Social learning, neighborhood effects, and investment in human capital: Evidence from Green-Revolution India

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Abstract

This paper empirically identifies social learning and neighborhood effects in schooling investments in a new technology regime. Social learning implies that learning is most efficient when observed heterogeneity in schooling is greatest. The estimates of learning-investment rule, from farm household panel data at the onset of the Green Revolution in India, show that (i) agents learn about schooling returns from income realizations of their neighbors, and (ii) the speed of learning is high when the variation of schooling is large. Thus, schooling distribution of the parents' generation in a community has externalities to schooling investments in children. Simulations show that the variations in schooling within and across communities generate variations in child enrollment rate and average household income.
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1. Introduction

It has become increasingly recognized that technological changes affect returns to schooling in both developing and developed countries (e.g., Foster and Rosenzweig, 1996; Juhn et al., 1993). To correctly infer new returns, however, agents face an informational problem. Since schooling investment is irreversible and also requires a long gestation period, agents cannot simply go to school to learn about schooling returns. Therefore, agents cannot rely on their own experience but

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must use observations from others to infer the returns. When agents learn from their neighbors, neighborhood factors influence the social learning.

The neighborhood characterizes the environment in which agents learn from their neighbors. This paper examines neighborhood effects on social learning that determines schooling decisions, using household data available from the onset of the Green Revolution in India, where in some regions the diffusion of high-yielding varieties (HYVs) affected returns to schooling. The analysis shows that schooling distribution of the parents' generation in a village is important to social learning and household decisions on child schooling investments.

The empirical finding that schooling decisions are correlated among neighbors can be viewed as the evidence of neighborhood effects, peer pressure, role models, norms of behavior, and social networks. The high correlation of similar decisions among neighbors has been found in many empirical studies (Case and Katz, 1991; Evans et al., 1993; Strauss and Thomas, 1995; Topa, 2001; Conley et al., 1999). Moreover, the within-community correlations are also hypothesized to justify public subsidies for education in theoretical studies (Benabou, 1996).[1] However, the process that generates the cross-sectional correlations of decision making has not been empirically identified until recently, except by Besley and Case (1994), Foster and Rosenzweig (1995), Munshi (2004), and Conley and Udry (2004).[2] In this study, I attempt to empirically identify the process of social learning and neighborhood effects on child schooling investments in a Bayesian learning model.

The question of whether agents know of and how fast they respond to return structures poses a more extensive but fundamental question into the way we think about economic development. For example, are observed variations of human-capital accumulation simply a consequence of different return-augmenting mechanisms in perfect information, as argued in endogenous growth theories (Lucas, 1988; Romer, 1986)? Or are they a consequence of local environments that affect agents' learning speed under imperfect information? Even if returns are augmented, the latter would potentially generate substantial variations in investment. Though corresponding implications for development policy are different, it is not easy to identify these two cases by casual observations.

Empirical findings regarding the above question are not conclusive. In his extensive survey on the rate of return to schooling investments, Psacharopoulos (1994) points out higher rates of return to private schooling investments in developing countries than in developed countries, especially from primary education. Child schooling investments are likely to be suboptimal in less-developed countries, although in most studies he surveys the sampling is not random and sometimes selective.[3] The evidence on dynamic changes in enrollment rate is rare in the literature on developing economies. Foster and Rosenzweig (1996) and Rosenzweig (1990) are exceptions. They show evidence from India that private schooling investments have increased in 10 years in

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[1] The literature in bounded-rationality social learning (Ellison and Fudenberg, 1993) analyzes different types of myopic learning rules (rules of thumb), asking if the equilibrium converges to an efficient outcome in the long run. Inertia is assumed in the dynamics of endogenous variables. Most of the empirical studies that confirm contemporaneous cross-agent correlations share the same spirit of abstraction with this literature in that behavioral foundations are not clarified. This paper, on the other hand, assumes rational (Bayesian) learning and attributes spatial variations of outcomes to different environmental factors (neighborhood characteristics) that determine the speed of learning.

[2] Conley and Udry (2004) incorporate networks of neighbors that determine exact routes of information flow. This paper assumes that households in a village learn from all the neighbors in the village.

[3] Glewwe (1996) argues that it is important to take into account quality differences in schooling investments in the empirical assessment of schooling attainment. See also Behrman (1999) for a recent survey of empirical evidence from broader perspectives.