Essays on estimating social returns to education

Abstract

Social returns to education measure the benefits that accrue to society from an increase in the average level of education in a community. It is these social returns to education that have led governments across the globe to invest heavily in the provision of education, despite its large private benefits. However, despite much evidence indicating that both monetary and non monetary externalities to education exist, there has been little effort in quantifying them especially in the context of developing economies. This thesis attempts to fill this gap in the literature.

We begin by presenting an overview of the literature in the first chapter and identify empirical challenges in estimating social returns to education. In our second chapter, we estimate social monetary returns to education using data from Indonesia. We choose this Southeast Asian economy since it is one of the very few developing countries where researchers have access to large scale panel data on a wide range of socioeconomic indicators. Indonesia also benefited from one of the highest public sector investments in the provision of education in the 1970's. We obtain individual level data from the Indonesia Family Life Surveys (1993-2007), and construct sub-district level data on average education levels from SUSENAS, a large scale national level socioeconomic survey.

The primary challenge in estimating social returns to education is identification. Average education may be correlated with individual wages because individuals with high ability also live in a sub-district with higher average education levels. This possibility makes it difficult to identify the causal effect of average education on wages especially because there are no exogenous policy changes that would drive sub-district level variations in average education levels. We leverage the fact that average education levels within sub-districts has varied over time. To the extent that the ability of an individual remains unchanged over time, a fixedeffects model is estimated. Under the maintained assumption that there exist no time-varying factors that are correlated with both average education and wages, the aforementioned approach can provide a "causal" estimate of the effect of average education on wages.

We further test the sensitivity of our results to different approaches and assumptions. For example, we leverage the fact that some individuals in our sample moved between subdistricts during our study period and use the "within-person" variation to identify the effect of average

education. Even so, a drawback with this approach is that we cannot compare wages of what a person earns in a new locality with what he would have earned had he not moved. Without this, it may well be the case that the same person would earn higher wages in a few years, living in the same locality. To partly overcome this problem, we do a robustness check where we compare wage levels of siblings who stay in different sub-districts (using sibling fixed effect) and try to asses if difference in average education has an impact of individual wages.

Over and beyond the aforementioned approaches, we use the richness of the IFLS to control for a wide array of factors in our regressions. However, if our assumption that there exist no time-varying factors that are correlated with both average education and wages fails or if there are measurement errors, our results may not truly measure the impact of average education on individual wages. We thus use an instrumental variable approach with number of schools in a community as an instrument for average education.

Our primary result based on the fixed-effect model suggests that an additional year of average education results in about a 2.3 percent increase in wages. In other models using mover and sibling data and instrumental variables our results confirm the presence of positive externalities. Further we observe that social returns are higher in urban areas (and secondary and tertiary sector) as compared to rural areas (and primary sector). Finally we also repeat the main specifications including forward lags for average sub-district educational attainment to check if forward lags are predictive. Our results show that only contemporaneous average education influences wages confirming that underlying time trends are not driving the results.

In our third chapter, we bring together the *returns to education* and *occupational choice* literature and estimate social non-monetary returns to education once again using data from Indonesia. Our theoretical model shows that in an environment where agents cannot observe individual ability ex-ante and workers and firms are matched randomly, the decision to become an entrepreneur is critically dependent on the average value of human capital of the workforce.

Empirically, we test this prediction using panel data from the Indonesia Family Life Surveys (IFLS) for three years between 1993 and 2007. Following the entrepreneurship literature, we distinguish between subsistence and transformational entrepreneurs and focus on estimating the impact of increase in average education of the workforce on the probability of being a transformational entrepreneur.

As suggested in the literature, transformational entrepreneurs are typically highly educated individuals who strive for growth, own larger businesses, and provide relatively secure employment opportunities for others. In our main specification, we thus define transformational entrepreneurs as self-employed individuals who employ permanent workers. In line with our theoretical predictions, average education of workers impacts the probability of being an entrepreneur in the case of transformational entrepreneurs but not in the case of subsistence entrepreneurs.

Secondly, we test for the impact of higher worker human capital on the probability of becoming an entrepreneur by estimating the correlation between worker human capital (in sub-district) and entrepreneurial profits. We estimate a profit equation for entrepreneurs after using a Heckman approach to adjust for potential selectivity bias. Parental occupation status provides us with powerful instruments to identify the selection-corrected profit equation. We find that a 1 year increase in the average education of workers in the sub-district is associated with a 10-13 percent increase in profits.