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Social interactions and college enrollment: A combined school fixed effects/instrumental variables approach

Jason M. Fletcher

La Follette School of Public Affairs, Department of Sociology, University of Wisconsin–Madison, 1225 Observatory Drive, Madison, WI 53706, United States

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ABSTRACT

This paper provides some of the first evidence of peer effects in college enrollment decisions. There are several empirical challenges in assessing the influences of peers in this context, including the endogeneity of high school, shared group-level unobservables, and identifying policy-relevant parameters of social interactions models. This paper addresses these issues by using an instrumental variables/fixed effects approach that compares students in the same school but different grade-levels who are thus exposed to different sets of classmates. In particular, plausibly exogenous variation in peers' parents' college expectations are used as an instrument for peers' college choices. Preferred specifications indicate that increasing a student's exposure to college-going peers by ten percentage points is predicted to raise the student's probability of enrolling in college by 4 percentage points. This effect is roughly half the magnitude of growing up in a household with married parents (vs. an unmarried household).

1. Introduction

There is a large and growing literature in economics and other social sciences that seeks to quantify the importance of peer influences on individual choices. Education and health outcomes have been of particular interest. One reason for this interest is that finding evidence of social interactions suggests that policies that influence an individual's decision are predicted to "spill over" and influence peers' decisions. This spillover effect suggests that traditional cost-effectiveness analyses of programs that influence important choices (e.g. smoking, college enrollment) do not capture the full benefit of the programs and that these programs will likely be under-utilized as a result. In addition, finding evidence of social interactions also indicates that the composition of peer groups matters for individual and aggregate outcomes. This fact has implications for policies that shift the composition of groups, such as school choice policies, busing, and voucher programs.

Unfortunately, although the policy significance of finding social interactions in important decisions such as college enrollment is large, the empirical challenges with credibly assessing the presence of social interactions are equally large. Three principal difficulties include (1) the endogeneity of the peer group, (2) separately identifying different types of social influences, and (3) the presence of group-level unobservables that could lead to spurious estimates of social influences. The first two problems have been the focus of much current research.[1] However, one concern with much current research in the areas

E-mail address: jmfletcher@wisc.edu

[1] Endogeneity of the peer group has been confronted by using instrumental variables (Evans et al., 1992), random assignment of peers (Sacerdote, 2001), school level fixed effects (McEwan, 2003; Lavy and Schlosser, 2007), or comparing groups based on mobility (Gaviria and Raphael, 2001). The separate identification of different types of social influences has come from the use of instrumental variables (Gaviria and Raphael, 2001) as well as the use of lagged peer measures (Hanushek et al., 2003; Clark and Loheac, 2007).

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of peer effects and social interactions is the problem of group-level unobservables (Durlauf, 2004). The presence of group-level unobservables could allow the researcher to conclude that social interactions exist when in fact there are 'third factors' that simultaneously affect the outcomes of all group members, leading to false conclusions of the importance of social interactions in the individual's decision-making process (Manski (1993) uses the term 'correlated effects').

Some of the most convincing research on peer influences in education outcomes has come from administrative data that is able to use school and/or school-by-grade fixed effects.[2] In many cases, this requires administrative datasets because of both the need for multiple cohorts and the need for large sample sizes so that enough variation is present in the data to identify the importance of social influences. Unfortunately, using administrative datasets limits both the individual-level observables available (e.g. family background variables) as well as the outcomes that can be examined.

In this paper, I combine the benefits of using rich longitudinal data that contains multiple cohorts of individuals in the same school and large enough samples to permit school-level fixed effects in the analysis to control for group-level unobservables. I combine this methodology with an instrumental variables approach to identify the parameters of interest to examine the importance of social influences on individual college enrollment decisions. The preferred instrumental variable strategy uses plausibly exogenous across-grade, within-school variation in the exposure to peers whose parents strongly encourage college enrollment. This encouragement by peers' parents is assumed to affect an individual's college enrollment related choices only through his peers' college enrollment related choices, controlling for other factors such as peer family income, maternal education, race, etc. This assumption is consistent with the intuition that peers' parent investments that occur at home are distinct from other peer variables, such as income, and thus only affect an individual's college enrollment decision through the impacts on his/her peers (i.e. are "excludable" from the individual's decision equation). This paper provides evidence that variation in this peer family characteristic is quasi-random across cohorts within schools and also conducts falsification tests that replace peer college choices with the college choices of individuals in adjacent cohorts in the same school (Lavy and Schlosser, 2007; Bifulco et al., 2011).

Using the combined instrumental variables/fixed effects approach indicates that college enrollment decisions are influenced by peers' choices. In particular, increasing a student's exposure to college-going peers by ten percentage points is predicted to raise the student's probability of enrolling in college by 4 percentage points. This effect is similar in magnitude to half the estimated benefit of growing up in a household with married parents (vs. unmarried) or having a mother with one year of additional schooling (vs. the sample average).

2. Background

For several decades in economics and other social sciences, researchers have made a substantial effort to incorporate social influences in modeling and estimating the decisions of individuals. Many point to the Coleman Report (1966) as a seminal work, as it drew attention to the family and social determinants of youth outcomes. Dozens of researchers have followed this shift of emphasis toward examining peer influences on education outcomes (e.g. Hoxby, 2000; Hanushek et al., 2003; Sacerdote, 2001; Foster, 2006; Cooley, 2007; Ding and Lehrer, 2007; Lavy and Schlosser, 2007; Ammermueller and Pischke, 2007; Zabel, 2008; Bifulco et al., 2011).

Before outlining relevant research that examines the importance of social influences on education outcomes, it is necessary to define relevant concepts in the social interactions literature. Manski (1993, 2000) distinguishes among the following types of social effects: endogenous effects, contextual effects, and correlated effects. *Endogenous effects* occur when the propensity of an individual to behave in some way varies with the behavior of the reference group. *Contextual effects* (also called exogenous effects in the sociology literature) occur when the propensity of an individual to behave in some way varies with the exogenous characteristics of the reference group. *Correlated effects* occur when individuals in the same group tend to behave similarly because they have similar individual characteristics or face similar institutional environments. Consider the case of college enrollment. Endogenous effects can occur if an individual is more likely to enroll in college if his classmates enroll—that is, if their decisions are interdependent. Contextual effects can occur if an individual is more likely to enroll in college if he or she is surrounded by classmates with highly educated parents. Correlated effects, which are not social in nature, can occur if individuals in the same school choose to enroll in college because they are geographically close to a college.

Distinguishing among these categories of effects (i.e. endogenous, contextual, and correlated effects) is important for several reasons, especially because of their different implications for potential policies. Policies that take advantage of endogenous effects are likely to produce a *social multiplier*. For example, if college enrollment is subject to endogenous effects, a policy that increases the propensity to enroll in college of an individual or a group of individuals within a school will affect other individuals who were not directly targeted by the policy—the effect of the policy is multiplied through social interactions. On the other hand, contextual changes may not imply the same multiplier effect responses to an exogenous shock. For example, adding higher income students to a low-income school would benefit the students in the receiving school, but the students at the sending school would be worse off. Thus, the gains to the former school would offset the losses from the

[2] In particular, group level unobservables have been controlled in some research that has access to multiple cohorts (Hoxby, 2000; Arcidiacono and Nicholson, 2005; Hanushek et al., 2003; Lundborg, 2006; Lavy and Schlosser, 2007), where, for example, school or school/grade fixed effects are controlled and idiosyncratic variations of peer characteristics and/or peer outcomes are used to assess the importance of social influences.