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Social effects in employer learning: An analysis of siblings

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HIGHLIGHTS

- Do wages incorporate information on personal contacts?
- I study employer learning when related workers have correlated abilities.
- The theory is tested using data on the test scores and log wages of siblings.
- An older sibling has a larger impact on a younger sibling than vice versa.
- There is strong evidence of statistical nepotism in labor markets.

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ABSTRACT

This paper examines whether wages are based on information about personal contacts. I develop a theory of labor markets with imperfect information in which related workers have correlated abilities. I study wage setting under two alternative processes: individual learning, under which employers observe only a worker's own characteristics, and social learning, under which employers also observe those of a relative. Using sibling data from the NLSY79, I test for a form of statistical nepotism in which a sibling's performance is priced into a worker's wage. Empirically, an older sibling's test score has a larger impact on a younger sibling's log wage than a younger sibling's test score has on an older sibling's log wage. The estimates provide strong support for social effects in employer learning.

1. Introduction

An important question in labor economics concerns how personal contacts influence job search behavior and wage setting decisions. As Granovetter's (1974) classic survey of workers in the Boston area illustrates, nearly half of all jobs are obtained through a social contact. The extensive use of friends, relatives, and acquaintances in job search enables personal contacts to play a role in shaping employers' beliefs about a worker's skills. As Rees (1966) notes when studying workers in a Chicago neighborhood, "Present employees tend to refer people like themselves, and they may feel that their own reputation is affected by the quality of the referrals."

This paper develops an empirical test for whether wages incorporate information on personal contacts. Combining a sibling model similar to Griliches (1979) with an employer learning model related to Altonji and Pierret (2001), I construct a framework in which workers are organized into disjoint social groups composed of agents with correlated abilities and differing ages. I examine wage determination under two competing assumptions about the market's formation of beliefs: individual learning and social learning. Under individual learning, a worker's wage equals the conditional expectation of her productivity given only her own schooling and performance. Under social learning, a worker's wage equals the conditional expectation of her productivity given the schooling and performance of all the members of her social group, including herself.

Using sibling data from the NLSY79, I apply this framework to test for a form of statistical nepotism in which a worker's wage depends on both

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one's own and a sibling's characteristics.[1] The basic logic is as follows. If one sibling is older than another sibling, then employers should have more precise information about the older sibling. Hence, when market participants form Bayesian beliefs about the abilities of the two siblings, the older sibling's average performance would have a greater impact on employers' mean beliefs about the younger sibling's ability than vice versa, and the component of the younger sibling's wage attributable to the older sibling's ability would be larger than the component of the older sibling's wage attributable to the younger sibling's ability.

Empirically, given data on the test scores and schooling of siblings, this weighting can be detected by regressing an individual's log wage on her own and a sibling's test scores and schooling. If employer learning is nepotistic, then the ratio of the coefficient on a sibling's test score to that on one's own test score should typically be higher in a younger sibling's than in an older sibling's log wage. However, if employer learning is individual, then the ratio of the coefficient on a sibling's test score to that on one's own test score should be the same for both a younger and an older sibling. The empirical results are consistent with statistical nepotism. In order to eliminate other explanations for the results, I document several pieces of evidence related to job search patterns, human capital measures, and geographic or economic proximity.

The empirical strategy integrates elements from four largely distinct literatures in labor economics. First, this paper is part of a sizeable literature on the identification of social effects.[2] The most closely related paper is Case and Katz (1991), which attempts to detect neighborhood influences by regressing an individual's outcome variable on the background variables of her peers.

Second, this paper contributes to a growing literature on employer learning and statistical discrimination. In order to examine social interactions in the employer learning process, I extend the basic methodology developed by Farber and Gibbons (1996) and Altonji and Pierret (2001).[3] I thereby devise a test for statistical nepotism, in which employers infer an individual's productivity based partly on information about her relatives.

Third, this paper is relevant to a theoretical literature on social networks in labor markets.[4] The framework in the current paper is most similar to the model in Montgomery (1991). In that model, workers are arranged into social groups containing either one or two members, and social groups of size two consist of an older and a younger worker with correlated abilities. Employers use the observed performance of the more senior worker in each pair to infer the ability of her more junior counterpart.

Fourth, this paper contributes to a small empirical literature that attempts to test for nepotism in labor markets. A relevant paper is Lam and Schoeni (1993), whose empirical strategy involves comparing the coefficients on a father's and a father-in-law's schooling in wage equations.[5] In addition, Wang (2013) identifies the effect of a father-in-law on male earnings, and Gevrek and Eylem Gevrek (2010) study how nepotism influences college performance.

The remainder of this paper is structured as follows. Section 2 presents the employer learning models. Section 3 describes the empirical specification. Section 4 discusses the construction of the estimation sample. Section 5 presents the empirical results. Section 6 proposes some implications for antidiscrimination policy. Section 7 concludes.

2. Sibling models with employer learning

This section analyzes how employer learning affects the relationship between siblings' test scores and log wages. The framework embeds a sibling model based on Griliches (1977, 1979) into an employer learning model related to Farber and Gibbons (1996), Altonji and Pierret, 2001, and Lange (2007).

2.1. Labor market characteristics of siblings

This section presents a statistical model of siblings' labor market attributes. The treatment focuses on the case in which there are two siblings, 1 and 2. As in much of the literature on employer learning, the log labor productivity $l(s_i,a_i,t_i)$ of person $i \in \{1,2\}$ is assumed to be decomposable into two components:

$$l(s_i, a_i, t_i) = g(s_i, a_i) + h(t_i), \tag{1}$$

where $g(s_i,a_i)$ is a time-invariant component of productivity, and $h(t_i)$ represents additional human capital accumulated with age t_i. Letting $\beta > 0$, the function $g(s_i,a_i)$ is linear in schooling s_i and ability a_i:

$$g(s_i, a_i) = \beta s_i + a_i, \tag{2}$$

where the coefficient on a_i is without loss of generality normalized to one. The abilities a_1, a_2 of the two siblings are joint normally distributed with respective means μ_{a1} and μ_{a2}, identical variance $\sigma_a^2 > 0$, and correlation $\rho_a \in (0, 1)$. Letting $\gamma > 0$, schooling is related to ability through:

$$s_i = \gamma a_i + \epsilon_i, \tag{3}$$

where ϵ_i, which represents factors other than labor market ability that influence education decisions, is assumed to be independent of a_1, a_2. The error terms ϵ_1, ϵ_2 are joint normally distributed with respective means $\mu_{\epsilon 1}$ and $\mu_{\epsilon 2}$, identical variance $\sigma_\epsilon^2 > 0$, and correlation $\rho_\epsilon \in (0, 1)$.

The information available to employers about ability a_i is symmetric but imperfect.[6] In particular, employers observe the schooling s_i of each person as well as a sequence $r_i = \{r_{iu}\}_{u=1}^{t_i}$ of noisy productivity signals given by

$$r_{iu} = g(s_i, a_i) + \eta_{iu}, \tag{4}$$

where each measurement error η_{iu} is a normal random variable with mean zero and variance $\sigma_\eta^2 > 0$.[7] The η_{iu} are assumed to be independent of each other and of all the other variables in the model.

The econometrician is assumed to observe a test score z_i in addition to the education level s_i. Letting $\theta_s > 0$ and $\theta_a > 0$, the ability measure z_i takes the form:

$$z_i = \theta_s s_i + \theta_a a_i + \omega_i, \tag{5}$$

where ω_i, which represents factors unrelated to labor productivity that affect the test score, is independent of both a_1, a_2 and s_1, s_2. The error terms ω_1, ω_2 are joint normally distributed with respective means $\mu_{\omega 1}$ and $\mu_{\omega 2}$, identical variance $\sigma_\omega^2 > 0$, and correlation $\rho_\omega \in (0, 1)$. In

[1] This article uses the term nepotism to refer to unequal treatment on the basis of family relationships. This usage differs from the nomenclature in Becker (1971), who applies the term to describe favoritism towards a particular group. By statistical nepotism, I mean unequal treatment due to information from a relative, not because of the preferences or influence of a relative.

[2] See Ioannides and Loury (2004) for a review of existing research on social effects in labor markets. Recent papers in this area include Bayer et al. (2008), Beaman (2012), Beaman and Magruder (2012), Burns et al. (2010), Cingano and Rosolia (2012), Combes et al. (2008), Dustmann et al. (2011), Hellerstein et al. (2011), Kramarz and Nördstrom Skans (2013), Kugler (2003), and Nakajima et al. (2010).

[3] Pinkston (2003) analyzes gender differences in the process of employer learning. Autor and Scarborough (2008) investigate an example of statistical discrimination based on race. Simon and Warner (1992) as well as Pinkston (2012) assess the informational content of employee referrals.

[4] Models of job search through social networks have been developed by Bramoullé and Saint-Paul (2010), Calvò-Armengol and Jackson (2004), Mortensen and Vishwanath (1994), and Zaharieva (2013).

[5] Similarly, Hellerstein and Morrill (2011) examine trends in the transmission of human capital from fathers to daughters by analyzing changes in the likelihood that a woman enters her father's as compared to her father-in-law's occupation.

[6] Symmetric information means that all employers in the labor market are equally knowledgeable about the variables in the model. That is, prospective employers observe the same information about a worker as a current employer.

[7] Note that r_i can be interpreted as the performance history of a worker.