

Schooling and National Income: How Large Are the Externalities? Revised Estimates

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In “Schooling and national Income: how large are the externalities?”¹ the marginal product of human capital was specified incorrectly as the change in national income due to the sum of the direct and indirect effects of changes in schooling on national income:

$$(1) \text{MPHs}_{it} = dY_{it} / dHs_{it} = \beta (Y/Hs)_{it} + [\alpha (Y/K)_{it} * (\delta K / \delta Hs)_{it}]$$

The correct equation for the marginal product contains only the direct effect $[\beta (Y/Hs)_{it}]$.² As a result, the marginal products of human capital (the national rate of return) and the marginal external rates of return from investment in schooling were overestimated.

Revised estimates based on numerous methodological improvements are shown in Table 1. These improvements include new estimates of foregone student earnings, national income data that include these earnings, estimates of the net stock of human capital developed using the perpetual inventory method, and a revised estimate of $\beta = 0.34$.³

Table 1					
Rates of Return on Investment in Schooling in 1990 (%)					
	Income per Adult (2000\$)	Original Estimates		Revised Estimates	
		National Rate	External Rate	National Rate	External Rate
Argentina	12305	26.9	19.2	20.5	14.8
Bolivia	4561	30.4	19.1	19.1	11.6
Brazil	11096	49.5	22.6	29.3	9.3
Chile	10622	20.4	10.6	12.1	4.4
Colombia	8793	61.0	43.4	37.9	24.6
Costa Rica	10400	24.8	12.9	15.0	7.4
Ecuador	7528	32.7	18.8	18.2	8.7
El Salvador	6418	26.5	11.1	19.7	9.2
Ethiopia	896	62.6	47.7	29.8	17.5
Jamaica	7250	26.4	13.7	15.1	3.8
Mexico	11731	49.3	36.9	27.0	17.8
New Zealand	23822	23.0	11.1	13.8	3.9
Paraguay	8981	103.0	84.4	60.3	46.5
Philippines	5652	54.2	43.5	39.0	31.0
Spain	20032	63.2	54.6	36.1	29.3
UK	25680	23.7	16.2	14.2	6.9
Uruguay	11112	27.2	14.8	21.7	7.7
USA	36912	21.6	10.6	12.2	3.6

The revised estimates exhibit considerable variation and are likely to be less accurate than the cross-country trend in the rates. These trends are shown in Figure 1. This trend indicates that in 1990 the marginal external rate of return ranged from about four percent in the highest-income countries to about 35 percent in the lowest-income countries. This rate is about half the private rate of return in high-income countries and about double the private rate in the lowest-income countries.

¹ Breton, Theodore R., 2010, “Schooling and national income: how large are the externalities?,” *Education Economics*, v18, n1, 67-92

² Thanks to Richard Rogerson, who identified the error.

³ Documented in Breton, Theodore R., 2010, “Schooling and National Income: Revised Estimates of the Externalities,” <http://ssrn.com/abstract=1669611>

Figure 1
Marginal Rates of Return on Investment in Schooling – 1990

