



# Returns to education in developing countries: Evidence from the living standards and measurement study surveys



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## ABSTRACT

We use 61 nationally representative household surveys from 25 developing countries between 1985 and 2012 to assess whether returns to education are systematically higher in developing countries, and to investigate whether recent increases in access to human and physical capital have altered returns. We find no evidence of systematic “excess returns” in developing countries, and estimate an average return to schooling in the represented countries of 7.6%. We also do not find evidence of systematic changes in returns over the past two decades. Overall, returns appear highly heterogeneous, with lower returns in rural areas, higher returns for females than males, and higher returns in the regions of Africa and Latin American than in Asia and Eastern Europe.

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## 1. Introduction

Estimating the returns to education is one of the most common economic analyses with a rich history dating back to the late 1950s. While a few studies have tried to identify the returns to education in developing countries (Psacharopoulos, 1981, 1985, 1989, 1994a, 1994b; Psacharopoulos & Patrinos, 2004), the large majority of this literature has focused on high-income economies (Card, 2001).

Conceptually, returns to education in a developing country context may be different from those of high-income economies for a variety of reasons, including smaller capital stocks and capital investment, limited technological capacity, and more restricted schooling access (Kang, 1993; Psacharopoulos, 1973; Todaro, 1989). While both Card (2001)

and Duflo (2001) argue that returns to education are likely higher in developing countries than in industrialized countries, supporting empirical evidence is surprisingly scarce. Beyond scarcity, the available estimates from developing countries are often hard to contextualize and compare due to the large range of different and often incompatible empirical models and non-representative data (Bennell, 1996; Psacharopoulos, 1996; Psacharopoulos & Patrinos, 2004).

In recent years, increasing globalization and growing rates of migration have led to substantial improvements in capital stocks as well as access to production technology (Fischer, 2003; Ghose, 2004; UNCTAD, 1999; World Bank, 2001). Simultaneously, the recognition of human capital as fundamental driver of economic development (Lucas, 1988; Mankiw, Romer, & Weil, 1992) and the inclusion of primary schooling as a Millennium Development Goal (UN, 2015) have resulted in a remarkable increase in human capital supply throughout the developing world. As both demand and supply for human capital have increased, the net changes in the returns to education are theoretically ambiguous.

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In this paper, we use 61 publicly available<sup>1</sup> and nationally representative Living Standard and Measurement Surveys (LSMS) conducted between 1985 and 2012 to empirically investigate two fundamental hypotheses. First, we use the pooled data set to assess the “excess returns” hypothesis, i.e. to test whether returns to education developing countries are systematically larger than the estimates most commonly cited for high-income countries. Second, utilizing the temporal range of the LSMS surveys from 1985 to 2012 we investigate whether recent changes in production technology, capital stocks and human capital have resulted in a systematic decline in the returns of education as suggested in the literature (Lam & Levison, 1991; Lustig, Lopez-Calva, & Ortiz-Juarez, 2013; Psacharopoulos, 1989).

Our empirical results reject both hypotheses. Our pooled estimates suggest that on average each additional year of education attainment is associated with a 7.6% increase in wages, very similar to the returns reported for the US and other high-income countries. The returns to education in high-income countries have been extensively analyzed and occasionally reviewed in studies such as Ashenfelter, Harmon, and Oosterbeek (2000), Card (1999), and Harmon, Walker, and Westergaard-Nielsen (2001). Card (1999), selectively reviewed recent studies and cited OLS estimated returns between 5.2% and 8.5% in high-income countries. Using 96 estimates from 27 studies (representing the US, the UK, and eight other high-income countries, as well as just two developing countries), Ashenfelter, Harmon and Oosterbeek (2000) performed a meta-analysis and showed that the average OLS returns to education in these studies is 6.6% with a standard error of 2.6. Harmon et al. (2001) use only US and Western European countries in a meta-analysis of OLS estimated returns and show that average returns are approximately 6.5% across a variety of model specifications. The average of OLS estimated returns we produce in developing countries lies within the established range for high-income countries based on these reviews and meta-analyses.<sup>2</sup> Additionally, in aggregate we do not find any evidence of returns falling over time, suggesting that the demand and supply of human capital have been growing in parallel.

The empirical results suggest a remarkable degree of heterogeneity in the returns to education across population strata, countries, and time. At the individual level, returns to education appear to be higher for females: an additional year of school increases female earnings by 8.6% compared to 7.1% for males. We also find that individuals residing in urban areas of developing countries experience greater returns (7.9%) to education than those residing in rural areas (6.9%).

In terms of educational level, our results indicate greater returns to education for tertiary education, which is consistent with recent studies (Kingdon, Patrinos, Sakellariou, & Soderbom, 2008; Schultz, 2004), but contradicts earlier work demonstrating higher returns to primary education in developing countries (Psacharopoulos & Patrinos, 2004).

In our pooled analysis, primary education yields an average return of 7.3% per year of schooling, secondary education yields average returns of 6.5% per year, and tertiary education yields average returns of 8.2% per year. Concerning primary education, the estimated private returns may be high compared to the limited years of forgone earnings at that age, and social returns likely exceed the labor market benefits we estimate. We also find large regional variations in returns: the largest returns to education are observed in Africa<sup>3</sup> (9.6%), next largest in Latin America<sup>4</sup> (8.6%), followed by Eastern Europe (6.3%)<sup>5</sup> and Asia (4.4%).<sup>6</sup> Last, there is substantial variation both within region and across regions: less than 1% return is observed in Iraq 2006 while in the same region Pakistan experienced 9.8% returns in 1991, and across all countries and regions the largest return observed is 13.6% in Peru 1985.

It is important to highlight that while these estimated returns are remarkably close to the range observed in high income, developed countries and summarized in Card (2001), they differ substantially from previous estimates for developing countries. Psacharopoulos and Patrinos (2004) summarize returns to education from 83 developing countries reporting an average return of 10%, with highest returns to education in Latin America and Sub-Saharan Africa (12% and 11.7% respectively), slightly smaller returns in Asia (9.9%) and returns less than 7.5% in the remaining areas. Our average regional estimates are typically 2–3 percentage points (25–30%) lower than these estimates. In order to verify our data we compare the average years of education in each LSMS survey to time-period specific existing estimates (Barro & Lee, 2010; Cohen & Soto, 2007; Lutz et al. 2007). We find that the average years of education in each LSMS survey lies within reasonable bounds set by the existing databases. Additionally, we compare our estimated returns to previously published studies and discuss potential sources of discrepancy including sample, income calculation, and econometric specification.

A large number of factors, including geographic variation in schooling quality, incentives, opportunity costs, and complementary production inputs within developing countries, as well as wide variety of data sources are probable explanations for the relatively large differences between the returns reported in this paper and the existing literature. Because representative income data from developing countries is scarce, previous studies have relied heavily on non-representative firm surveys (Patrinos & Psacharopoulos, 2010). Firm surveys oversample urban areas as well as the portion of the formal labor sector employed by large firms (Psacharopoulos & Patrinos, 2004). Our data suggests that returns in urban areas are systematically higher than returns in rural areas; it is also likely that only the most talented individuals across educational groups are able to find formal

<sup>1</sup> See Table A.1 for details on the availability and inclusion/exclusion of LSMS surveys.

<sup>2</sup> Empirical testing of the difference between the average returns in developing and developed countries is not feasible because of the selective and non-systematic nature of previous studies, as well as the lack of standard errors in 2 of the 3 studies.

<sup>3</sup> Includes Cote d'Ivoire, Ethiopia, Ghana, Malawi, Niger, Nigeria, South Africa, Tanzania and Uganda between 1985 and 2012.

<sup>4</sup> Includes Brazil, Ecuador, Guatemala, Nicaragua, Panama and Peru between 1985 and 2009.

<sup>5</sup> Includes Albania, Bosnia, Bulgaria and Serbia between 1995 and 2007.

<sup>6</sup> Includes Azerbaijan, Iraq, Kyrgyz Republic, Pakistan, Tajikistan and Timor Leste between 1991 and 2009.

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