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Uncertain educational returns in a developing economy

Sandeep Mohapatra *, Martin K. Luckert

Department of Resource Economics and Environmental Sociology, University of Alberta, Canada

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ABSTRACT

This paper estimates the distribution of educational returns by gender for India. While previous studies focus on mean returns, the variance of educational returns has important implications for policy-making and micro-level decision making with respect to education. If the variance of educational returns is large, it can leave large sections of the population with negative returns; if the variance of educational returns is gender specific, it can influence households' decisions to educate girls versus boys. Our econometric results provide evidence that India's labor markets are characterized by significant uncertainty and that the uncertainty is systematically larger for women.

1. Introduction

The rate of return to education is a key economic parameter that has received attention from empirical researchers for decades (see Psacharopoulos and Patrinos, 2004 for a recent review). Estimates of educational returns are used to guage the level of educational expenditures undertaken by governments and individuals. For example, policymakers often use information on educational returns to assess the feasibility of student loan programs for funding higher education (OECD, 2007; Oliveira Martins et al., 2009). Perception by parents about the return to education influences their decisions regarding educating children, and educating boys versus girls (Gertler and Glewwe, 1992; Munshi and Rosenzweig, 2006). Returns to education are also important from a macroeconomic perspective since human capital accumulation is regarded as one of the prime movers of regional and country-level economic growth (Barro, 1991).

Most studies on educational returns investigate mean values. In contrast to mean returns, the variance (henceforth uncertainty) associated with economic returns to education has received little attention (Patrinos et al., 2006). There is, however, a long standing theoretical literature emphasizing that when investing in human capital, individuals and governments are not only interested in returns, but also in the certainty of those returns (e.g. Levhari and Weiss, 1974). Understanding the uncertainty in educational returns is necessary for understanding both the incentives that individuals have to invest in education and the impacts of government policies that support increased investment in education. For example, if significant portions of the distributions of returns to education are negative, then risk averse individuals, and/or governments averse to uncertain impacts of policies, may be hesitant to invest in education. Alternatively, if investments in human capital decrease the variance of wages, that is, if the uncertainty in educational returns is decreasing in education levels, then governments will have stronger incentives to nurture human capital accumulation due to its insurance effect, either as a substitute for, or in combination with social protection polices (Anderberg and Andersson, 2003).

In recent years a number of studies in labor economics, with a focus on developed economies, are increasingly paying attention to the magnitude of uncertainty present in educational returns. Many empirical papers confirm that educational returns exhibit significant variability across individuals (e.g. Koop and Tobias, 2004). Others show that the amount of variability present in educational returns may evolve over time as governments expand the total quantity of education in an economy (Harmon et al., 2003). Uncertainty can increase, for example, if an education expansion draws less able people into the educated pool. Implications of uncertainty in eductional returns for wage inequality, and the possibility that sizeable fractions of the population may face negative returns, have also been explored (Maier et al., 2004; Lauer, 2004).

One strand of the uncertainty literature focuses on understanding what drives the enrollment rates of women in higher educational institutions in developed countries (e.g. Averett and Burton, 1996; Jacob, 2002; Anderson, 2002). Using theoretical models of lifetime earnings, studies show that a female college wage premium and women's expectations of future earnings are the major drivers of women's college enrollment (He, 2011). The logic behind these models is that individuals make their college entry decisions by comparing the expected difference in the average discounted wages from two future wage distributions,

* Corresponding author at: 515 General Services Building, Department of Resource Economics and Environmental Sociology, University of Alberta, Edmonton, AB, T6G 2H1, Canada. Tel.: +1 780 492 0823.
E-mail address: Sandeep.mohapatra@ualberta.ca (S. Mohapatra).

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college and non-college. Charles and Luoh (2003) show, however, that the decision depends not only on the difference in expected earnings, but also on differences in the anticipated variance of the two future distributions.

Though the literature on uncertain returns to education has been focused in developed countries, the issues addressed in this literature are of fundamental concern to developing economies, where human capital accumulation and gender equality, both mediated through labor markets, are key determinants of economic growth (OECD, 2007; Schultz, 2002). Since uncertainty in educational returns discourages human capital accumulation, and can also influence proportions of men and women who are educated, it can affect the long run growth and equilibrium of an economy. Despite the importance of uncertain returns to education in developing economies, to our knowledge, there are no investigations in these settings.

The overall goal of this study is, therefore, to investigate whether differing levels of educational returns are characterized by uncertainty and whether the uncertainty is systematically different for men and women in a developing country context. We consider the case of India, one of the largest and fastest growing developing economies in the world. To achieve our overall goal, we employ three specific approaches. First, using a nationally representative dataset on over 30,000 wage workers observed during the 2005–2006 time period, we describe how wage distributions vary across levels of education and gender. Second, we econometrically estimate the determinants of wages for men and women and statistically test for the presence of uncertainty at each level of education. Third, we use the estimated parameters to construct the distribution of annual rates of return corresponding to each level of education for each gender. As part of this third approach, we also calculate the probabilities of individuals receiving negative returns to education.

Our study makes three contributions. First, it contributes to the empirical literature on uncertainty in educational returns, with an emphasis on its importance in developing countries. As discussed above, only a few studies in labor economics have examined uncertainty in educational returns, and these have been in developed country contexts. Second, our study contributes to the literature on the economics of gender in developing countries. Examining uncertainty in returns to education may be particularly important for women in developing country settings, as their education has been shown to play a multifaceted role in economic development.[1] Third, our study contributes to current policy discussions regarding education reform and its link to a wide range of outcomes in India, including poverty, inequality and economic growth. In sum, by focusing on the the variance of estimated returns, we hope to establish more clearly the implications of uncertain returns for the targeting of education policies.

The rest of the paper is organized as follows. In Section 2, we develop a conceptual framework that shows how empirical distributions of educational returns can affect the demand for education by individuals and households. In Section 3, we describe the Indian context of our study, and the data used in our analysis. In Section 4, we present our econometric model for estimating educational return distributions. Our results are contained in Section 5, and are divided into three sections that correspond with each of our approaches; comparisons of wage distributions, econometric estimates of uncertainty in returns to education, and a simulation of annual returns to education and the probability of negative returns. Section 6 concludes the paper.

2. The implications of uncertainty for gender specific investments in education – a conceptual framework

Charles and Luoh (2003, subsequently referred to as CL in this paper) developed an educational investment model that is useful for conceptualizing the implications of our econometric findings for micro-level educational investment decisions. In this section we describe the model and recast it to represent the case of India. We then use the results of the conceptual model to derive testable hypotheses regarding our estimates of uncertainty in educational returns and how they correspond to alternative incentive structures within households to educate females and males.

A number of scholars have studied, in India and other developing country contexts, factors that influence household decision making with regards to educating their children. This literature highlights the complexity of the decisions that households face (e.g. Munshi and Rosenzweig, 2006). In addition to labor market considerations, a number of factors may influence education decisions including social norms and cultural considerations. However, similar to a large body of past work, our focus in this paper is on labor market considerations, while controlling for social considerations such as caste and religion. The conceptual model which follows reflects this focus.

The CL model depicts individuals who are deciding whether to attend college during a future period. In the context of our Indian case study, consider a representative household where parents make the decision about whether to invest in increased education for their children.[2] Education is valued by parents as an investment that is expected to yield a financial return to the household.[3] These investments depend on anticipated net returns from educating males versus females.[4]

But returns to education are not certain, and can vary depending on whether a household invests in a male or a female child. Fig. 1, taken from the CL paper, may be used to investigate this choice. Consider two alternative distributions, B and B', that represent, respectively, more and less certain future earnings from an investment in education. The corresponding lower future earnings without the investment are represented by A and A'. The lower and higher levels of education are, respectively, referred to as "no college" and "college" in the CL figure. The difference in the means of the higher and lower education distributions represents a premium, P received from obtaining a higher education level. Under the standard approach based on average values, labor markets are assumed to function such that households at the margin, comparing educational premiums, would be indifferent between A and A' or B and B' for a given level of costs. But if a risk averse household is faced with the option of taking option A, or to

[1] Increased education of women and girls has been shown to be associated with: decreased malnourishment (Smith and Haddad, 1999), decreased infant mortality (Schultz, 1993; Summers, 1994), decreased fertility rates (Subbarao and Raney, 1995), decreased vulnerability to HIV/AIDS (de Walque, 2007), decreased environmental degradation (Asian Development Bank, 1989), a greater likelihood of resisting violence (Sen, 1999) and of participating in political meetings (UNESCO, 2000), and the adoption of more efficient farming practices (Smith and Haddad, 1999). Based on such evidence, many economists openly recommend allocating a disproportionate share of public expenditures toward women's education (Schultz, 2002).

[2] Models of parental investment in their children have been developed by Ben-Porath (1967) and Heckman (1976), and have been applied in a variety of contexts (Alderman and King, 1998). Though the parental investment framework more accurately describes the situation in India than the individual investment framework developed by CL, we follow the CL framework because it embodies the same tradeoffs of benefits and costs while explicitly focusing on distributions rather than on average levels of educational returns.

[3] Households may also have a direct consumption motive in educating children. For example, parents may prefer educated over non educated children. We do not include such a motive in our conceptual model because it does not change the main point pursued here.

[4] Differences in the anticipated net returns to education among genders can be due to differences in costs, benefits, or both. Empirical work using Mincer earnings functions focuses on gross returns for a given levels of costs.