
**Review of “Standardized Sensitivity
Analysis in BCA: An Education Case
Study” by Elina Pradhan and Dean
Jamison**

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Overall comments

- An important innovation of the paper is the inclusion of child and adult mortality benefits of schooling (in addition to the standard earnings benefits). I had not seen this done before in BCA.
- Paper clearly articulates the importance of sensitivity analysis in BCA in three dimensions: (i) the valuation of mortality reductions at different ages, (ii) the valuation of mortality reductions at different country income levels, and (iii) the discount rate.

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- Yet another “neat” result in the paper is the comparability of BCA estimates to cost-effectiveness estimates in the case where mortality reductions are valued independently of income in the BCA.
 - The paper is comprehensive and very thorough; I have no quibbles with the approach adopted by the authors.

Schooling or female schooling?

- Much of the mortality benefit of schooling comes from *female* schooling, not overall schooling, as the authors clearly state.
- But I believe the authors have added the mortality reduction-based benefit of *female* schooling to the wage returns from *all* (male plus female) schooling to obtain their overall BCA.
- Ordinarily, this would not be a problem, except there are a number of studies from LMICs that suggest large gender differences in the earnings returns to schooling.

Morbidity effects?

- The mortality-reducing benefits of increased female schooling are admittedly significant ...
- But there is reason to expect that the child morbidity and nutritional benefits of additional female schooling could be quite large.
- Is it possible to “borrow” estimates from the Wong-Orazem paper to include some ballpark estimates of the benefit of, say, reducing child stunting through increased female schooling?

Additional thoughts for consideration

- What are some of the ways in which both BCA in education – and sensitivity analysis of BCA estimates – could be extended?
- First, there is an additional dimension of heterogeneity in the estimated impact of female schooling on (i) earnings, and (ii) under-5 and adult mortality.

Heterogeneity of schooling impact estimates

- There is a wide range of estimates of the earnings returns to schooling, sometimes even within a country, that vary markedly depending upon control for innate ability, family background, and schooling quality, among other things (unobserved heterogeneity).
- Likewise, there exist multiple estimates of the impact of female schooling on child mortality. Context matters.
- In the SSA, does it make sense to add this fourth dimension of sensitivity by allowing for a few different schooling impact estimates? Maybe, the authors did that already, and I may have missed it.

How you increase schooling years also matters ...

- The paper focuses on the benefits and costs of increasing female schooling from six years on average to seven.
- But it matters how you increase that one additional year. Recent research in Brazil suggests that if you have children start school a year earlier (at age 6 instead of 7), the impacts can be very different than if you keep them in school one year longer (say, until age 14 instead of 13).
- I realize such detail is beyond the scope of the current paper, but as individual BCA country estimates are prepared, it is important to keep this complexity in mind.

Studying impacts based on quasi-natural policy experiments?

- In addition to standard BCA and economy-wide modeling, there is a third approach that hasn't been used by the BCA community as much.
- This involves looking at large quasi-random social interventions that have taken place in the past and studying their reduced-form impact on households and communities many years or even decades later.

Examples of studies

- Duflo (2001) studied the effect on male wages in 1995 of one of the largest primary school construction programs in the world that occurred in Indonesia between 1973 and 1978.
- By using information on their birth year and migration history, she could match men in the labor market to the district in which a primary school was constructed when they were of primary-school age.
- She did a rough benefit-cost calculation and found that the internal rate of return for the school construction program was in the range of 8.8-12%.

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- The advantage of such econometric studies is that they yield “reduced-form,” real-world estimates of impact – in other words, the estimates are based on actual household data and allow for all kinds of synergies and interactions to have occurred.
 - Numerous examples of such studies that have been done for expansion of health insurance coverage (in Vietnam) or construction of primary health centers (in Brazil).

Calculating impact on lifetime production

- This is a more general point that applies to all BCA studies that value lifetime production benefits.
- “Lifetime production” is not clearly identified and uniformly defined, with studies using one of the following variables to measure production impact:
 - Wage rates in the paid labor market
 - Earnings in the paid labor market (i.e., daily wage rate x days worked)
 - Farm profits
 - Income from self-employment
 - Total income
 - Total consumption

Wage rates versus earnings

- As a result, production benefits are not strictly comparable.
- For instance, an intervention could increase an individual's labor productivity and therefore his market wage rate, but the individual might cut back on his hours (assuming a backward-bending labor supply curve), in which case the effect on earnings might be muted. A researcher measuring the effect only on earnings would be underestimating the intervention's true productivity impact.

Income versus consumption, intrahousehold substitution

- Likewise, an intervention might result in increased income but some of that income could be diverted to savings, which means that a researcher looking at consumption effects might underestimate the true production impact.
- Intrahousehold substitution could also distort estimated production benefits. If an intervention increased an individual's income but that prompted another household member to cut back on her work hours, the estimated impact on *household* (as opposed to *individual*) income would be biased downwards.

Correct measure to use?

- Not clear what is the correct measure to use.
- Depends on whether one wants to measure the impact of an intervention on labor productivity, gross output in the economy, or household welfare.

Conclusion

- Excellent case study that highlights the importance of both “standard sensitivity analysis” in BCA estimates and of including the non-wage benefits of schooling.
- *Important finding*: almost half of the total “benefit” of schooling comes from the mortality-reduction associated with increased schooling.