

Literacy, Skills and Welfare: Effects of Participation in Adult Literacy Programs

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Background and Motivation

Education is important for development, but 52% of the adults in a sample of rural Ghanaian households have no education. Furthermore, Ghanaian schools are often of poor quality. Hence, even if people did go to school they may not have acquired the needed skills.

Question: Can adult literacy programs help reduce poverty under these circumstances?

There has been little prior analysis of the impact of adult literacy programs and most suffer from substantial methodological problems.

A "standard" adult literacy program takes about 21 months to complete. Classes take place 2-3 times a week in the evening and last 2-3 hours each time. Most take place in the local school or if one is not available a hut or church. At the end of the course there is a formal test and a certificate is awarded to those who pass the test.

In class the students take turns reading and answering calculation questions. Class sizes vary substantially, but generally is between 10 and 40 students. The facilitator will often be the local grade school teacher.

Estimation Strategy

The outcomes of interest are skills acquired (literacy and numeracy) and welfare measured by the log of expenditure per adult equivalent.

The skills are self-reported. A person is considered literate if she can read a letter in either English and/or a Ghanaian language. Numeracy is measured by whether the respondent indicates that she can do written calculations.

Welfare is based on expenditure per adult equivalent for two reasons. First, the sample used is rural and there is little wage work which makes it very difficult to examine the effect on individual income. Second, expenditures are generally considered to be a better measure of household welfare than income.

Main Econometric Issues

The two main potential econometric problems are possible endogenous program placement and self-selection into program participation.

Endogenous program placement is a potential problem since where an adult literacy program is placed might depend on unobservable area characteristics that also affect the outcomes of interest (especially household welfare). We deal with this problem by using community/village fixed effects. These communities are on average only 18 km².

Self-selection into the program is a problem if participation is based (partly) on unobservable individual or "household" characteristics. While many things are controlled for through the use of community fixed effects there is still the potential that unobserved ability affects who participates in the programs. We address this issue by using instrumental variables. The instruments are exposure to the adult literacy program interacted with a set of variables (age, educational level of highest educated household member, ownership of land and a dummy for the household not being engaged in agriculture). Clearly, the number of potential instruments are severely limited by the use of community fixed effects, but the chosen instruments perform relatively well.

Ghana Living Standards Survey

We use the 4th round of the Ghana Living Standards Survey (GLSS), which is a nationally representative stratified multipurpose household survey. There are three parts to the survey: Household, community and price. It used a two-stage sampling design, with 300 enumeration areas (EAs) selected in the 1st stage and 20 households were interviewed in each EA in the 2nd stage. Of the 6000 surveyed household we use only the rural sample, which leaves a sample of just under 3200 households.

The main data issues are missing information on participation, such as whether a participant has "graduated" and when, where and for how long someone participated, and information on programs in the area (provider, quality and whether still active).

Effects on Skills

The following table presents the descriptive statistics for literacy and numeracy rates by education level of the individual, participation status and whether a program was available in the community. Note the low levels of literacy and numeracy for all both those with a post-middle education.

Participation, Literacy and Numeracy Rates						
Completed education	Participated	Literate	Numerate	Non-Participants	Literate	Numerate
No Program Available						
None / Koranic	0.119	0.177	0.167	0.027	0.065	809
Primary	0.072	0.818	0.818	0.433	0.688	152
Middle	0.037	1.000	1.000	0.910	0.967	382
Post Middle	0.009	1.000	1.000	0.991	0.982	111
Program Available						
None / Koranic	0.185	0.143	0.146	0.032	0.062	2,771
Primary	0.109	0.528	0.583	0.493	0.665	660
Middle	0.036	0.982	0.964	0.931	0.952	1,519
Post Middle	0.018	1.000	1.000	0.993	0.996	279

Compared to OLS using community fixed effects to estimate the effects of individuals' participation on literacy and numeracy lead to slightly lower but still statistically significant effects. The instruments are jointly significant at the five percent level for both the complete sample and for the "No Education Households" sample.

	Participation's Effect on Skills		
	OLS	FE	FE-IV
Complete Sample			
Effect on literacy	0.097*** (0.011)	0.092*** (0.011)	0.278** (0.115)
Effect on numeracy	0.068*** (0.011)	0.057*** (0.011)	-0.061 (0.114)
No Education Households			
Effect on literacy	0.109*** (0.010)	0.107*** (0.010)	0.835*** (0.272)
Effect on numeracy	0.091*** (0.012)	0.072*** (0.012)	0.192 (0.196)

Effects on Welfare

This table shows the effects of participation by highest level of education within the household for both household level and individual level estimations. For household level estimations the instruments are statistically significant at the one percent level for the "No Education Households" sample, but not for the other subsamples. Clearly, the effect of participation is concentrated among households where the adults have no formal education. The effect of participation is also clearly lower using community fixed effects than OLS with region dummies.

	Participation's Effect on Log Household Expenditure				
	Complete Sample	Level of Completed Education in Household ^a			
		Post Middle	Middle	Primary	None
Individual Level Estimations					
OLS	0.105*** (0.027)	-0.114 (0.092)	0.035 (0.044)	0.000 (0.071)	0.197*** (0.041)
Community Fixed Effects	0.048** (0.019)	-0.059 (0.050)	0.014 (0.027)	0.025 (0.050)	0.103*** (0.030)
IV Community Fixed Effects	-0.057 (0.192)	-0.109 (0.156)	-0.265 (0.351)	-0.295 (0.345)	0.046 (0.245)
Household Level Estimations					
OLS	0.098*** (0.027)	-0.178* (0.103)	0.033 (0.046)	-0.002 (0.078)	0.199*** (0.046)
Community Fixed Effects	0.056** (0.022)	-0.132 (0.115)	0.028 (0.037)	0.047 (0.080)	0.130*** (0.034)
IV Community Fixed Effects	1.813 (1.234)	1.726 (1.284)	1.637* (0.981)	0.565 (0.519)	0.152 (0.290)

NOTE: ^a At least one adult with this level of education and none with more within household.

Conclusions

The community fixed effects results show that participation in an adult literacy program raises the likelihood of a person being literate and numerate by about 10 and 6 percentage points, respectively. The effect of participation on literacy becomes stronger after instrumenting, although it appears unrealistically large for the "No Education Households" sample, which is likely due to low levels of variation in the instruments within communities.

More importantly, there is a strong effect of participation on welfare for households with no educated members. The estimated effect is approximately 10 percent. For comparison the return to basic education in Ghana is believed to be 4-6 percent per year.

Furthermore, there is evidence that program placement is endogenous and that this bias, if uncorrected, would lead to an overestimate of the effectiveness of participation in adult literacy programs. The instrumental variables estimates are more ambiguous, which is to be expected given the limited number of variables and variation available after controlling for community fixed effects.

Finally, the results can be used for a simple "cost-benefit" analysis. The average cost per participant to the government of Ghana is USD 33.40 and the opportunity cost of participation is the time required valued at the average wage for individuals without any formal education. Benefits are the ten percent increase in consumption from when the participants "graduate" from the program until and including age 55. We assume only one adult equivalent in the household. Based on these conservative assumption the social rates of return are very respectable: The lowest internal rate of return is 9.2 percent for a 40 year old male participant who began at the lower poverty line.