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Summarizing primary and secondary effects

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Abstract

Current methods for decomposing class differentials in educational decisions into primary and secondary effects produce many parameters, rendering them ill-equipped for parsimonious comparisons across countries or birth cohorts. This paper develops a parametric method that provides an optimal summary of primary and secondary effects across discrete class origins. Under the testable assumption that the pattern of effects of class origins on academic ability is proportional to the pattern of effects of class origins on educational choice net of academic ability, the method returns a single summary measure. Applying the method to two cohorts born in the UK in 1958 and 1970 suggests that – even with increasing overall inequality of educational opportunity – the relative contribution of secondary effects to class differentials in A-level completion has changed little between the two cohorts.

Keywords: Primary effects; Secondary effects; Inequality of educational opportunity; Educational inequality; Decomposition; Logit; Logistic regression

1. Introduction

Educational stratification researchers have become increasingly occupied with decomposing social class differentials in educational decisions into primary and secondary effects. In this context, primary effects refer to the indirect effect of social class on the educational decision that results from class differences in academic ability or performance, while secondary effects refer to the direct effect of social class on the educational decision holding academic ability or performance constant. Following Boudon (1974), current research gives theoretical interpretation to these two effects: Whereas primary effects are a result of class differences in genetic and socio-cultural dispositions, secondary effects stem from class differences in the expected returns to completing a certain educational level. Higher class students need to attain a relatively higher level of schooling than lower class students, if they are to avoid downward mobility and enter the same or higher social class as their parents (Breen & Goldthorpe, 1997).

While the theoretical interpretations of primary and secondary effects have been spelled out rather convincingly, stratification researchers continue to discuss how best to identify and quantify primary and secondary effects in empirical analyses. One strand of research directly estimates the theoretical parameters governing the model of relative risk aversion by Breen and Goldthorpe (1997) (Becker, 2003; Becker & Hecken, 2009; Breen & Yaish, 2006; Gabay-Egozi, Shavit, & Yaish, 2010; Holm & Jæger, 2008; Jacob & Weiss,

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2011; Jæger & Holm, 2012; Need & de Jong, 2001; Stocké, 2007; van de Werfhorst & Hofstede, 2007), while another strand indirectly infers the relative importance of secondary effects over primary effects from observed correlations between social class, educational decisions, and academic ability or performance (Becker, 2009; Boado, 2011; Contini & Scagni, 2011; Davies, Heinesen, & Holm, 2002; Erikson, 2007; Erikson, Goldthorpe, Jackson, Yaish, & Cox, 2005; Erikson & Rudolphi, 2010; Jackson, 2010, 2013; Jackson, Erikson, Goldthorpe, & Yaish, 2007; Kloosterman, Ruiter, De Graaf, & Kraaykamp, 2009; Karlson & Holm, 2011; Neugebauer, 2010; Neugebauer & Schindler, 2012; Schindler & Lörz, 2012; Schindler & Reimer, 2010). In analyses using discrete measures of social class, this latter strand of research is characterized by producing a plethora of parameters, complicating comparisons across birth cohorts or countries or both. Because comparative studies lie at the heart of stratification research, this situation is unfortunate and warrants and acceptable solution.

This paper offers a solution to this issue. It presents a method for summarizing the relative contributions of primary and secondary effects to class differentials in educational choices across discrete measures of social class. Drawing on work by Breen and Karlson (2012), I use a parametric approach that – under a testable proportionality assumption – provides a single, yet optimal, summary. The method is based on regression models with parametrically weighted predictor variables; a strategy that has a long tradition in stratification research and social science research more generally (Yamaguchi, 2002). For example, one type of model is the unidiff or log-multiplicative layer-effect model (Erikson & Goldthorpe, 1992; Xie, 1992), another is the stereotyped ordered regression of Anderson (1984), and a third is the diagonal reference model of Sobel (1981). The approach I suggest deviates from these models in that it places a cross-equation proportionality constraint on the social class effects on *both* academic ability *and* the educational decision net of academic ability. I apply the method to the case of trends in the primary and secondary effects in A-level completion for cohorts born 1958 and 1970 in the UK. The analysis shows that – despite increase in overall class inequalities in A-level completion – secondary effects have been constant between the two birth cohorts, accounting for approximately two-thirds of the class differentials.

2. Existing methods and their limitations

The literature on primary and secondary effects provides several ways of decomposing class differentials in discrete educational choices (Buis, 2010; Erikson et al., 2005; Karlson & Holm, 2011; Morgan, 2012). One limitation pertaining to all of these methods is that, whenever discrete measures of social class are employed, they produce a plethora of parameters. This issue arises because each contrast between classes is assigned a primary and a secondary effect. In analyses involving J social classes, the total number of contrasts is $\frac{1}{2}J(J-1)$. In analyses involving five origin classes, this amounts to 10 contrasts and consequently 10 primary and secondary effects. Seven class analyses would return 21 primary and secondary effects. If researchers are interested in particular class contrasts, then such detailed information may prove valuable. But in cross-country and cross-cohort analyses – so central to the stratification discipline – researchers often prefer optimal summaries of results as the basis for comparisons (Breen & Karlson, 2012).

The literature on decompositions of primary and secondary effects has suggested two ways of solving the issue of having too much information. The first is to collapse social classes into a few, large classes (e.g., Jackson et al., 2007). This strategy is useful whenever collapsing classes does not ignore important heterogeneity within the larger classes. While the validity of collapsing classes in principle can be tested, it is far from clear how researchers should proceed if collapsing classes ignores important information. The second approach takes a simple average of decomposition percentages over class contrasts (e.g., Karlson & Holm, 2011). While this approach allows for many contrasts, it does not assign proper weights to each of the decomposition percentages. Moreover, in their application of this approach, Karlson and Holm (2011) took the average over only a subset of all class contrasts, ignoring potential heterogeneity in the remaining contrasts.

A further issue relating to the abundance of parameters arises in the method by Erikson et al. (2005) (also see, Jackson et al., 2007). The method produces two sets of primary and secondary effect estimates, introducing indeterminacy in how best to report the results (Buis, 2010). Jackson et al. (2007) suggest reporting the simple average of the two. Whether this approach can be considered optimal is yet to be explored.

In sum, existing methods for decomposing primary and secondary effects produce much information, and no common approach for optimally summarizing this information has been developed. To develop such an approach, I draw on the recent work by Breen and Karlson (2012), who suggest a general method for summarizing the extent to which education mediates social mobility. To provide optimal summaries, they suggest combining the decomposition method of Karlson, Holm,