for women, respondents who grew up in different family structures, and the children of less-educated parents. Furthermore, the large difference in the representation of first- and second-generation

[3] Note that for us to observe parent-child links for respondents whose parents were not born in Canada, the parents must have immigrated either before they had children or while their children were relatively young; that is, we can document the intergenerational experience of first-generation immigrants if they came with their parents at a relatively early age.

immigrants in the sample with parental links raises particular concern with respect to our ability to speak to the experience of that group.

Choice of cohorts

As mentioned before, we restrict our analysis to respondents born between 1963 and 1981. The lower and upper bounds on birth years are determined based on the timing of parent-child links. The T1FF data is available from 1982 to 2013. As shown in Figure 1, the modal age at which a first observed parent is observed for the first time is 18 years old. The greatest number of first observed parents are observed when children are 19 years old.

The lower bound in birth years, 1963, is chosen so that respondents are 19 years old in 1982. Next, 1982 is chosen as the upper bound on birth years so that the youngest respondents in our sample are 31 years old in 2013, the last year for which tax records are available. As discussed below, this is around the lower age bound necessary to obtain a satisfactory measure of permanent income. Note that in the first part of the Results section, we consider a subset of the older generation, those born between 1963 and 1970, to allow for comparisons with the existing literature. Unless otherwise specified, we refer to respondents born between 1963 and 1981.

Together with the way relationships are established, the choice of cohorts can lead to truncation of parent-child links for the youngest and oldest respondents. In particular, the selection issues discussed previously are likely to be worse around the bounds, or to interact with some of the parents' or respondents' characteristics. Observing more years for those respondents might have allowed for a link to be established for some respondents that are currently not associated with a parent; or for more links to be established for respondents for whom we already have at least one parent. Some of these limitations are visible in the relationship between linkage rate and birth year (see Figure 3). This suggests that truncation is likely to have affected in a limited way the ability to link children with their parents. To further assess the seriousness of our concern about truncation, we do the following exercise. Note that most linkages happen at 16 years old or later. Therefore, we evaluate what is lost from observing respondents born between 1963 and 1965 for the first time between 17 and 19 years old. To do so, we restrict the cohort to include only people born between 1966 and 1981, in which case all respondents could be observed at the latest at 16 years old. We find that little more than 5% of parents who appear before 1985 do not appear again in 1985 or later. While these may be a very select group, their size is unlikely to affect our overall estimates. Sample size does not allow us to inform their characteristics specifically.

Parental income measures

Data limitations have led to a fairly extensive literature investigating the effect of the moment at and period for which income is measured, for parents and for children. In particular, authors have identified two issues that have resulted in the overstatement of intergenerational mobility in earlier work: errors-in-variables and life-cycle biases (Atkinson, Maynard, and Trinder, 1983; Solon, 1992; Zimmerman, 1992). Errors-in-variables bias refers to the bias that results from using annual income or the average of a small number of annual income values instead of true permanent income; life-cycle bias refers to the bias that is introduced by measuring income for parents and children at different points in their respective life-

cycles. In the Canadian context, Chen et al. (2017) shows that measuring parental and child income at similar ages, well into their working years, and including at least ten years of data for parents, produces estimates of the intergenerational elasticity of income (IGE) around 0.32, nearly 50% higher than previous findings by Corak and Heisz (1995, 1999). The latter had measured parental income irrespective of parents' age, and used at most five years of income data.

To allow for comparisons with previous work, we adopt two types of measures of parental income, which both address, to different levels, errors-in-variables bias. The first type follows the standard approach in the literature (Corak and Heisz, 1999; Corak 2017; Connolly et al. 2018). We average income over a five-year period that corresponds approximately to the time of the first parental link.[4] We implement this by averaging parental income when the child is 15 to 19.[5] We allow parents to have no income or no tax records in one or more years (coded as zero income). However, parental observations with an average of less than $500 are dropped from the sample. All values are CPI adjusted in 2013 constant Canadian dollars.

The second type is the measure developed by Chen et al. (2017), and is intended to better capture true permanent income, or lifetime income. It consists in an average of annual income over the 21 years when the parent is between ages 35 to 55. This approach is intended to account for errors-in-variables bias arising from the averaging of parental income over a number of years too small to obtain an accurate measure of permanent parental income. This source of bias has been found to introduce a downward bias in IGE estimates where parental income is measured using 5-year averages (Chen et al., 2017). Parental observations with less than 10 years of income at or above $500 are excluded.[6]

Henceforth we respectively refer to these two measures of parental income as COR (average when child is between 15 and 19 years old) and COP (average when parent is between 35 and 55). While the different measures of parental income vary in the severity of errors-in-variables bias they imply, they also have an impact on the way the sample is selected. In weighting the trade-off between measurement and selection bias, we rely on the fact that rank-rank regressions are less sensitive to the former (Chetty et al. 2014a; Corak 2017), and present most of our results using COR measures to minimize imposing additional selection.

Child income measures

[4] Existing studies using the IID average parental income between 1978 and 1982, which corresponds to the time when children born in 1963 to 1966 (the cohorts typically used in these studies) are 12 to 19 (15-19 for those born in 1963, and 12 to 16 for those born in 1966) (Corak and Heisz 1999; Chen et al. 2017). Corak (2017) instead averages parental income over a five year period when children are 15 to 19. He uses the 1963-1970 and 1967-1970 birth cohorts.

[5] Children born in 1963 are 19 or above in 1982 and 18 or above in 1983, and those born in 1964 to 1966 are also above 15 years old in 1982 or some later years. This doesn't allow for an averaging over several years. We therefore increase the upper age bound to 21 years old in 1982 and 20 years old in 1983 to allow parental income averages over at least three years for children of all birth years.

[6] Note that some parents of children in the oldest cohorts will be too old to meet the above criterion and will automatically be dropped if more than 45 years old in 1982. The same will occur for parents of children in the younger cohorts if they are below 45 years old in 2013. In addition, many parents have a sufficient number of income above $500, but will have part of the 35 to 55 age interval falling before 1982 or after 2013, and therefore censored.

The choice of child income measures also contributes to lifecycle and errors-in-variables biases. These biases may be introduced if child income is measured at an age when the current income is different from permanent income, or at an age different than the age of the parents when their income is measured. Corak and Heisz (1999) measure child income in 1995, when the 1963-1966 cohort was around 30 years old. Using similar log-log models, Chen et al. (2017) compare IGE estimates when child income is measured at 30 years old, 40 years old, and averaged between 38 and 42 years old. The largest difference in the estimates appears between measures of income at 30 and 40 years old. However, rank-rank estimates in Corak (2017) comparing relative mobility averaged when children are 29 to 32 and 38 to 45 show no difference (see also Connolly et al., 2018). This suggests that log-log estimators are more sensitive to lifecycle and errors-in-variable biases than rank-rank estimators. All measures except for Corak and Heisz (1999) exclude children if their (average) income is below $500.

In order to assess the validity of the estimates used throughout this study, we compare an array of measures of child income: at 30, at 30 without an exclusion of income below $500, at 40, the average income between 29 and 31, and the average income between 38 and 42. We also use the average income of children between 2009 and 2013. This measure is used in models investigating the effects of correlates of parental income, such as education, marital status, and job characteristics. These respondent characteristics are measured at the moment the LISA is conducted, and using a measure of income that precedes data collection by several years would be theoretically inconsistent, especially when considering respondents' employment status, job characteristics and marital status, which can highly vary over time even late in one's life course. Again, all these measures exclude values below $500 except otherwise specified.

Baseline estimates and replications

The complexity of the intergenerational transmission phenomenon has given rise to several indicators that seek to describe it, including transition matrices, probabilities for children to be in bottom and top income quintiles, conditional on their parents' ranking, log-log regressions, and rank-rank regressions. Becker and Tomes (1986)'s work pioneered log-log regressions, whereby the log value of child income is regressed on the log value of parental income, yielding an estimate that corresponds to the elasticity of child income with respect to parental income. In that context, the coefficient on the log value of parental income reflects the extent to which positive or negative deviation from the mean among parents translates into deviation from the mean among children. Following the work of Dahl and Deleire (2008), Chetty et al. (2014a, b) have also popularized the use of rank-rank regressions, which instead regress the child's percentile income rank on their parent's percentile income rank. This approach presents two advantages over the classical log-log regression: it does not require arbitrary decisions about how to treat zero and near-zero income values, and Corak (2017) and Connolly et al. (2018) have found them much less sensitive to the way income is measured (while income level changes over the life course, income ranking is much more stable).

Reproduction of existing estimates from the Canadian literature

As a starting point, we reproduce the results presented in Corak and Heisz (1999 – or CH) and Corak (2017), Chen, Ostrovsky and Piraino (2017 – or COP). Table 1 summarizes the content of these studies. A source of concern in using the LISA to study the intergenerational transmission of (dis)advantage is that the smaller sample size and retrospective sampling (with respect to parent-child pairs) may warp estimates. Results are presented in Table 2. Overall, our estimates are very close to those found in Canadian studies using the IID, even though our dataset contains a fraction of the observations the IID contains. Indeed, there are more than 2 million observations for children born in 1963-1970 in the IID, compared to less than 4,000 in our sample. We take this as a sign that our dataset is representative of the segment of the Canadian population included in the IID, and that further research using our dataset can be conducted with confidence.

The initial findings by Corak and Heisz (1999) focused on the intergenerational transmission of market income and labour earnings in father-son pairs. Father income was averaged between 1978 and 1982, a five-year period over which sons born in 1963-1966 were 12 to 19 years old. This corresponds broadly to our measure where parental income is averaged over a period of five years when a child is 15 to 19. The measure for child income came from a single year, 1995, when the sons were around 30 years old. Similarly, we measure child income for the 1963-1970 cohorts when sons were 30 years old exactly. We complement with a measure of child income that averages son's income between 29 and 31 years old. CH report log-log coefficients ranging between 0.114 and 0.131 for labour earnings, depending on how many years of parental income were used over 1978-1982 for averaging. For market income, their coefficients range from 0.119 to 0.194. Similarly, we obtain coefficients of 0.147 for labour earnings, and 0.134 for market income. Our estimates for market income are higher when we average child income between 29 and 31. Overall, our results for father-son elasticities are consistent with those reported in CH.

We then reproduce the study by Chen et al. (2017), who aimed to address lifecycle and errors-in-variables biases. They compared log-log estimates obtained from specifications where parental income is averaged over a five-year period with those obtained from specifications where parental income is averaged over a 21-year period. Child income is also measured at different ages.[7] Our results are, again, broadly similar. We do find similar patterns where estimates of intergenerational income elasticity are smaller when children are 30 than when they are 40 years old. Averaging the income of fathers over a 21-year period (the COP estimate) yields higher estimates as well. This approach yields our highest estimate, at 0.559. In general, we obtain larger coefficients than COP, and the difference are relatively small except for models using the COP measure and total income. Lastly, our results highlight the fact that using a COP estimate to correct biases comes with a sample size trade-off: close to 50% of our sample is lost when restricting the sample only to fathers that have at least 10 years of income above $500 over a 21-year period where they are 35 to 55 (inclusively).

We also reproduce the log-log coefficients from Corak (2017). Following the same approach as his study, we use parents and children of all gender and use total family income as our measure of income. Parental income is averaged over the five years when the child was 15 to 19 years old, and we measure child income as the average of total family income between 31 and 32 years old, between 38 and 42 years old,

[7] COP restrict their sample to individuals with income over $500 in three of the five years over which income is averaged, for measures of parental income based on five-year averages. Our results for five-year averages are closer to the approach by Corak and Heisz (1999) and Corak (2017). We only exclude individuals with an average below $500.

and between 2009 and 2015 (this last measure is not used in Corak, 2017; see justification below). Our log-log estimate (obtained using child income at 38-42 years old) is larger than his, at 0.262 compared to 0.201 (note that the IID used by Corak, 2017, allows him to compute average child income between 38 and 45 years old). Finally, we turn to the rank-rank estimates from Corak (2017). Here again, our estimates exceed those of Corak, at both 31-32 and 38-42 years old (see the first two rows of Table 3. Nevertheless, we also find the same pattern than in Corak (2017): estimates are similar regardless of whether child income is measured as an average of the income between 31 and 32 years old or between 38 and 42 years old. This leads us to conclude that the lifecycle bias appears muted in rank-rank models, an observation also made by Chetty et al. (2014a) and Corak (2017).

In addition, we compare these rank-rank estimates with a rank-rank estimate where child income is averaged between 2009 and 2013 (last three columns of Table 3). This approach aims to measure income at the survey date. This measure of income is necessary for models that also include mediators or confounders that are measured at survey date.[8] The cohort born in 1963-1970 were 43 to 50 years old in 2013 (and 39 to 46 in 2009). Our results show that these estimates are very close to our other rank-rank estimates. Overall, the results presented in this section imply that we can confidently use this dataset to obtain estimates of similar quality than the existing literature.

Finally, the bottom five rows of the top panel of Table 3 explore the sensitivity of the estimates to different definitions of income in rank-rank regressions. We discuss results for total income only, but there is practically no difference with results for market income. As in Corak (2017), we estimate models where total family income is divided by 2 if two parents are present on the first year a parent is observed (as in Corak, 2017, we do not account for family transformation thereafter). This assumes an equal sharing of income between two adults in a family. However, this does not account for the fact that two adults living in the same household might realize economies of scale in their consumption. We also report results using an unadjusted measure of total income. This is a more direct measure of the overall income level of a family, but does not account for the fact that two-parent families on average need to spend more to fulfill their basic needs. [9] None of these measures is able to account for the interaction between labour supply, marital status, and fertility decisions. Finally, we use a measure of individual income. Here, the parent with the highest income, regardless of its gender, is selected. This might better capture the difference in the socioeconomic status that children and their parents are able to achieve on their own. However, as it

[8] The respondent characteristics – including job characteristics – used in multivariate models, below, are measured in 2014 when LISA data collection took place. This implies these variables represent individual characteristics around the time income is measured for all respondents, and we seek a measure of income corresponding to respondent income at the time their characteristics were measured.

[9] The choice of an adjustment can be debated and depends on various theoretical assumptions. Besides the different measures discussed here, family income is also sometimes divided by the square root of total family size (including children). This does not appear as a suitable measure for our study since it does not correspond to the actual socio-economic attainment of a family. For example, it would make the returns to education smaller for parents of larger families. It would likewise place parents of smaller families higher on the income ladder although the income difference between families of different sizes but otherwise similar income level would not be driven by earned income but by resources available for each family member. An adjusted measure of income is better suited for other contexts where income is used as a measure of available resources rather than a measure of socioeconomic attainment. Meanwhile, it must be noted that families with more children might receive a higher amount in child benefits, therefore boosting their total income.

is well known, labour market participation decision in two-parent families are gendered, and there might be a large gap between the individual and family income of mothers (see Chen et al., 2017, for evidence of a weaker relationship between the income of fathers and daughters than the income of fathers and sons in Canada). Finally, in order to measure the association between parental family income and the socioeconomic status individually attained by children in adulthood, the last two rows show estimates from models where child individual income percentile is regressed on our two measures of family income. These are baseline estimates presented for reference, and variation by gender and by other subgroups are presented below.

Overall, the choice of an income measure is not straightforward. Keeping the various assumptions and implications described above in mind, the rest of the analysis relies on unadjusted total family income. As shown in Table 3, the choice of an adjustment to family income does not appear to have a large impact on the estimates: the estimates do not differ in a meaningful way if family income is divided by two. Consistent with the discussion above, estimates are lower when individual income is used.

Until this point, we have used the 1963-1970 cohort in our analysis in order to use a sample comparable to other studies, using the 1963-1966 and sometimes the 1963-1970 birth cohorts. However, our sample for these cohorts is relatively small, and the data currently available to us allows us to include younger respondents. As explained earlier, we use children up until the 1981 birth year. This doubles our sample size compared to using the 1963-1970 cohorts only. The rank-rank models estimates for the 1963-1981 cohorts are slightly smaller, but overall similar to those obtained using the 1963-1970 cohort.[10] We therefore use this pooled sample in our analyses when sample size becomes a limitation to disaggregated analyses.

The rest of the analysis excludes foreign-born respondents who arrived in Canada after the age of 15 because most of them are not linked to a parent, for logical reasons. We consider this group out of scope, and unlike previous studies, the LISA data includes a variable on the year of arrival to Canada for foreign-born respondents, which can be used to perform that exclusion. The estimates presented above do not exclude this group of respondents for reasons of consistency with existing studies. The coefficients for rank-rank regressions on a sample excluding foreign-born respondents who arrived in Canada after 15 years old is presented in the bottom panel of Table 3, for reference. The number of excluded respondents is very small, given the low likelihood that they would meet the conditions to appear in the sample (both a parent and the child filing their taxes on the same year while residing at the same address), especially given that immigrants who arrived as adults might have arrived in Canada without their parents altogether or have never shared an address with them. The results show very little difference in the estimates from the sample on which the exclusion is applied when compared to the baseline estimates.

Conditional probabilities from transition matrices

[10] Results for the 1971-1981 cohort show that the estimates for these birth years are smaller by a few percentile points than the results for the 1963-1970 cohort. They are close to rank-rank estimates in Corak (2017). This decrease in the size of rank-rank estimates for the younger cohort suggests an increase in intergenerational mobility. This contrasts with findings by Connolly et al. (2018), who show the exact opposite using a much larger sample. This difference might be due to the design of our data source, and we refrain at this point to draw conclusions about change over time.

We now turn to the core part of our analysis. Table 4 reports descriptive results based on a transition matrix approach, for respondents born in 1963-1981, which constitute the cohort of interest in the rest of this paper. This type of evidence allows to determine the likelihood that a child will be placed in the bottom or top income quintile, conditional on their parental income quintile. It also captures non-linearities in the association between parental and child income. If there was no association between parental and child income, each cell would take a value of 20%. These results are obtained using parental and child total family income (both sexes). Parental income is averaged over the 5 years where children were between 15 and 19, and child income is averaged over 2009 to 2013.

Our results show that 35.4% of children born from parents in the top parental quintile are also placed in the top income quintile. This is more than three times larger than the percentage of children born from parents in the bottom quintile and reach the same income quintile, at 10.7%. We find an almost mirror image of these conditional probabilities among children in the bottom income quintile, with 10.7% of children born in top-quintile families experiencing downward mobility to the bottom quintile, and 32.1% of children born in bottom-quintile families remaining in the bottom quintile. These results are consistent with Corak (2017), who finds that 32.3% of children born in the top quintile remain there, 30.1% of children born in the bottom quintile remain there, and 11.4% of children born in the bottom quintile reach the top quintile in adulthood (downward mobility from top to bottom is not reported).

Overall, 48.3% of children born from parents in the bottom quintile experienced an upward mobility of more than one quintile. Coincidently, 42.4% of children born in the top quintile experienced a downward mobility more than one quintile. These results suggest that social mobility out of bottom and top parental income quintile is unlikely, but not exceptional.

Characteristics of respondents by their parental income quintile

Table 5 presents cross-tabulations of parental income quintile with the characteristics of their children, including family background, health and education, employment, and job characteristics. This is a first step towards understanding which factors or pathways might account for the intergenerational transmission of income.

Mother's and father's education are generally increasing in parental income. However, there is a particularly strong association between having a university-educated parent and being in the top parental income quintile. The probability of having resided with both birth parents (biological or adoptive) at age 15 also changes across the parental income distribution, from 72% to 90% for the bottom and top quintile. Finally, visible minorities and immigrants are represented more heavily at the bottom, making up respectively 16% and 19% of respondents in the lowest quintile, against 6 and 8% in the top quintile.

Conversely, there is a clear relationship between parental income quintile and education. Education increases monotonically with parental income quintile, with a particularly large portion of respondents in the top quintile reporting a bachelor's degree or more: only 25% of respondents born to bottom-quintile parents obtained a university degree, compared to 35% for those born to the fourth quintile, and 60% for those from the top of the distribution. Education is otherwise fairly constant across middle three parental income quintiles, with a higher probability of having at most a high school degree at the bottom. Self-assessed health does not show systematic variation across the parental income distribution.

The proportion of employed respondents increases across the parental income distribution. Reading, writing and communication skills requirements are also generally increasing with parental income quintile. Mathematics skill use is also broadly increasing in parental income. The need for manual dexterity is essentially flat across the parental income distribution, although slightly lower for children of the top quintile; and physical strength requirements are monotonically decreasing in parental income. The probability of being employed (or self-employed) in a position of authority is lower for the bottom two quintiles than for the top three quintiles. Similarly, respondents are slightly more likely to report having a permanent contract and being unionized if their parents are in the top 2 income quintiles.

Exploration into mechanisms and pathways of intergenerational transmission of income

We now turn to exploring the role of education in the intergenerational transmission of income. In doing so, we also look at other factors as points of comparison for the results on education, and to further inform these results. We focus on rank-rank regressions, which are informative of both absolute and relative mobility, while being less sensitive to income definitions. Let i denote individual respondents, such that $i = 1, \dots, N$; $y_{i,c}$, the respondent's ranking in the income distribution; and $y_{i,p}$, their parent's income rank; the rank-rank specification is

$$y_{i,c} = \alpha_0 + r_p y_{i,p} + \epsilon_{i,c}$$

where α_0 and r_0 respectively denote absolute and relative mobility. Specifically, α_0 corresponds to the average percentile rank of children born to parents from the very bottom of the parental income distribution. As for r_p, it documents the strength of the relationship between parent and child income percentile ranks. Recall that this specification presumes nothing with respect to the direction of causality, but merely captures the correlation between the respective income rankings of children and their parents. Correspondingly, we refrain for now from discussing the interpretation of $\epsilon_{i,c}$, other than to point out that it capture idiosyncratic variation in respondent income ranking that is uncorrelated with parental income rank.

We wish to investigate education as well as other factors that may affect the correlation between parental and child income rankings. To do so, we broadly denote these factors as $X_{i,s}$, where $s \in \{c, p\}$ so that they may be either child or parent (family background) characteristics, and introduce two additional specifications:

$$y_{i,c} = \alpha_0 + r_p y_{i,p} + b_1 X_{i,s} + \epsilon_{i,c}$$

$$y_{i,c} = \alpha_0 + r_p y_{i,p} + b_1 X_{i,s} + b_2 y_{i,p} \times X_{i,s} + \epsilon_{i,c}$$

Because of the endogenous nature of all variables involved, we are careful in interpreting results from either regression. However, interesting things can be learned from both. The first specification is mostly informative of the correlation that exists between parental income rank and the factors considered. For instance, a decrease in the regression estimate is evidence that the variable considered is correlated with the intergenerational transmission mechanism. The second one allows the correlation between parental and child income to vary across people with different characteristics.

We use results from the 1963-1981 birth cohort. This provides us with a sample of reasonable size. Estimates for the 1963-1970 cohorts were also obtained (not shown). The results do not differ in any noticeable way from the results pooling all birth cohorts.[11] We further restrict the sample to exclude immigrant respondents who first lived in Canada at 16 years old or later. The results presented here use the COR measure of parental income, and the mean of child income between 2009 and 2013, to account for the fact that the characteristics of respondents are measured on the survey date, in early 2014.[12]

The baseline rank-rank association for this specification, r_p, is 0.261, CI = [0.197,0.317], and absolute mobility, α_0 , is 36.7 CI = [31.1,37.9]. These are the baseline estimates against which the coefficients below are compared. Furthermore, we allow for the possibility that absolute and relative mobility may be different for men and women, for members of visible minority groups, and for immigrants or those born from immigrant parents. Models 2, 4 and 6 in Table 6a respectively include dummies for respondents who reported being a women, being a member of a visible minority group, or an immigration background; models 3, 5 and 7 include corresponding interactions. The coefficients on dummies and interactions for women and immigrants are not statistically significant, meaning that the association between parental and child total family income is similar across these ascribed status groups. Nevertheless, the interaction coefficient between parental total family income percentile and a dummy for women becomes statistically significant in models where the dependent variable is child individual total income percentile. This is consistent with existing findings showing a weaker association between parental and child income in Canada for daughters rather than sons. For instance, Fortin and Lefebvre (1998) estimate that father-daughter income correlation is greater than father-son income correlation. An explanation for the absence of a difference between men and women when child total family income percentile is used as a dependent variable might be that women born to high-income parents are more likely to form couples, and more likely to do so with high-income spouses, therefore reaching a higher level of family income without necessarily having a high personal income. On the other hand, the interaction coefficient for visible minority group membership is negative and almost as large in absolute value as the rank-rank association coefficient, r_p; is it statistically significant at the 95% level. This is suggestive evidence that members of visible minority groups might be much more mobile, but around a low income level since their absolute mobility level is statistically equivalent to respondents who are not members of visible minority groups. Given that these results are not robust, we suggest further research.

Education

Including a set of dummy variables for educational attainment in the baseline regression (Table 6b, model 8) decreases the coefficient on parental income by approximately 42%, to 0.172 (CI = [0.106,0.228]). In

[11] Results may differ across the two groups because of changes in tax filing behaviour incentivized by the introduction of the GST and CTB in the late 1980s and early 1990s. Respondents born between 1971 and 1981 would have been 18 between 1989 and 2000, and therefore for the most part would have been linked to their parents after the tax changes. The break is not an even one, i.e., part of the 1971-1981 cohort will have been linked before 1993.

[12] As shown in Table 3. The results do not differ in major ways from those using a measure of child income averaging income between 38 and 42. We conduct additional checks by controlling for age, to account for the different age of respondents, and find no change in the baseline coefficient (not shown). This is likely due to the fact that the age band is narrow, and in 2014, these individuals were at a point of their age-income profile where the slope is relatively flat.

other words, a large portion of the relationship between parent and child income ranks is accounted for by factors that are associated with both parental income and child education. Education shifts absolute mobility upwards for all respondents who have more than a high school degree. The difference is large: at the very bottom of the parental income distribution, children with less than a high school degree make it to the 20th income percentile on average, while children with a bachelor's degree or more end up over the median.

Next, we include a set of interactions between parental income and education (model 9), allowing for the association between parental and child income to vary by education level. In this context, the relative mobility coefficient loses its statistical significance, further suggesting that the relationship operates in large part through education. However, none of the interaction coefficients are statistically significant at conventional levels, meaning that children with different education levels have similar experiences of relative mobility.[13] This is especially meaningful in light of the literature that has found education to be "a great equalizer" for children with a bachelor's degree in the US (Hout 1988; Torche 2011).[14] Specifically, that literature finds the intergenerational correlation in socioeconomic status to be lower among individuals with a bachelor's degree. In that case, higher education may be seen as performing a meritocratic function. Unlike existing research in the US, we find no association between parent and child incomes, even for children with very low levels of education. It may also be the case that there is more selection in education in Canada, leading to more homogeneity within levels of educational attainment. The lack of difference in the relative mobility of respondents who vary in educational attainment may reflect composition effects. Indeed, it may be that the education dummies effectively behave as dummies for different segments of the income distribution.

Health and marital status

As a point of comparison for the effect of education on absolute and relative mobility, we consider the effect of introducing health in the baseline regression, in model 10 (Table 6b). People who report different levels of overall health do not differ in terms of their relative mobility. However, respondents with fair or poor health fare substantially worse than those who reported good to excellent health, across the parental income distribution. The difference is approximately half as large as the difference between respondents who have less than a high school education and those who have at least completed a bachelor's degree.

[13] Some of the interaction coefficients are nevertheless sizeable, especially the coefficient for post-secondary education below Bachelor's degree. The same goes for the coefficient for parental income. Given our relatively small sample size and cell size, the evidence from the interaction models should be considered as exploratory.

[14] Wanner and Hayes (1996) reach similar findings on Canada, using a log-linear approach and a class mobility framework. Torche (2011) is an exception in the sociological literature in reporting findings using income as a measure of socioeconomic attainment rather than class or occupation. Her results for earnings and family income are consistent with results based on other measures more widely used in sociology. She also finds no equalizing effect of holding a graduate degree, the effect of higher education being driven by terminal Bachelor's degree graduates. We find a weaker interaction term between parental income and graduate degrees than Bachelor's degree when those two categories are separated, but both parameters remain non-significant.

Since our models use total family income, individuals in married or common-law couples might have a higher level of income if both spouses earn an income, for example. If children born to higher income parents are more likely to form a couple, marital status will account for part of the association between parental and child income. Model 11 includes dummies for separated, divorced or widowed individuals as well as for never married individuals. These marital status dummies accounts for part of the association between parental and child total family income. We include marital status as a control in later multivariate models to account for income differences due to marital status.

Alternative measures of family background

Parental income is often used in the literature on the intergenerational transmission of (dis)advantage as it captures a lot of what is transmitted from parents to children that may affect the fortune of the latter; including abilities, education, health and access to social networks. However, at the centre of this literature is also the recognition that the correlation between parent and child incomes arises not only through the direct impact of parental resources on children's labour market outcomes, but also through the role of underlying factors that affect both parents' and children's incomes.

The LISA survey allows us to explore other dimensions of the intergenerational transmission of (dis)advantage. We consider two alternative measures of parental background: parents' education level and the family's living arrangements at 15. For education, we consider father's and mother's characteristics separately, as existing literature has found that they may operate through different channels. For instance, Björklund et al. (2006) report that mother's education was more meaningful as a determinant of the pre-natal environment, compared to father's education. Living arrangements are characterized by the adults the respondent lived with at age 15: whether or not the child was living with both of their biological or adoptive birth parents at 15 years old, with only one of them and their new spouse, with only one of them in a single-parent family, or in another arrangement (another relative, an institution, etc.). These measures of family background are likely to be associated with parental income, but may also capture forces that operate independently from income.

Models 12 to 15 of Table 7a shows that parental education is significantly and positively associated with child's income. However, there are differences by parent sex, in terms of the educational attainment that has the most impact on children. For fathers, the largest difference is only achieved for those who completed a university degree, while much of the education advantage is enjoyed by mothers who have as little as a high school degree. When including both parental income and the measure of parental background, only the interaction for university-educated fathers remains statistically significant. In other words, having a university-educated father affects child income in a way that is at least partly orthogonal to the effect of family income. Finally, models 16 and 17 show that having lived in a lone-parent household at age 15 is associated with a large and statistically significant decrease in income rank in adulthood, almost 12 points. Importantly, that effect is reduced by the inclusion of parental income, and loses its statistical significance.

Table 7b shows the results for a regression of child income on all measures of parental background and the gender, visible minority and immigration background of respondents. Model 18 shows that the association between parental and child income net of other background characteristics remains strong, at 0.199, meaning that parental income is an important characteristics associated with the distribution of

opportunities. When adding education dummies into the model in model 19, as well as controls for health and marital status, the parental income coefficient decreases by approximately 50%, to 0.100 (and remains statistically significant). The effect of the other background variables decreases by several percentile points. Most notably, the association between living with a single parent at 15 and child income becomes small and statistically not significant. The corresponding coefficient was statistically significant, in model 18, net of other background characteristics, but without education.

Job characteristics of employed respondents

As mentioned before, approximately half of the relationship between parent and child incomes is accounted for by factors that are associated with both parental income and child education. The remaining half is independent of educational attainment. Unobserved cognitive skills developed during childhood, as well as test scores and school quality and reputation might also explain the association between parental income and child income. This study cannot account for these pathways. Other possible candidates to explain the remaining variation include characteristics that facilitate employment and that contribute to higher earnings. For instance, previous work by Corak and Piraino (2011) has demonstrated that employers may be transmitted intergenerationally. Access to better networks might improve the employment prospects of children born to high-income parents compared to those born to low-income parents. In a first model, we show that the association between parental and child income is accounted for by a higher likelihood of being employed for children born to high-income families (model 20 in Table 7b). However, when adding the employment dummy to a model also including the background and respondent characteristics used in previous specifications, we find no additional effect of the employment variable on the strength of the association between parental and child income (model 19, compared to model 22). This suggests that factors that account for the association between parental and child income pre-labour market entry are correlated with the employment outcome of children.

Next, we turn to the characteristics of the jobs themselves, to see if they explain some of the remaining correlation between parent and child incomes. The following results use a sub-sample of employed respondents. Although we do not observe employers, the LISA provides a broad range of detailed job characteristics. The data includes a set of detailed questions on skills used at work. Respondents are asked to report the level of some general skills they use at work (reading, writing, communication, mathematics, physical activity and dexterity). The LISA also includes information on contract type (permanent or temporary), unionization status, supervisory functions (managing or supervising employees), and working hours. For the sample restricted only to employed individuals, the rank-rank coefficient, r_p , for relative mobility is slightly smaller than the coefficient for the whole sample, at 0.231 (CI=[0.170,0.287]). The intercept, α_0 , for absolute mobility is slightly higher, at 40.9 percentile points (CI=[35.2,42.3]). When adding education among regressors, we find a similar mediation effect than in the full sample, with the rank-rank association between parental and child income decreasing to 0.165.

We first present estimates showing the role of skill use. The skill use question in LISA asks about the complexity of the tasks respondents are expected to perform in their jobs in six skill areas: reading, writing, mathematics, communications, dexterity, and physical strength.[15] We estimate models where

[15] This question relates to the level of skills used at work. For example, respondents are asked the following: "What level of reading comprehension is needed to perform your current job? Please select a number from 1 to 7." In this

child income is regressed against parental income and each skill use variable separately, and models where education is also included. Education is a measure of skill likely to be highly correlated with the task complexity, or required skill level, of the jobs respondents hold.

Results in Table 8a, models 24 to 28 and Table 8b, models 29 to 36, show that reading, writing, mathematics and communications are associated with an income premium. Meanwhile, dexterity and physical tasks mostly have no impact on income, after accounting for parental income; the only exception is for people in jobs with mid-level dexterity skill use, who experience an income penalty. Furthermore, including the dummies for reading, writing or communication in the baseline model results in a moderate decrease of the estimated coefficient on parental income; that is, factors that underlie both parental income and reading and writing skills used at work account for approximately 0.03 percentile points of the relationship between parental and child incomes. Meanwhile, the level of math, dexterity, and physical skills used at work do not account for the relationship between parental and child income. Two things are worth noting. First, the effect of controlling for skill uses on the parental income coefficient is much smaller than that which resulted from the inclusion of education dummies. In other words, there is much less correlation between parental income and skills used at work than there is between parental income and education; i.e., the observed relationship between parent and child incomes is linked much more closely to the role of education than to that of skills used at work. This might simply be due to the fact that educational attainment is a better proxy for respondent skills, or that educational credentials are rewarded net of the skill level of respondents who hold them. Relatedly, skills used at work are not good candidates to explain the correlation between parent and child income that is orthogonal to education; this is confirmed by results from model 25, 28, 30, 33, 34 and 36, where both skills and education dummies are added to the baseline model. Finally, in models with both skills and educational attainment dummies, reading, writing and communication decrease the economic and statistical significance of the education coefficients, but other skills have little to no impact. Allowing for the effect of parental income to vary by skill level shows differences in absolute mobility for all skills, in the directions expected, but no significant differences in relative mobility (not shown).

These results show that jobs with higher skill levels are associated with an income premium. However, only literacy and communication skills appear to account for some of the association between parental and child income, either directly or through education (i.e.: more educated workers being sorted into jobs requiring the use of higher level skills). This is relatively surprising, but suggests that the development of certain skills, or at least the sorting or workers into jobs with a higher demand for the use of certain cognitive or physical/motor skills, is not correlated with parental income or education.

Being employed under a permanent contract (vs. temporary employment), supervising employees, and being unionized all have a large, positive and significant effects on income. Again, the inclusion of these job characteristics in the baseline model has practically no effect on the estimated coefficient on parental income (0.01 to 0.02 percentile points), including in models with education dummies (Table 8c, models 37 to 40). As for skills used, we conclude that these job characteristic account for little to none of the part

case, level 2 correspondents to “Read step-by-step instructions for completing a form,” and level 6, to “Read a scientific journal article describing surgical procedures.” A related question on job skills asks respondents to report the frequency in the use of each skill. It is highly correlated with the skill level measure we are using and is not used in our models.

of the income correlation that is independent from education, nor for the portion that is associated with education.

Including unionization status as a dummy variable suggests that being unionized has no impact on respondent income (models 41 and 42). However, allowing for the effect of parental income to vary by unionization status reveals that this conceals differences in both absolute and relative mobility (model 43). Notably, there is no statistically significant relationship between the income of unionized individuals and that of their parents; they are also 8.770 percentile points better off across the parental income distribution (when also controlling for education). This is consistent with the fact that unionized workplaces tend to promote workers based on seniority and bureaucratic criteria, leaving a smaller place for subjective assessments of merit, but also for advancement based on skill level, which we found to be an important pathway for the intergenerational transmission of income. Union membership therefore appears to play an equalizing role or to reflect strong selection.

In model 44 (Table 8d), we create a new baseline controlling for all background characteristics discussed above. We obtain a rank-rank estimate of 0.189, about 0.04 percentile points lower than the baseline without any covariates. Again, education has the expected impact on the parental income coefficient, in model 45 (also controlling for health and marital status). The association between parental and child income for employed respondents decreases by approximately 40%, similar to the decrease observed between the same specifications in the full sample. When adding all job characteristics variables together into a model with the other variables already discussed, in model 46 (also controlling for working hours),[16] we obtain a rank-rank coefficient of 0.078. This means that education and job characteristics are able to account for most of the explained part of the association between parental and child income among employed respondents, net of other background characteristics, but that education appears as the most important pathway. This is significant to the extent that pre-labour market entry factors appear to account for most of the explained association between parental and child income. Including job characteristics in the model also decreases the coefficients on education, health and visible minority status to various degrees, suggesting that more educated and healthy respondents, and those without a visible minority status may have a higher income through their sorting into higher quality jobs. Some of this effect might represent an indirect pathway for the intergenerational transmission of parental income. These results also highlight the need for further research into the unobserved characteristics of children with higher income parents, as well as other dynamics unaccounted for by our models, in order to address the large unexplained part of the association. Finally, model 47 reproduces model 46, adding the interaction term between union membership and parental income. The difference between union members and non-members is also found in this specification.

Overall, our exploration of the role of education with respect to intergenerational income mobility shows that (1) nearly half of the relationship between parental and child incomes is linked to factors associated with both parental income and child education; (2) absolute mobility increases substantially with education, but relative mobility varies little across education levels. Furthermore, a limited set of job characteristics appear to account for the association between parental and child income, with literacy-related and communication job skill use level playing the largest role, and union membership muting the

[16] Only reading and communication skill use are added to this model because the other skill use variables have a large number of observations with missing values. These were the most important skill use variables in previous models.

association. It is important to note that 38.3% (0.100/0.261) is unaccounted for by the characteristics of respondents (including their education) or their background (see models 1 and 19). This remaining direct effect is sizable: a child born from parents in the 10th family income percentile will have a family income 8.0 percentiles below a child born from parents in the 90th family income percentile, net of other characteristics.[17]

Conclusion

Estimates of the intergenerational transmission of income in Canada suggest that it is a fairly mobile society. The literature on the topic has demonstrated that the link between parents' and children's income is complex, arising from the cumulative and complementary interactions of pre- and post-natal environments (Björklund et al., 2006; Corak, 2013; Cunha et al., 2006). Higher-income parents have more opportunities to invest in their children, and disparities that arise early on in life have long-lasting effects. On the other hand, there is evidence that skills retain some degree of malleability throughout life (Cunha et al., 2006), and that parental characteristics may affect children's income through channels revealed to researchers at later stages of life (eg. Corak and Piraino, 2011).

Due to data limitations, these mechanisms are still poorly understood in the Canadian context. Indeed, much of the existing work has relied either on survey data, characterized by shorter panels and small numbers of parent-child pairs, or on administrative data, which informs few of the likely determinants of intergenerational mobility. We overcame this issue by exploiting rich survey data from the Longitudinal and International Study of Adults (LISA), linked to a panel of administrative data for both parents and children covering 1982 to 2013.

Our contribution is three-fold. First, we demonstrated that the LISA can be used for studies of intergenerational income mobility, despite a smaller sample than is available in traditional administrative data sets, and a retrospective sampling methodology with respect to parent-child pairs. Second, we documented the effect of education on the estimate of intergenerational mobility. We found that factors associated to both parental income rank and child education account for almost half of the estimated relative mobility. In addition, higher-educated people experience higher absolute mobility, most likely through a combination of selection and causation. However, individuals with different levels of education exhibit similar relative mobility, contrasting with results from the United States that find much greater mobility among college graduates. This puzzling finding suggests that future research should focus on disentangling these forces, to better inform the role that education plays in the lives of Canadians. Finally, we investigated the role of a wide range of job characteristics in accounting for some of the remaining variation in child income that is attributed to parental income, net of factors associated with education. We find that the effect of controlling for job skill level on the parental income coefficient is much smaller

[17] Results for education and skills used at work are essentially unchanged by the use of child individual income rather than child family income. On the other hand, permanence and authority are associated with higher income premiums. Relative mobility is still unchanged by differences in those characteristics. Finally, all estimates using union status are very similar, whether child individual or family income is used. The similarity in estimates for education and job skills are relatively unsurprising, given the literature on assortative mating. The latter result on union status is more unexpected. It suggests potential matching along dimensions that are strongly correlated with union status.

than that which results from the inclusion of education dummies. Overall, only literacy and communication skills appear to account for some of the association between parental and child income, either directly or through education. Finally, our results shed light on the potential role of institutional and policy factors by showing the equalizing role of union membership.

Our findings highlight the importance of pre-labour market outcomes (especially educational attainment) in explaining why economic opportunities are unequally distributed between children born to families with different levels of income. Future research using the LISA data or other sources of intergenerational data could focus on the life course events (for example, family instability following divorces and separations) and characteristics of the family environment in childhood and adolescence that might explain the uneven distribution of economic opportunities among children born to parents with different income levels.

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Figure 1. Distribution of age of LISA respondents at observation of first parent, 1963-1981 birth cohorts

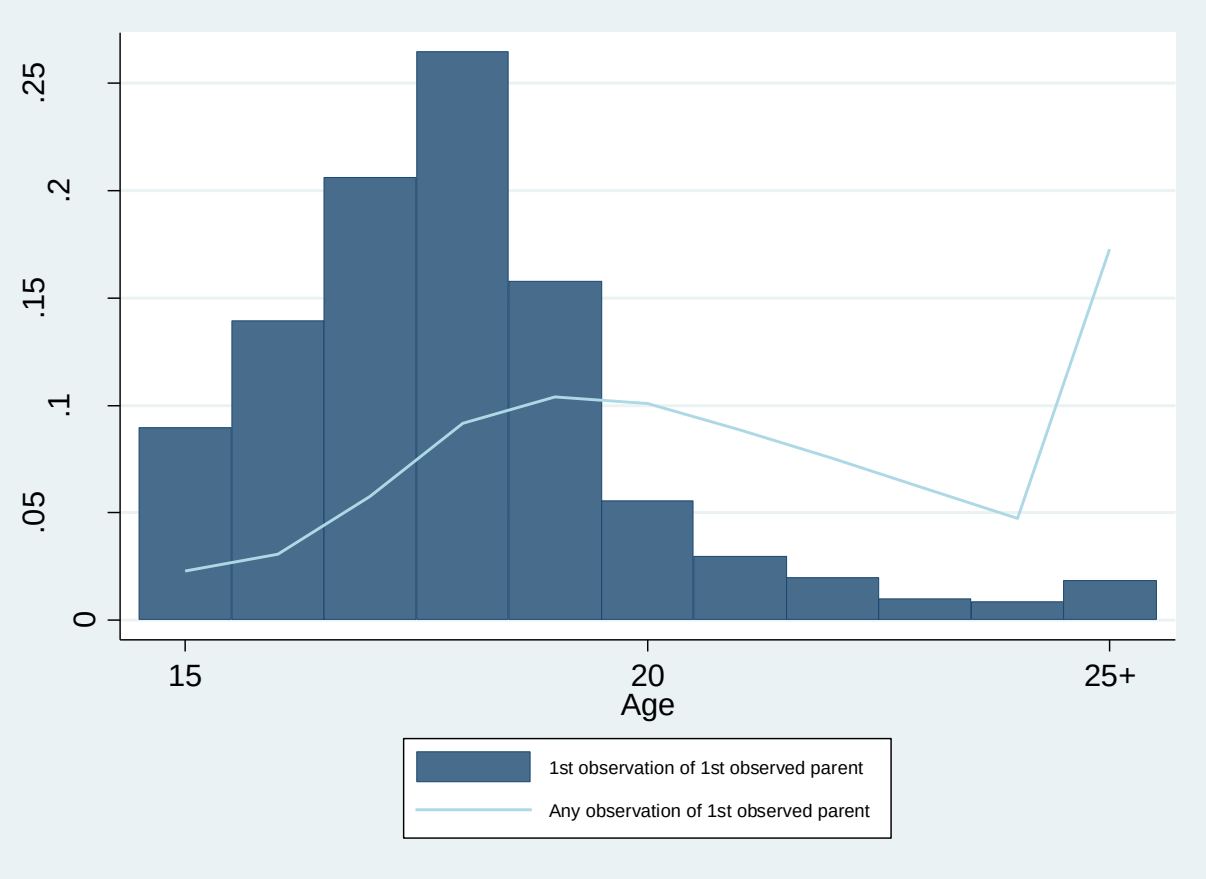
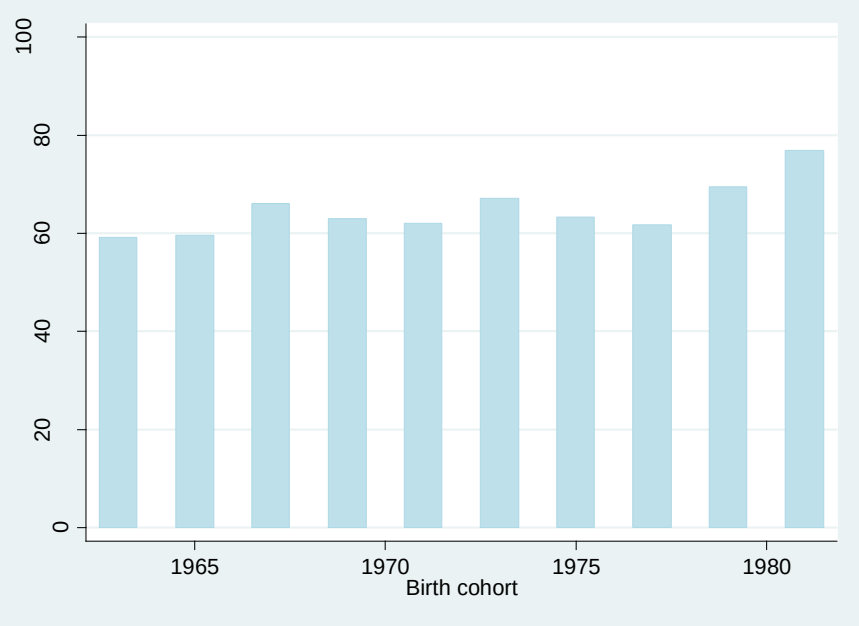
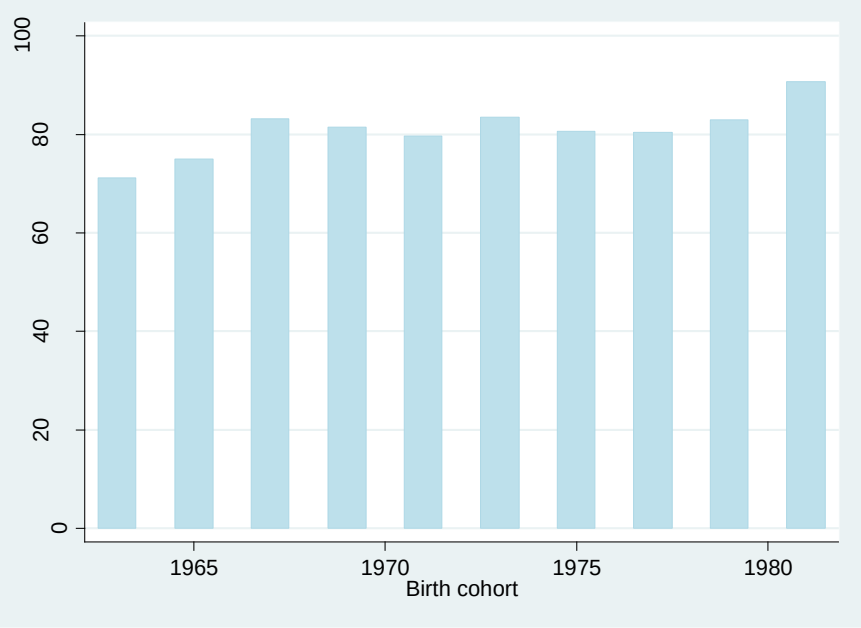


Figure 2. Linkage rate to parent T1FF, LISA respondents linked to T1FF, by birth cohort, 1963-1981 cohorts



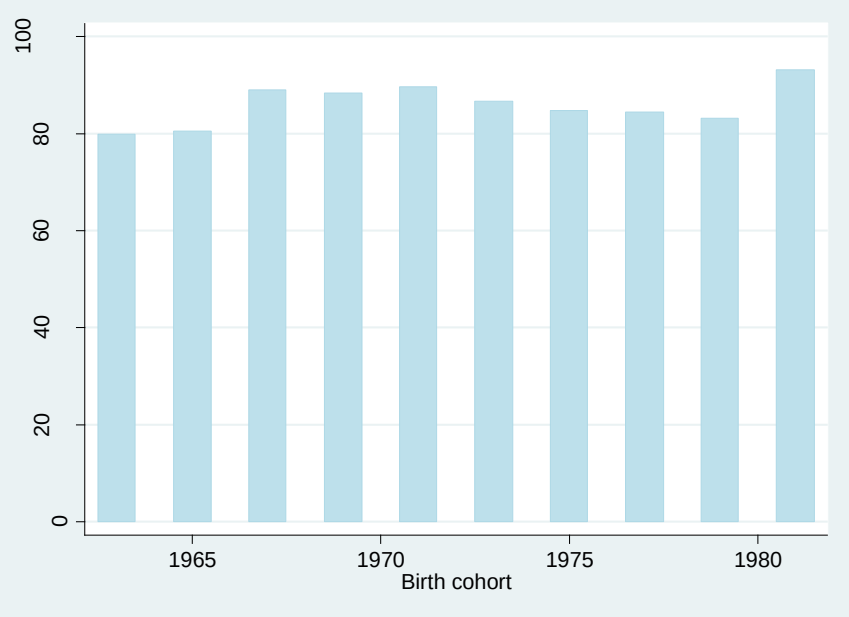
Note: each bar is an aggregate rate for two consecutive birth cohorts.

Figure 3. Linkage rate to parent T1FF, LISA respondents linked to T1FF, by birth cohort, 1963-1981 cohorts (excluding foreign-born respondents who immigrated after 15 years old)



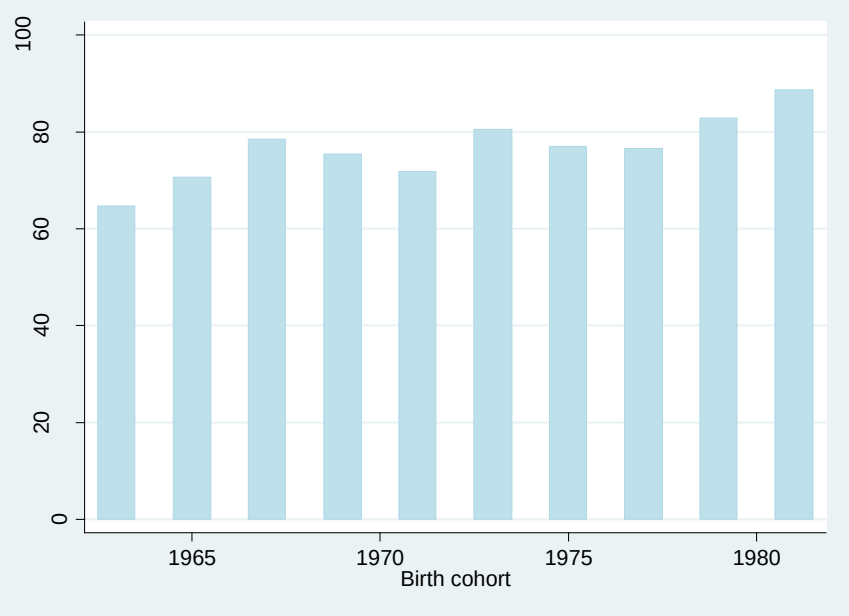
Note: each bar is an aggregate rate for two consecutive birth cohorts.

Figure 3.1 Linkage rate to parent T1FF, male LISA respondents linked to T1FF, by birth cohort, 1963-1981 cohorts (excluding foreign-born respondents who immigrated after 15 years old)



Note: each bar is an aggregate rate for two consecutive birth cohorts.

Figure 3.2 Linkage rate to parent T1FF, female LISA respondents linked to T1FF, by birth cohort, 1963-1981 cohorts (excluding foreign-born respondents who immigrated after 15 years old)



Note: each bar is an aggregate rate for two consecutive birth cohorts.

Table 1. Summary of existing Canadian studies of intergenerational mobility using the IID

Author	Children birth cohorts	Age parent	Age child	Parent income measure	Child income measure	Parent identification	Income type	IGE Absolute	IGE Relative	RR Absolute	RR Relative
Corak & Heisz 1999	1963-1966	Variable	29 to 32 (one year)	Fathers' income from 1978 to 1982 T1, averaged; Maximum number of periods averaged is five (1978 through 1982); Children born in 1963 were 15-19 between 1978-1982; Children born in 1966 were 12-16 in 1978-1982.	Sons' income from 1995 T1 (age 29 to 32).	Father-sons pairs; Aged 16 to 19 years of age in 1982; Filed an income tax return at some point between 1982 and 1986 (while still at home); Had a father present during that year.	Total market income	Not reported	0.194 (average income over 5 years is 1+)		
								Not reported	0.236 to 0.236 (depending on whether years below specific income threshold excluded)		
								Not reported	0.119 to 0.194 (depending on number of years included in average)		
							Total earnings	Not reported	0.131 (average income over 5 years is 1+)		
								Not reported	0.228 to 0.242 (depending on whether years below specific income threshold excluded)		
								Not reported	0.114 to 0.131 (depending on number of years included in average)		

Table 1 (continued)

Author	Children birth cohorts	Age parent	Age child	Parent income measure	Child income measure	Parent identification	Income type	IGE Absolute	IGE Relative	RR Absolute	RR Relative
Corak 2017	1963-1970	Variable	38-45	Parental (all parents) family income averaged over 5 years when child was 15-19; Average individual (parent or child) income under $500 dropped; Income coded as 0 if no T1; Family income divided by two if two parents; All incomes are measured in 2014 constant dollars based upon the CPI.	Child family income averaged over 5 years (2004-2008); Average individual (parent or child) income under $500 dropped; Income coded as 0 if no T1; Family income divided by two if two parents; All incomes are measured in 2014 constant dollars based upon the CPI.	All parent-children pairs; Family structure fixed at time 1; Filed an income tax return while still at home; Had a parent present during that year.	Family total income	8.52	0.201	38.3	0.242
			31-32							38.4	0.240

Table 1 (continued)

Author	Children birth cohorts	Age parent	Age child	Parent income measure	Child income measure	Parent identification	Income type	IGE Absolute	IGE Relative	RR Absolute	RR Relative
Chen Ostrovsky and Piriano 2017	1963-1966	Age 35-55	38-42	Average annual father income from the ages of 35 to 55, conditional on having positive values ($500 and over in constant 2010 dollars) in at least 10 of these 21 years.	Average of T1 income between 38 and 42. To be included, observations must have income above 500$ for at least 3 of the 5 years.	Father-son (first son/daughter used if more than 1) Child-parent pairs drawn from the TIFF in all years between 1982 and 1986 (first pair retained).	Total income (market income)	Not reported	0.359 (0.343)		
	1963-1966	Age 35-55	40		T1 income at 40.			Not reported	0.359 (0.349)		
	1963-1966	Variable	40	Father's T1 income, averaged over 1978 to 1982. Maximum number of periods over which income is averaged is five (1978 through 1982). Children born in 1963 were 15-19 between 1978-1982 Children born in 1966 were 12-16 in 1987-1982 Observations dropped if income in each of five years (1978 to 1982) are below $500 constant dollars.	T1 income at 40.			Not reported	0.317 (0.301)		
	1963-1966	Variable	30		T1 income at 30.			Not reported	0.222 (0.230)		

Table 2. Replication of intergenerational income elasticity estimates in previous studies, 1963-70 cohorts

Parent income measure	Income source	Child-parent pair type	Child age	β (log-log)	n	Original estimates	Difference	Source and details on original estimates
COR	DEI	Father-son	30	0.147	600	0.114	0.033	CH, parent income 1 year
COR						0.131	0.016	CH, parent income average 5 years
COR	DEI	Father-son	Avg 29-31	0.142	600			
COR								
COR	DEI	Father-son	40	0.206	500			
COR	DEI	Father-son	Avg 38-42	0.311	600			
COR	MI	Father-son	30	0.134	700	0.119	0.015	CH, parent income 1 year
COR						0.194	-0.060	CH, parent income average 5 years
COR	MI	Father-son	Avg 29-31	0.195	700			
COR								
COR	MI	Father-son	40	0.241	700	0.301	-0.060	COP
COR	MI	Father-son	Avg 38-42	0.235	700			
COR	XTIRC	Father-son	30	0.236	700	0.222	0.014	COP
COR	XTIRC	Father-son	Avg 29-31	0.257	700	0.222	0.035	COP
COR	XTIRC	Father-son	40	0.384	700	0.317	0.067	COP
COR	XTIRC	Father-son	Avg 38-42	0.363	700			
COP	MI	Father-son	40	0.333	400	0.349	-0.016	COP
COP	MI	Father-son	Avg 38-42	0.367	400	0.343	0.024	COP
COP	XTIRC	Father-son	40	0.559	400	0.359	0.200	COP
COP	XTIRC	Father-son	Avg 38-42	0.469	400	0.359	0.110	COP
COR	XTIRC (family/2)	Parent-child	Avg 31-32	0.254	1700			
COR	XTIRC (family/2)	Parent-child	Avg 38-42	0.262	1700	0.201	0.061	COR, child income average 38-45 years old

Note: All estimates are based on a specification using first observed parents.

Legend: DEI=dependent employment income; MI=market income; XTIRC=total income. CH refers to Corak & Heisz (1999); COP refers to Chen et al (2017); COR refers to Corak (2017).

Table 3. Baseline rank-rank regression estimates and replication of Corak (2017), 1963-1970 cohorts

		Average, 38-42 years old			Average, 31-32 years old			Average, 2009-2013		
Parent total income (XTIRC)	Child total income (XTIRC)	α	r	n	α	r	n	α	r	n
		All respondents								
Family/2, original estimates from Corak (2017)	Family/2, original estimates from Corak (2017)	38.4	0.240	-	38.3	0.242	-	-	-	-
Family/2	Family/2	35.6	0.284	1700	34.5	0.306	1700	36.5	0.267	1700
Family	Family	35.6	0.286	1700	36.0	0.277	1700	35.8	0.281	1700
Individual	Individual	38.5	0.228	1700	37.3	0.250	1700	38.5	0.228	1700
Family/2	Individual	39.5	0.208	1700	37.5	0.246	1700	39.7	0.204	1700
Family	Individual	37.7	0.242	1700	37.5	0.248	1700	37.7	0.244	1700
		Respondents immigrated after 15 years old excluded								
Family/2	Family/2	35.6	0.284	1700	34.3	0.310	1700	36.5	0.266	1700
Family	Family	35.5	0.287	1700	35.9	0.278	1700	35.7	0.283	1700
Individual	Individual	38.2	0.233	1700	37.1	0.255	1700	38.2	0.233	1700
Family/2	Individual	39.3	0.212	1700	37.4	0.250	1700	39.5	0.208	1700
Family	Individual	37.5	0.248	1700	37.2	0.253	1700	37.4	0.250	1700

Notes: total income is used in all models. “Family” means the sum of the income of the parent or respondent and their spouse, when present. “Family/2” indicates that family income is divided by two when a spouse is present. “Individual” means that only individual income is used. This is the personal income of the respondent (either son or daughter), or the personal income of the parent of the respondent with the highest individual income (regardless of the parent’s gender).

Table 4. Total family income transition matrix, 1963-1981 cohorts

	Child total family income quintile					
Parental total family income quintile	Bottom	2nd	3rd	4th	Top	Total
Bottom	32.1	19.6	19.6	18.0	10.7	100.0
2nd	24.0	24.9	21.1	15.8	14.2	100.0
3rd	17.7	20.5	21.1	23.1	17.6	100.0
4th	15.6	19.9	21.5	20.8	22.2	100.0
Top	10.7	14.9	16.8	22.3	35.4	100.1
All quintiles	20.0	20.0	20.0	20.0	20.0	100.0

n=3500

Note: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present.

Table 5.1. Percentage distribution of respondent background characteristics, by parental income quintile, 1963-1981 birth cohorts

Parent Total Family Income Quintile	Father's education				Mother's education				Living with both birth parents at 15 years old		Visible minority		Immigration background		
	No high school	High school	Some postsec	Univer-sity	No high school	High school	Some postsec	Univer-sity	Yes	No	No	Yes	Born in Canada	Foreign-born	Foreign-born parents
ALL															
1	48	21	19	12	45	30	16	9	72	28	84	16	66	19	15
2	43	22	25	11	37	28	24	11	78	22	90	10	71	10	19
3	37	24	24	15	29	36	25	10	85	15	91	9	69	9	22
4	24	27	26	24	19	42	27	12	89	11	94	6	72	8	20
5	11	17	24	48	10	29	30	32	90	10	94	6	69	8	23
Total	32	22	24	22	28	33	25	15	83	17	91	9	70	11	20

Table 5.2. Percentage distribution of respondent characteristics, by parental income quintile, 1963-1981 birth cohorts

Parent Total Family Income Quintile	Education					Self-assessed health			Employed	
	No high school	High school	Appren-ticeship, Trade or Voca-tional	Some postsec below Bachelor	Bachelor or above	Very good/ excellent	Good	Fair/poor	Yes	No
ALL										
1	14	24	15	25	23	68	23	9	79	21
2	6	24	16	31	24	67	29	4	85	15
3	9	19	14	31	28	59	33	8	85	15
4	4	17	11	33	35	68	27	6	92	8
5	2	10	5	23	60	72	21	6	92	8
Total	7	19	12	29	34	67	27	7	87	14

Table 5.3. Percentage distribution of employed respondents' complexity of skills used at work and job characteristics, by parental income quintile (total family income), 1963-1981 birth cohorts

Parent Total Family	Reading skill use (complexity)			Writing skill use (complexity)			Communication skill use (complexity)			Math skill use (complexity)			Dexterity skill use (complexity)			Physical skill use (complexity)			Authority		Permanent contract		Union member	
Income Quintile	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	No	Yes	Yes	No	Yes	No
ALL																								
1	22	33	45	20	40	41	28	29	43	38	31	32	26	23	52	33	21	46	67	33	72	29	36	65
2	17	28	56	25	31	44	25	27	48	38	28	33	21	26	52	29	23	48	66	34	68	32	37	63
3	18	30	52	14	35	51	22	29	49	32	27	41	21	27	52	31	22	47	62	38	74	26	35	65
4	18	23	59	16	29	56	21	27	52	31	35	35	22	24	54	36	23	42	67	33	77	23	42	59
5	10	17	73	12	27	62	14	20	66	29	33	39	28	24	48	41	26	34	62	38	76	24	40	60
Total	17	26	57	17	32	51	22	26	52	33	31	36	23	25	52	34	23	44	65	35	73	27	38	62

Table 6a. Rank-rank estimates, 1963-1981 birth cohorts

	1			2			3			4			5			6			7		
		CI			CI			CI			CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
Parental income (ParInc)	0.261	0.197	0.317	0.260	0.194	0.317	0.276	0.185	0.362	0.260	0.195	0.318	0.279	0.215	0.338	0.264	0.199	0.318	0.271	0.197	0.335
Women				1.377	-2.207	4.364	3.158	-3.488	9.973												
ParInc*Women							-0.035	-0.157	0.075												
Visible minority (VisMin)										-2.674	-11.355	3.270	8.076	-4.885	24.339						
ParInc*VisMin													-0.243	-0.597	-0.031						
Canadian-born of Canadian-born parents (ref.)																					
Foreign-born (ForB)																2.935	-6.151	8.335	4.967	-9.038	19.641
Foreign-born parents (ForBPar)																-1.497	-8.454	1.600	-0.597	-11.655	8.105
ParInc*ForB																			-0.043	-0.397	0.213
ParInc*ForBPar																			-0.017	-0.180	0.137
Constant	36.7	31.1	37.9	36.2	30.5	38.0	35.4	28.4	37.9	37.1	31.5	38.6	36.1	30.4	37.6	36.6	31.2	38.5	36.3	30.5	38.6
n	3500			3500			3500			3500			3500			3500			3500		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 6b. Rank-rank estimates, 1963-1981 birth cohorts

	8			9			10			11		
		CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
Parental income (ParInc)	0.172	0.106	0.228	0.290	-0.050	0.520	0.255	0.191	0.310	0.197	0.123	0.232
No high school diploma (ref.)												
High school diploma or eq.	6.399	-1.506	13.857	8.282	-4.670	18.332						
Apprenticeships or trade/vocational certificate	13.290	6.895	21.800	18.172	5.335	30.271						
Some postsecondary below Bachelor (university/college)	16.544	9.457	25.221	26.330	13.860	38.378						
Bachelor and above	28.698	20.884	36.394	30.103	15.023	40.581						
High school * ParInc				-0.066	-0.325	0.231						
Apprenticeships/trade * ParInc				-0.137	-0.417	0.193						
Some postsec * ParInc				-0.232	-0.499	0.094						
Bachelor and above * ParInc				-0.074	-0.337	0.284						
Very good/ excellent health (ref.)												
Good health							-5.008	-9.696	-1.650			
Poor/fair health							-18.727	-27.027	-13.204			
Married or common-law (ref.)												
Separated, divorced, widowed										-23.688	-27.687	-14.785
Never married										-32.242	-36.899	-28.119
Constant	24.049	15.235	28.730	19.948	9.551	29.639	39.668	33.877	41.426	49.413	46.331	52.535
n	3500			3500			3500			3500		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 7a. Rank-rank estimates, 1963-1981 birth cohorts

	12			13			14			15			16			17		
		CI			*CI*			*CI*			*CI*			*CI*			*CI*	
	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*
Parental income (ParInc)				0.225	0.155	0.286				0.238	0.165	0.292				0.246	0.179	0.296
Father's ed.: Lt. HS (ref.)																		
Father's ed.: HS	2.500	-3.017	7.025	0.121	-4.697	4.939												
Father's ed.: Some postsec	3.691	-1.474	8.038	0.847	-4.057	5.214												
Father's ed.: University	11.755	6.214	16.274	5.252	0.271	10.209												
Mother's ed.: Lt. HS (ref.)																		
Mother's ed.: HS							7.285	3.014	12.006	3.986	-0.333	8.820						
Mother's ed.: Some postsec							7.262	2.959	12.030	2.975	-1.436	8.735						
Mother's ed.: University							10.432	3.929	16.214	3.955	-3.154	9.633						
Both birth parents (ref.)																		
One birth parent, new spouse													-5.728	-14.913	0.257	-3.599	-11.666	2.351
Single birth parent													-11.714	-17.807	-4.269	-6.287	-12.770	0.704
Other arrangements													-13.644	-41.109	5.809	-10.546	-36.226	7.536
Constant	46.327	40.646	46.830	37.472	31.526	39.025	44.671	38.933	45.192	35.677	29.620	37.260	51.488	46.731	51.062	38.417	32.650	39.858
n	3400			3400			3400			3400			3500			3500		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 7b. Rank-rank estimates, 1963-1981 birth cohorts

	18			19			20			21		
		CI			*CI*			*CI*			*CI*	
	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*	Coeff.	*Lower bound*	*Upper bound*
Parental income (ParInc)	0.199	0.122	0.261	0.100	0.032	0.139	0.228	0.159	0.275	0.094	0.017	0.138
Father's ed.: Lt. HS (ref.)												
Father's ed.: HS	-0.745	-5.715	4.025	0.050	-3.788	3.860				0.067	-4.025	4.217
Father's ed.: Some postsec	-0.107	-5.762	4.374	-1.239	-5.736	1.828				-1.435	-6.187	1.581
Father's ed.: University	4.741	-0.918	10.367	-1.084	-7.033	2.900				-1.118	-7.229	3.158
Mother's ed.: Lt. HS (ref.)												
Mother's ed.: HS	3.942	-0.417	8.974	1.589	-2.152	5.437				1.651	-2.087	5.493
Mother's ed.: Some postsec	2.411	-1.751	7.743	-0.031	-3.120	5.083				0.019	-2.856	5.171
Mother's ed.: University	1.961	-5.150	8.251	-0.640	-5.154	6.194				-0.584	-4.951	5.356
Both birth parents (ref.)												
One birth parent, new spouse	-5.319	-14.123	0.995	-3.651	-10.041	1.396				-3.553	-9.666	1.576
Single birth parent	-7.127	-14.433	-0.265	-3.545	-8.654	1.054				-2.995	-7.778	1.423
Other arrangements	-9.593	-41.695	11.476	-8.461	-37.920	5.496				-8.922	-39.895	6.033
Women	0.585	-3.078	3.673	-1.256	-4.293	1.090				-0.905	-4.001	1.356
Visible minority (VisMin)	-6.257	-15.655	1.868	-4.203	-12.360	3.164				-3.875	-11.463	3.302
Canadian-born of Canadian-born parents (ref.)												
Foreign-born (ForB)	3.475	-8.205	10.673	0.833	-7.501	7.728				0.462	-8.092	6.410
Foreign-born parents (ForBPar)	0.015	-6.322	4.029	0.253	-4.730	3.277				0.123	-5.053	3.590
No high school diploma (ref.)												
High school diploma or eq.				3.609	-3.501	9.943				2.851	-3.732	8.972
Apprenticeships or trade/vocational certificate				6.894	0.350	14.125				5.768	-0.833	12.982
Some postsecondary below Bachelor (university/college)				12.166	5.196	19.196				10.926	4.638	17.905
Bachelor and above				24.815	18.336	32.189				23.078	16.618	30.590
Very good/ excellent health (ref.)												
Good health				-2.945	-6.013	0.302				-2.944	-5.768	0.223
Poor/fair health				-9.362	-15.698	-3.964				-7.710	-13.858	-2.730
Married or common-law (ref.)												
Separated, divorced, widowed				-22.151	-27.250	-15.226				-21.705	-26.936	-14.065
Never married				-31.487	-35.765	-27.851				-30.838	-35.214	-27.403
Employed (ref.)												
Not employed							-19.762	-25.003	-14.306	-8.752	-12.236	-3.711
Constant	38.318	32.549	41.064	43.773	37.504	51.982	41.060	35.518	42.851	45.963	40.107	53.627
n	3300			3300			3500			3300		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 8a. Rank-rank estimates, 1963-1981 birth cohorts

	22			23			24			25			27			28		
		CI			CI			CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
ParInc	0.231	0.170	0.287	0.165	0.102	0.231	0.203	0.143	0.270	0.160	0.096	0.227	0.198	0.132	0.267	0.158	0.095	0.228
No high school diploma (ref.)																		
High school diploma or eq.				3.170	-5.927	11.572				-0.165	-10.278	8.518				-1.459	-12.033	9.233
Apprenticeships or trade/vocational certificate				8.194	-0.231	17.248				4.150	-4.016	13.396				2.491	-6.792	14.013
Some postsecondary below Bachelor (university/college)				11.443	2.904	20.486				6.990	-2.220	15.943				5.221	-5.220	16.881
Bachelor and above				22.747	13.565	30.765				16.605	7.710	25.737				14.861	4.858	25.722
Skill use: reading (low)																		
Skill use: reading (middle)							6.653	0.726	13.314	5.288	-0.019	11.592						
Skill use: reading (high)							14.572	9.486	20.113	9.065	3.791	14.809						
ParInc * reading (middle)																		
ParInc * reading (high)																		
Skill use: writing (low)																		
Skill use: writing (middle)													10.461	5.523	16.959	9.077	4.375	14.912
Skill use: writing (high)													16.387	11.836	22.397	10.599	5.646	16.218
Constant	40.886	35.192	42.302	31.191	20.713	36.569	32.720	24.810	35.454	29.901	18.166	37.221	31.890	23.684	34.244	30.073	16.301	38.474
n	3100			3100			2900			2900			2800			2800		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 8b. Rank-rank estimates, 1963-1981 birth cohorts

	29			30			31			32			33			34			35			36		
		CI			CI			CI			CI			CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
ParInc	0.204	0.135	0.265	0.156	0.088	0.222	0.227	0.157	0.292	0.171	0.102	0.251	0.236	0.166	0.296	0.177	0.114	0.256	0.203	0.119	0.277	0.160	0.083	0.251
No high school diploma (ref.)																								
High school diploma or eq.				1.638	-8.627	9.967				2.449	-8.391	13.291				2.380	-6.534	12.830				3.680	-5.910	13.970
Apprenticeships or trade/vocational certificate				6.838	-2.305	16.158				6.593	-3.310	17.687				7.933	-0.572	17.879				11.245	1.663	21.818
Some postsecondary below Bachelor (university/college)				9.502	0.266	18.557				10.099	-0.301	20.416				11.498	3.215	21.948				11.450	2.029	22.234
Bachelor and above				19.399	9.623	28.909				20.141	9.300	30.449				21.073	12.039	31.709				21.479	10.428	32.566
Skill use: communication (low)																								
Skill use: communication (middle)	7.928	3.039	13.032	6.229	1.675	11.172																		
Skill use: communication (high)	13.363	8.820	18.043	8.627	4.117	13.115																		
Skill use: mathematics (low)																								
Skill use: mathematics (middle)							7.701	2.934	12.628	5.766	1.097	10.290												
Skill use: mathematics (high)							14.769	10.586	19.633	11.806	7.744	16.557												
Skill use: dexterity (low)																								
Skill use: dexterity (middle)													-5.486	-12.458	-0.548	-2.758	-9.186	1.573						
Skill use: dexterity (high)													-1.680	-6.542	3.172	0.558	-3.637	5.169						
Skill use: physical (low)																								
Skill use: physical (middle)																			-3.682	-7.764	4.244	-1.720	-6.102	5.714
Skill use: physical (high)																			-5.186	-8.579	1.121	-2.259	-6.456	4.288
Constant	33.314	26.614	35.945	27.813	17.619	34.021	33.662	27.039	35.555	26.687	13.600	34.321	42.071	35.552	45.060	31.585	19.731	36.975	42.291	33.780	44.422	31.575	17.548	36.779
n	3000			3000			2700			2600			2600			2600			1900			1900		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 8c. Rank-rank estimates, 1963-1981 birth cohorts

	37			38			39			40			41			42			43		
		CI			CI			CI			CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
ParInc	0.226	0.163	0.279	0.160	0.092	0.219	0.213	0.152	0.273	0.145	0.078	0.208	0.233	0.176	0.302	0.162	0.100	0.235	0.055	-0.030	0.138
No high school diploma (ref.)																					
High school diploma or eq.				3.191	-6.128	12.092				3.030	-5.729	12.609				4.647	-5.357	16.280	4.657	-5.912	14.823
Apprenticeships or trade/vocational certificate				8.059	-0.154	17.455				7.170	-1.537	17.258				8.791	-0.781	19.931	8.474	-0.159	19.187
Some postsecondary below Bachelor (university/college)				11.829	3.869	21.209				10.962	2.803	20.793				13.098	4.763	25.005	12.579	3.538	23.950
Bachelor and above				22.553	13.918	31.192				22.448	13.723	32.259				23.902	14.742	35.547	23.730	13.821	34.431
Authority over employees	8.261	5.351	12.649	7.541	4.570	11.509															
Temporary contract							-11.476	-17.55	-8.099	-10.828	-17.35	-8.117									
Not a union member (NoUnion)													-1.025	-4.905	2.429	0.234	-3.279	4.030	-8.770	-15.98	-2.250
ParInc * NoUnion																			0.172	0.066	0.299
Constant	38.219	32.519	39.418	28.715	18.072	33.770	44.524	38.828	46.406	35.183	24.602	41.652	42.916	36.583	45.149	31.280	18.078	38.045	37.238	24.626	44.257
n	3100			3000			2900			2900			2600			2600			2600		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.

Table 8d. Rank-rank estimates, 1963-1981 birth cohorts

	44			45			46			47		
		CI			CI			CI			CI	
	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound	Coeff.	Lower bound	Upper bound
ParInc	0.189	0.106	0.253	0.116	0.050	0.164	0.078	0.011	0.131	-0.003	-0.080	0.060
No high school diploma (ref.)												
High school diploma or eq.				3.841	-3.675	11.565	2.025	-6.568	10.220	1.985	-6.165	10.370
Apprenticeships or trade/vocational certificate				5.227	-2.284	14.431	1.612	-7.333	10.223	1.366	-8.380	10.775
Some postsecondary below Bachelor (university/college)				11.229	4.205	19.928	7.737	-0.349	16.462	7.295	-0.654	16.932
Bachelor and above				23.612	16.690	32.994	17.002	8.912	26.570	16.793	8.838	26.700
Skill use: reading (low)												
Skill use: reading (middle)							0.944	-3.271	6.820	1.136	-3.435	6.620
Skill use: reading (high)							4.478	-0.556	10.182	4.504	-0.482	9.847
Skill use: communication (low)												
Skill use: communication (middle)							3.609	-0.945	8.254	3.718	-1.124	9.021
Skill use: communication (high)							4.737	0.000	9.275	4.899	0.090	9.279
Authority over employees							1.561	-2.210	4.353	1.406	-2.227	3.969
Temporary contract							-5.008	-11.265	-0.912	-5.058	-10.513	-1.336
Not a union member (NoUnion)							-2.061	-4.974	1.245	-8.800	-14.240	-3.131
ParInc * NoUnion										0.129	0.038	0.228
Working hours							0.238	0.128	0.377	0.235	0.115	0.377
Women	-1.468	-5.617	0.896	-2.272	-5.852	0.424	-1.473	-5.359	1.061	-1.373	-5.441	1.334
Visible minority (VisMin)	-6.329	-16.539	2.956	-4.617	-13.966	3.220	-3.031	-13.352	5.570	-3.249	-13.952	5.313
Canadian-born of Canadian-born parents (ref.)												
Foreign-born (ForB)	2.602	-9.888	9.744	0.436	-7.337	7.380	0.289	-7.245	9.300	0.452	-7.739	8.814
Foreign-born parents (ForBPar)	-0.163	-6.987	4.024	0.466	-4.116	4.047	0.925	-4.016	4.898	0.876	-3.813	4.729
Father's ed.: Lt. HS (ref.)												
Father's ed.: HS	-0.613	-6.405	4.521	0.274	-4.096	4.342	0.922	-3.382	5.079	1.147	-3.217	5.592
Father's ed.: Some postsec	0.706	-4.356	5.305	0.031	-5.017	3.379	0.368	-4.275	3.929	0.458	-4.072	4.392
Father's ed.: University	4.219	-1.771	10.344	-0.215	-6.157	4.122	0.658	-5.504	5.294	0.708	-5.528	5.374
Mother's ed.: Lt. HS (ref.)												
Mother's ed.: HS	4.005	-0.497	9.728	1.071	-3.270	5.374	1.882	-2.435	6.290	1.898	-2.458	6.363
Mother's ed.: Some postsec	1.415	-3.004	7.073	-0.804	-4.401	3.938	0.675	-3.070	5.556	0.932	-2.771	6.011
Mother's ed.: University	1.092	-6.567	7.626	-1.358	-6.357	4.951	1.538	-3.102	8.798	1.863	-2.802	9.348
Both birth parents (ref.)												
One birth parent, new spouse	-4.484	-13.607	1.376	-3.118	-9.714	2.312	-1.940	-8.449	2.812	-1.951	-8.795	2.918
Single birth parent	-5.415	-12.983	2.104	-2.643	-7.869	1.825	-4.858	-10.514	-0.171	-5.069	-11.050	-0.481
Other arrangements	-10.690	-48.365	14.084	-10.859	-41.532	3.513	-11.214	-53.602	5.672	-10.701	-46.437	6.216
Health					Yes			Yes			Yes	
Marital status					Yes			Yes			Yes	
Constant	42.142	36.134	45.693	54.333	37.107	74.483	42.345	24.071	62.595	47.540	28.696	68.569
n	2900			2900			2400			2400		

Notes: Total family income is used. It is the sum of the income of the parent or respondent and their spouse, when present. 95% bootstrap confidence intervals (CI) reported. Sample excludes foreign-born respondents who immigrated to Canada after 15 years old.