Multigenerational Benefits to Secondary Schooling in Ghana

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Sector(s): Education, Gender, Health

Fieldwork: Innovations for Poverty Action (IPA)

Location: Ghana

Sample: In the first generation, 2,064 adolescents (average age: 17 in 2008 and 31 in 2023); in the second generation, 1,920 children, aged 14 months to 7 years old).

Initiative(s): Post-Primary Education Initiative (PPE)

Target group: Children Children under five Mothers and pregnant women Parents Secondary schools Students Women and girls Youth Children under one

Outcome of interest: Dropout and graduation Earnings and income Enrollment and attendance Immunization Mortality Sexual and reproductive health Student learning Technology adoption Women's/girls' decision-making Aspirations Gender attitudes and norms Age of childbearing Attitudes and norms Cognitive development Health outcomes Nutrition Socio-emotional development Long-term results Cost Analysis

Intervention type: Subsidies Scholarships

AEA RCT registration number: AEARCTR-0000015

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Partner organization(s): Ghana Education Service, Innovations for Poverty Action (IPA), Harvard Laboratory for Developmental Studies, USAID Development Innovation Ventures, UK International Development

Governments considering whether to adopt a free secondary education policy must weigh the up-front costs against the long-term benefits. A study conducted in Ghana over 15 years evaluated the benefits of secondary school scholarships on both education and health outcomes. Both male and female students randomized into receiving a four-year scholarship were much more likely to complete senior high school and scored better on cognitive tests by age 22. By age 30, women experienced better downstream labor market impacts: They were more likely to have obtained tertiary education, to be employed in the public sector, and to earn a higher income. Women also had fewer unwanted first pregnancies. Finally, children of female scholarship recipients were more likely to survive to age three and showed greater cognitive development by age five. These findings suggest that reducing costs of secondary education is critical to keeping students in school; and that a mother's education can play a key role in both her and her children's long-term outcomes.

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As of 2022, 45 percent of high-school-aged children in low- and middle-income countries worldwide were enrolled in secondary school. [1], In sub-Saharan Africa, that figure was 36 percent. School fees and other costs of schooling partly explain these low rates in the region. [2]

However, the extent to which governments in low- and middle-income countries should subsidize secondary education—for example, through scholarships and reduced fees—remains heavily debated. Secondary school education is relatively expensive and typically rationed through an entry exam. This means that public spending on education subsidies can be regressive, disproportionately benefitting those who are already well-off enough to be admitted.

Understanding the benefits of expanding access to secondary education is therefore critical to decide whether, when, and how subsidies should be implemented.

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The study took place in Ghana between 2008 and 2023. At the onset of the study, the government covered full tuition and fees for primary and junior high school students, but not for senior high school students. As a result, school enrollment dropped from over 70 percent in junior high to less than 30 percent in senor high school. This drop was more pronounced for girls, and more pronounced in rural areas.

The study involved 2,064 youths from rural areas across 5 regions. These youths had earned admission into a public high school as of July 2008, but had not enrolled by early 2009, primarily due to financial constraints.



Secondary school students in Ghana. Photo: Ishita Ahmed | J-PAL/IPA

Ishita Ahmed

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The intervention consists of a full secondary school scholarship. The scholarship covered one hundred percent of tuition and other fees (including exam fees) for four years at the beneficiary's local public school and was paid directly to the school. 682 of the 2,064 youths were randomly selected by lottery to receive a scholarship. They were informed about the scholarship in January 2009 and encouraged to report to their school immediately. 75 percent of scholarship recipients did so.

Data collected from study participants over a 15-year period (2008 to 2023) enabled researchers to compare outcomes of scholarship recipients to non-recipients as they transitioned from youth to adulthood.

Data Collection

Participants were 17 years old on average at the onset of the study. From 2009 to 2012, the research team conducted phone surveys with participants once a year to ask for their current education status and number of children. Researchers also conducted an in-person survey in 2013 to measure participants' educational attainment, cognitive skills, employment status, health, marriage status and fertility, and other outcomes. Starting in 2015, annual callbacks included additional questions about participants' employment, education, fertility, child survival, and relationship status. By the final round of data collection in 2023, participants were 31 years old on average, and the majority had children of their own.

To measure the impacts of the scholarship on recipients' children, the research team conducted age-specific, context-appropriate assessments designed by the Harvard Laboratory for Developmental Studies. Specifically, starting in 2017, researchers began collecting data on participants' children and their cognitive development at specific age milestones: eighteen months, two and a half years, three and a half years, five years, and seven years old. They completed this with height and weight measures, surveys with the caregiver, and Language ENvironment Analysis (LENA™) recordings for babies.

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Results Summary: Five years after the scholarship was introduced, scholarship recipients had higher educational attainment, performed better on a cognitive test, and reported higher rates of adoption of preventive health behaviors. By 2023, women who received the scholarship were more likely to have enrolled in and completed tertiary programs, the gateways to government jobs. While they were not more likely to earn income than non-recipients, they earned more on average. The scholarships also transformed women's family outcomes. Female recipients were less likely to have an unwanted pregnancy, more likely to have a partner with tertiary education, and their children experienced reductions in under-three mortality rates and gains in cognitive development by school age.

Education and Labor Market Impacts

Scholarship use and secondary school participation: While only 19 percent of youths who did not receive a scholarship enrolled in senior high school (SHS) in 2009, 75 percent of scholarship recipients enrolled, a 295 percent increase. By 2017, nine years after the study began, recipients' SHS graduation rate was 73 percent—62 percent higher than the 45 percent rate observed among non-recipients. Overall, scholarship recipients obtained an average of 1.26 more years of secondary education than non-recipients. These large impacts were seen among both men and women.

Learning: Five years into the study—by which time most participants had either completed or left SHS (if ever enrolled) but not yet enrolled in tertiary education—scholarships recipients scored 0.16 standard deviations higher on a test of math and reading comprehension. This demonstrates the effect that secondary school scholarships had on learning even without access to further

education. These large impacts were seen among both men and women.

Tertiary education: 45 percent of female scholarship recipients applied to tertiary programs, an 80 percent increase compared to the 25 percent rate observed among non-recipients. Additionally, 32 percent of female recipients were accepted to these programs, a 50 percent increase compared to the 16 percent rate observed among non-recipients. 26 percent enrolled, a 92 percent increase compared to non-recipients. By 2023, the completion rate for tertiary programs among female scholarship recipients was 92 percent higher than non-recipients, a difference of 10.8 percentage points.

While men who received scholarships were also significantly more likely to apply to tertiary programs, they were not more likely to be admitted, and the scholarship had no detectable effects on tertiary education for men.

Employment and earnings: For the first ten years after receipt of the scholarship, scholarship recipients did not report higher work earnings than non-recipients on average. This is partly because scholarship recipients were more likely to delay joining the workforce to complete their education.

However, from 2020 onwards and up to the last measurement period (2023), the average earnings of female scholarship recipients were higher than those of non-recipients by 20-30 percent. This was not due to differences in labor force participation. Instead, what emerged was a difference in the type of employment: scholarship recipients were twice as likely to have a public sector job (8.7 percent vs. 3.9 percent among non-recipients) and less likely to be self-employed.

Expectations vs. reality: While the scholarships resulted in positive educational and employment outcomes, these were observed in only a quarter of the sample. This was in stark contrast to parents' and children's (unrealistic) expectations of the returns to education. At baseline, 70 percent of students believed they would have public sector jobs by age 25 if they finished SHS. However, by age 26, only 6 percent of SHS graduates were employed in the public sector. This was likely due to the drawn-out process of applying for tertiary programs and the limited supply of government jobs. By 2022, both scholarship winners and non-winners held much more realistic job expectations for their own children.

Family and Intergenerational Impacts

First generation fertility and marriage: Immediately following graduation in 2013, female scholarship recipients were 6.9 percentage points less likely to have been pregnant (and 7 percentage points less likely to have had an unwanted first pregnancy) compared to non-recipients. This gap narrowed over time, with recipients and non-recipients having given birth to the same number of children by 2022, suggesting recipients had delayed their pregnancies.

In 2023, fifteen years after winning the scholarship, female recipients were 13 percent less likely to be married or cohabitating with a partner than female non-recipients (a difference of 6.2 percentage points), and 51 percent more likely to marry a partner with a tertiary education (a difference of 8.5 percentage points).

No significant impacts on family outcomes are observed among male scholarship recipients, though they were more likely to still live with their parents by 2013 and 2019.

Second generation health: By 2023, children of women who received scholarships were 1.8 percentage points more likely to survive to age 3 compared to children of female non-recipients, representing a 45 percent reduction in child mortality (2.2 versus 4 percent mortality rate). Researchers' surveys showed that children of women who received scholarships received more preventive care than those of non-recipients.

Second generation cognitive development: At younger ages, children of mothers who received scholarships showed no difference in their cognitive skills relative to children of non-scholarship mothers. However, by age five and seven, these children's cognitive development scores were 0.238 and 0.252 standard deviations higher than their peers, respectively.

Mothers who received a scholarship reported more often playing with their children, doing simple mathematics with them, and singing them songs. These self-reports were confirmed by objective measures. This stimulation could explain children's greater

performance on cognitive tests a few years later. [3]

No significant differences were observed in children's outcomes between male recipients and non-recipients, likely because men were not children's primary caregiver.

Cost Analyses

Cost effectiveness: The scholarship influenced more than just school enrollment. Focusing on the child mortality impact alone, the researchers estimate that the program is highly cost-effective. The scholarship program is estimated to cost US$23,582 per child death averted, factoring in costs for students who would have attended school without the subsidy. The cost becomes US$15,184 if the scholarship were given to girls only.

Comparatively, the tenth percentile of WHO-recommended child health interventions ranges between US$11,300 and US$33,200 per averted death, suggesting that secondary school scholarships could be included among recommended strategies for reducing child mortality.

Cost-benefit analysis: Considering a range of monetary values for a life saved, and after converting early childhood cognitive gains among children of recipients into expected gains in adult earnings and adding those to gains for the scholarship recipients themselves, the researchers estimated that the program's public welfare benefits were at least 6 times the original cost. The benefit-cost ratio is even more favorable for scholarships targeted at young women.

Use of Results

Ghana's free SHS policy was instituted in 2017, nine years after this study began. The policy covered tuition and fees for all Ghanaian students admitted to SHS. It was enacted as part of Ghana's 2010 to 2020 Education Strategic Plan, which aimed to increase access and create equal opportunities for quality education. [4]

Duflo, Esther, Pascaline Dupas, Elizabeth Spelke, and Mark Walsh. "Intergenerational Impacts of Secondary Education: Experimental Evidence from Ghana." Working Paper, July 2024. Duflo, Esther, Pascaline Dupas, and Michael Kremer. "The Impact of Secondary School Subsidies on Career Trajectories in a Dual Labor Market: Experimental Evidence from Ghana." Working Paper, June 2024. Duflo, Esther, Pascaline Dupas, Michael Kremer. "The Impact of Free Secondary Education: Experimental Evidence from Ghana." Working Paper. June 2021.

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