Intergenerational correlations in educational attainment: Birth order and family size effects using Canadian data

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ARTICLE INFO

ABSTRACT

We exploit the 1986, 1994, and 2001 waves of the Canadian general social surveys in order to estimate intergenerational correlations in education. The use of these specific data is important because of available information on the final educational attainment of survey respondents and both parents, as well as family size and birth order. OLS estimates reveal that: (1) relying exclusively on maternal schooling to capture the effects of parental education results in coefficient estimates that are biased upwards; (2) children born to parents with some post-secondary schooling are more likely to attain similar education levels than children born to parents with lower educational accomplishment; (3) in most specifications coefficient estimates of paternal schooling are greater in magnitude than maternal accomplishment; and finally, (4) coefficient estimates of the number of siblings are consistently negative and significant even after the inclusion of birth order effects, implying that a larger family is correlated with a reduced likelihood of post-secondary education.

1. Introduction

Numerous studies examine and evaluate the significance of a wide array of potential determinants of post-secondary educational attainment, including family income and background, tuition levels, financial aid, distance to post-secondary institutions, and more recently, the impacts of compulsory school attendance legislation.[1]

In this context, intergenerational correlations in educational attainment have been surprisingly, relatively unexplored.[2,3]

This research attempts to contribute to the literature by estimating such correlations in order to gain a better idea of the magnitude of intergenerational transfer in human capital. This is specifically accomplished by using data from the public use files of the 1986, 1994, and 2001 waves of the general social surveys conducted by Statistics Canada. The availability of similar surveys over time is important,

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[1] Canadian specific research on the impacts of household or parental income on individual educational attainment include Dicks and Sweetman (1999), Christofides, Cirello, and Hoy (2001) and Corak, Lipps, and Zhao (2005). In another strand of research, empirical results obtained by Frenette (2002, 2003) suggest that post-secondary participation rates, especially for university, are strongly influenced by the distance an individual lives from a post-secondary institution. This effect is particularly strong for low-income students. Oreopoulos (2006) studies the effects of compulsory schooling laws in Canada. Neill (2006) evaluates the effects of tuition fees.

[2] Parental education can impact the educational attainment of their children for several reasons, including (but not restricted to): a desire to emulate the achievements of one's parents; the emphasis placed on education by certain traditions and cultures; and the fact that better educated parents, on average, earn higher income. An excellent survey of this literature is available from Haveman and Wolfe (1995). Finnie, Laporte, and Lascelles (2004) and Finnie, Lascelles, and Sweetman (2005) are relevant Canadian studies.

[3] Oreopoulos, Page, and Stevens (2006) acknowledge the importance of the social returns to parental education by estimating its effects on grade retention of children, employing data from the 1960, 1970, and 1980 U.S. Censuses.

as it allows us to evaluate the effects of parental education across different cohorts.

The data available from the general social surveys are rather rich in detail, and permit us to mitigate a significant amount of potential bias arising from the omission of other family characteristics. In particular, a significant amount of research on the impacts of parental education focuses on the effects of maternal schooling on corresponding attainment by subsequent generations.[4] However, an inability to control for paternal education might result in biased estimates of the effects of parental education to the extent that a positive correlation exists between marriage and education. In other words, more educated women are likely to seek an equally or more educated man as a spouse. We are able to control for this specific type of measurement error, as we possess data on the final educational attainment of both parents.

The data also allows us to disentangle the effects of birth order from family size. Besides ensuring cleaner estimates of the relationship between parental and childrens' education, this information enables us to empirically test the quantity–quality trade-off with respect to having more children, as originally advanced by Becker and Lewis (1973) and Becker and Tomes (1976, 1979). In simple terms, this theory posits that each additional child will enjoy fewer economic opportunities because of the corresponding increase in marginal costs and reduction in parental resources. In contrast, Hanushek (1992) suggests that this relationship resembles a U-shape. While a lower birth order is initially correlated with a decline in economic opportunities, the marginal impacts ultimately flatten out and start increasing again such that the last child enjoys more opportunities than siblings in the middle. We are able to evaluate both these competing hypotheses as the data enable us to control for family size as well as birth order.[5]

Our estimates suggest several findings that are interesting from a policy perspective. First, coefficient estimates of maternal education are biased upwards in the absence of corresponding controls for paternal education. Second, both parents achieving some post-secondary (university and non-university) education are positively correlated with the probability of some university education by the subsequent generation. Further, specific coefficient estimates are quite similar across different surveys with father (mother) schooling correlated with a roughly 0.2 (0.17) increase in the likelihood of some university education by children.

On the other hand, it is important to note that the effects of post-secondary attainment by parents with respect to a broader definition of post-secondary education of children (university and non-university), although statistically significant, declined considerably over the sample period. Specifically, estimates from the 1986 and 2001 waves sug-

gest that paternal (maternal) post-secondary education is correlated with a 0.27 (0.2) and 0.15 (0.13) increase, respectively, in similar education levels among children.

Third, we find some limited evidence of a U-shaped relationship between educational attainment and birth order. Specifically, coefficient estimates of birth order fixed effects from the 2001 wave with respect to the likelihood of some university education are negative and statistically significant. Further, they initially increase in magnitude and then drop. However, we place greater emphasis on the fact that coefficient estimates of family size (number of siblings) are negative and statistically significant across all surveys, even after the use of birth order fixed effects. These findings are robust even after restricting our sample to specific age cohorts for each wave of the general social surveys. This is relevant, given that recent research (Black, Devereux, & Salvanes, 2005) suggests that coefficient estimates of the number of siblings are biased upwards in the absence of birth order fixed effects. Our results suggest the contrary.

The remainder of the paper is organized as follows. Section 2 discusses the data and relevant empirical specifications. Empirical estimates are evaluated in Section 3. Finally, Section 4 concludes with a summary of our principal findings.

2. The data and empirical specifications

Our data are drawn from the 1986, 1994, and 2001 waves of the general social surveys conducted by Statistics Canada. Each of these waves consists of nationally representative data collected through telephone interviews. The data are comprehensive in the sense of containing detailed information on the educational attainment of survey respondents as well as their parents.[6]

It is important to emphasize the difference in college education between Canada and the United States. In the U.S., 'going to college' typically means an undergraduate education at a university or at educational institutions termed as a college and offering a wide array of bachelors' degrees, which is still considered to be university level education. On the other hand, 'college' in Canada usually refers to education attained at a community college, or a trade, technical, or vocational institute, which is post-secondary but 'non-university' education. In this respect, Boothby and Drewes (2006) point out important differences between Canadian and U.S. post-secondary educational levels. Studying 2001 educational attainment among 25–64-year olds in the labor force in both the countries, they find that while the proportion of individuals with post-secondary (university and non-university) is higher in Canada (58%) relative to the U.S. (41%), 36% of the total labor force in Canada has non-university post-

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[4] As noted by Behrman and Rosenzweig (2002).

[5] Black et al. (2005) and Kantarevic and Mechoulan (2006) obtain a statistically significant correlation between birth order and years of education and point to the importance of controlling for family size through fixed effects or actual size. This is to ensure that a lower birth order does not simply reflect lower average or marginal (per child) resources associated with larger families.

[6] While the Canadian Census does consist of data on individual educational attainment, it only contains corresponding information on parental education if the parents live with the survey respondent. Conversely information on children as well as parents' education levels is available if children still live in their parents' residence. Employing data from both these cases might clearly result in sample selection bias. This is a problem which is not restricted to the Census, and is relevant to most other surveys.