

Adult Literacy Programs in Ghana: An Evaluation*

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Abstract

This paper examines the effect of adult literacy program participation on household consumption in Ghana. We find that in most cases there is no significant effect on consumption from participation after allowing for self-selection into the program. For households where no adults have completed any formal education there is, however, a substantial positive and statistically significant effect on household consumption, pointing towards the potential importance of adult literacy programs for the parts of the population which have not participated in the formal education system. Possible explanations for why adult literacy program participation does not seem to significantly affect households where some formal education has been attained are explored, as well.

1 Introduction

It is often argued that one of the most important effects of education is that it enables individuals to gain and process information and use it to their advantage (See, for example, [Rosenzweig 1995](#)). A better educated farmer may be a more efficient user of fertilizer and is likely to be able to get a higher price for his goods because he is able to obtain and use information (crop prices, farming methods, fertilizer, machinery) more efficiently. This information processing involves reading, writing and doing calculations. In a population where many adults cannot read or write, adult literacy programs may be an effective way of improving people's livelihoods, but so far there has been little analysis of the impact of adult literacy programs on economic and social development. Hence, this paper examines the effect of adult literacy program participation on the standard of living.

We find that there is no significant effect on consumption from participation after allowing for self-selection into the program, except for households where all adults have no education. Given the relatively large number of participants from all types of households and the significant time cost involved in participation this is a puzzling result. This is especially so since there is often more than one participant from the same family. We also find that self-reported literacy is only slightly higher for participants than it is for non-participants with equivalent education.¹ Finally, we examine whether participation, especially of persons from households where we do not find a significant effect on consumption, may be a way of increasing the participants' bargaining power within the household.

The structure of the paper is as follows. The next section reviews the relevant literature. We discuss the estimation strategy in [Section 3](#) and present the data in [Section 4](#) and the variables in [Section 5](#). The results are presented in [Section 6](#) and [Section 7](#) examines possible reasons for the lack of effect for households where some formal education has been attained. Finally, [Section 8](#) concludes.

¹This comparison is, of course, most useful for individuals without education; they are expected to have few other options to learn to read and write beside participation in an adult literacy program.

2 Literature Review

The positive impact of general literacy and numeracy skills on economic well-being including wages and income has been established in several studies for both developed and developing countries.² Additionally, a related literature has established important links between literacy and numeracy and non-economic outcomes, most notably health; in particular, maternal literacy has been found to positively affect child health (Glewwe 1999b; Glewwe and Desai 1999). This section reviews the small literature on the effects of adult literacy programs and how or whether literacy is shared within households.

2.1 Impact of Adult Literacy Programs on Literacy and Economic Well-Being

Assessments by UNESCO of adult literacy programs in a number of countries during the late 1960s and early 1970s showed weak performance in terms of internal efficiency; in turn, these early pessimistic reports have sometimes been carried over as pessimistic assumptions in more recent research (Lauglo 2001, p. 12). More recent studies, such as Carron, Mwiria, and Righa (1989) and Carr-Hill, Kweka, Rusimbi, and Chengelele (1991), show a beneficial impact of literacy and numeracy skills among the participants who became literate; in addition, more literate farmers have been found to be more likely to use hybrid seeds and other modern agricultural techniques, which, in turn, presumably translates into higher earnings. These studies, however, suffer from several methodological problems. First, both the number of learners (the treatment group) as well as non-learners (the control group) in the samples is small.³ Second, these studies typically only report simple statistics such as the fraction of completers who are able to read and/or do written calculations. This contrasts with our approach which employs a data set

²For evidence from developed countries, see, on the US: Mitra (2002), Murnane, Willett, and Levy (1995), Tyler, Murnane, and Willett (2000) and Ishikawa and Ryan (2002); on Canada: Green and Riddell (2003); on Australia: Chiswick, Lee, and Miller (2003) and on the UK: Dustmann and Fabbri (2003). For evidence from developing countries, see, on Ghana: Glewwe (1999a), Vijverberg (1999) and Jolliffe (1999); on Kenya and Tanzania: Boissiere, Knight, and Sabot (1985); on South Africa: Moll (1998). Glewwe (2002) reviews numerous studies on developing countries.

³In Carron, Mwiria, and Righa (1989) the treatment and control groups are 291 and 66 individuals, respectively. The equivalent numbers from Carr-Hill, Kweka, Rusimbi, and Chengelele (1991) are 272 and 59.

that allows comparing outcomes of adult literacy course participants with those of comparable non-participants and controls for the endogeneity of the participation decision. This ensures that our findings are indeed valid to the extent that we have controlled for other possibly confounding factors.

Another weakness that most of these studies share is that they mainly consider the impact on literacy and numeracy skills, ignoring other elements that are also important parts of adult literacy programs (Lauglo 2001). Hence, one might want to control both for skills and for participation, since participants may obtain skills other than literacy and numeracy that positively impact their livelihoods, such as information on income generating activities (modern farming methods, for example) and health knowledge. Additionally, participants may feel empowered as a result of the program, even if they do not become literate per se (Abadzi 2003, p. 69); this may, particularly for women, be the first step to becoming active in the Labor market.

Oxenham, Diallo, Katahoire, Petkova-Mwangi, and Sall (2002, p. 11) aptly sum up the current state of research on the effectiveness of adult literacy programs, "... theoretical advances in methods of evaluating outcomes and impact do not seem to have made headway in programs of adult basic education". Hence, "what is [...] needed is a methodology, broadly accepted by economists and project managers in aid agencies, that can measure the economic returns to prospective literacy projects" (Iredale 1999, p. 351). Our study is an attempt to apply such a methodology to provide a consistent and coherent assessment of the effectiveness of the Ghanaian adult literacy programs in generating skills and improving livelihoods of participants.

2.2 Sharing of Literacy and Numeracy Skills within the Household or Community

An area that has only recently attracted attention is whether literate persons share their skills with illiterate household or community members. Two recent studies find evidence that households do indeed share literacy skills.⁴ In a study from Bangladesh, Basu, Narayan, and Ravallion (2002) find that literate household members share their skills with non-literate members. This leads to wage gains for non-literate members whenever there is at least one

⁴Basu and Foster (1998) suggest an alternative measure of countries' literacy based on the idea that literacy is shared within households.

other literate person in the household. Similarly, studying child health in Papua New Guinea, [Gibson \(2001\)](#) finds evidence of a substantial indirect effect from literate to non-literate household members.

These studies have, however, merely considered literacy and numeracy skills per se without regard for where these skills were obtained. Again, since adult literacy courses provide participants with skills other than literacy and numeracy per se, there is a case to be made that these skills may be shared, as well. This possibility is explored in our paper, although these examinations are somewhat limited due to the nature of the data.

3 Estimation Strategy and Issues

As discussed in the Introduction the main purpose of this paper is to estimate the effect of participation in adult literacy programs on the standard of living in Ghana. Denote the outcome of interest for individual i by y_i and let y_{i1} be the outcome with participation and y_{i0} the outcome without participation. Furthermore, let p_i be a binary variable equal to one if i participated in the program and zero if she did not. We can then describe the outcome of interest by

$$y = \alpha p + \mathbf{x}\boldsymbol{\beta} + u, \tag{1}$$

where u has zero mean and is uncorrelated with \mathbf{x} . This section discusses our estimation strategy and the associated potential econometric issues.

We are interested in the “average treatment effect” (ATE), which is

$$ATE \equiv E[y_1 - y_0].$$

This is the expected effect of participation on a randomly selected person from the population of interest and is equal to α in (1). In the absence of a randomized experiment the main econometric issue when estimating this effect of program participation is potential self-selection into the program. There are a number of possible methods for dealing with this problem. The two main methods are the “ignorability of treatment” approach described by [Rosenbaum and Rubin \(1983\)](#) and instrumental variables.

The “ignorability of treatment” method assumes that, conditional on a set of explanatory variables \mathbf{x} , the participation p and the outcomes (y_0, y_1) are independent.⁵ If this is fulfilled it is possible to estimate the effect of

⁵It is possible to relax this assumption to conditional mean independence, but that will not affect our argument here.

participation with none or few distributional assumptions using, for example, standard regression methods or propensity score methods. For this method to work it is, however, important that any unobservable variables, \mathbf{a} , that affect participation, which is determined by, say, $p = g(\mathbf{x}, \mathbf{a})$, are independent of $((\mathbf{x}), y_0, y_1)$. Hence, if we had “sufficient” information about each individual and the programs we could use this method. The data we use were, however, not collected specifically for this purpose and hence contains less information about the individuals and programs than what is needed. Specifically, there are two potentially important variables that we cannot observe: The ability of each individual and the quality of the literacy programs. It is likely that someone with higher ability will face a higher return to participation than somebody with lower ability. Hence, higher ability people may be more likely to participate than others. If we do not take this into account the predicted effect of participation will likely have an upward bias. The second unobserved variable is the quality of the programs, which is also likely to affect the decision to participate, since the return to participation is probably higher in a high quality program as compared with a low quality program. A substantial part of the adult literacy programs in Ghana are financed and run by the government, but a not insignificant portion of the programs are run by NGOs, and there is no common curriculum and teacher evaluation for the different programs. Furthermore, we have neither direct information about the quality of the programs nor even information about whether it is a government or NGO program. Because of these unobservable variables we use the instrumental variables method. This, however, only works if we are able to find a suitable instrument. The requirement is an instrument that affects the decision to participate net of the other explanatory variables but is not correlated with the unobservable heterogeneity. We discuss our choice of instruments in Section 5 below.

As discussed by Wooldridge (2002, Chapter 18) this can be estimated under relatively relaxed conditions using 2SLS. The first step is to estimate the participation decision using a probit model. The second step is to estimate the consumption equation by IV using the *fitted probabilities* from the probit model and \mathbf{x} , which includes an intercept, as instruments. An attractive feature of this approach is that the results are robust even if the participation equation is not correctly specified.

The first part of our estimation strategy is to estimate what determines the decision to participate in an adult literacy program. This tells us whether our instruments have a significant effect on the participation in a program,

which is one of the requirements for a good instrument. Furthermore, it is of interest in itself to describe and estimate the process of the participation decision, since it provides an indication of whether the programs are reaching those for whom they are intended. The participation decision is described by

$$p = 1[\mathbf{z}\boldsymbol{\gamma} + \nu > 0], \quad (2)$$

where $1[\cdot]$ is an indicator function which takes the value one if fulfilled and zero otherwise. If ν is uncorrelated with the explanatory variables, including the instruments, then (2) can be estimated consistently using a probit model. We do this at the household level, using whether a household has one or more participants in an adult literacy programs as the dependent variable. There are two reasons for doing the analysis at the household level. First, we are using data on rural households where it is often difficult, if not impossible, to assign income to a specific household member since there is relatively little labor market participation; the main income source for a large portion of the households we use is from agricultural production. Second, policy makers are arguably more interested in whether there is an effect on consumption at the household level than at the individual level.

The second part examines the effect of participation on the standard of living of the household. The standard of living of a household can be measured in a number of different ways, but owing to the lack of suitable income data we use consumption as a proxy for the standard of living. The complete econometric model of participation and its effect on consumption is

$$y = \alpha p + \mathbf{x}\boldsymbol{\beta} + u > 0 \quad (3)$$

$$p = 1[\mathbf{z}\boldsymbol{\gamma} + \nu > 0], \quad (4)$$

where \mathbf{z} includes the instruments and \mathbf{x} . We discuss the dependent variables, instruments and independent variables in detail below (See Section 5).

4 Data

The Ghana Living Standards Survey (GLSS) is a nationally representative stratified multi-purpose household survey collected in 1987/88, 1988/89, 1991/92 and 1998/99 as four independent cross-section surveys, consisting of a household survey, a community and a price questionnaire. We use the most recent of these (GLSS 4) here.

GLSS 4 employed a two-stage sampling design. Out of the available enumeration areas (EAs) 300 were chosen in the first stage with a probability based on the size of the EA in the 1984 census. In the second stage 20 households were selected from each of the chosen EAs, yielding a total of 6,000 households. Owing to different rates of population growth in EAs between 1984 and 1998 the survey is not self-weighting. Ghana Statistical Service therefore provides a set of weights derived from the 2000 census.⁶ Throughout our analysis we use these weights together with corrections for the survey design (clustering and stratification).⁷

The household part of the GLSS contains modules ranging from education and health to migration, credits and assets. For our purposes, the most important modules are the education and household expenditure modules. The education module includes information on educational attainment, participation in adult literacy courses and literacy and numeracy proficiency (Ghanaian reading and writing, English reading and writing and ability to do written calculations). The module on household expenditures includes information on food and non-food expenditures, where the former is additionally decomposed into frequently and less frequently purchased items.

The community questionnaire contains information on access to services in communities, including schools, hospitals, markets, motorable roads and public transportation. The most important information for our purposes includes information on whether there has been an adult literacy course in the community and if so, for how long. The information on infrastructure and markets is also important, since literacy and numeracy skills may be more important when there is a market and/or a developed infrastructure in the area.

5 Variables

This section describes the dependent and independent variables we use in our estimations. We begin with the dependent variables, then the instruments and finally the (regular) explanatory variables. Table 1 shows descriptive statistics for the variables.

⁶See [Ghana Statistical Service \(2000\)](#) for further details.

⁷This is done with Stata's "svy" commands.

Table 1: Descriptive Statistics

	Mean	St. Dv.	Minimum	Maximum
Participated in adult literacy program	0.1696	0.3753	0.0000	1.0000
Log of adult-equivalent adjusted expenditure	13.7912	0.6852	11.6815	17.0921
Log of per-capita expenditure	13.3919	0.7236	11.0557	17.0027
Literacy program in community	0.8110	0.3915	0.0000	1.0000
None currently enrolled in literacy program	0.3209	0.4669	0.0000	1.0000
Not all communities in EA has program	0.0323	0.1767	0.0000	1.0000
Main religion: Catholic	0.2366	0.4251	0.0000	1.0000
Main religion: Other Christian	0.4952	0.5001	0.0000	1.0000
Main religion: Islam	0.0767	0.2662	0.0000	1.0000
Main religion: none	0.0437	0.2046	0.0000	1.0000
Owens land	0.3643	0.4813	0.0000	1.0000
Non-farming household	0.0821	0.2746	0.0000	1.0000
Percent adults with primary education	13.3722	29.8079	0.0000	100.0000
Percent adults with middle/JSS education	29.1962	39.5597	0.0000	100.0000
Percent adults with vocational education	0.6753	6.7139	0.0000	100.0000
Percent adults with secondary or above	5.3795	19.3767	0.0000	100.0000
Median age of adults	38.2911	7.8997	25.0000	55.0000
Percent female adults	59.5823	34.6838	0.0000	100.0000
Bank in community	0.0896	0.2857	0.0000	1.0000
Hospital in community	0.0115	0.1065	0.0000	1.0000
School in community	0.8917	0.3108	0.0000	1.0000
Public transportation	0.6694	0.4705	0.0000	1.0000
Road in community (not passable all year)	0.4012	0.4901	0.0000	1.0000
No road in community (closest road passable all year)	0.0452	0.2077	0.0000	1.0000
No road in community (closest road not passable all year)	0.1099	0.3127	0.0000	1.0000
Daily market in community	0.1388	0.3458	0.0000	1.0000
Weekly market in community	0.1909	0.3930	0.0000	1.0000

5.1 Dependent Variables

The dependent variable in the first stage estimation (the participation decision) is the self-reported participation in an adult literacy program by one or more adults in the household (one if one or more participated, zero otherwise). A potential problem is that we miss information on several important aspects of the household members' participation. Ideally, we would like information on whether a participant has "graduated" from an adult literacy program, but that is not available. Furthermore, we do not know when, where or for how long she participated and we do not know how much effort she put into the program. We are therefore likely to underestimate the effect of participation since we cannot identify participants who only recently joined a program or spent little effort on it and these persons are likely to have a small effect on their household's consumption.⁸ Another potential issue is that the effect of participation may depend on the number of participants, but we currently do not take this into account.⁹

The dependent variable for the second stage estimation (the outcome estimation) is the consumption of the household. Consumption or household expenditures are preferable to earnings or wages as a measure of economic well-being for at least two reasons. First, if households smooth their consumption over time the link between latent household economic well-being and earnings or wages is weaker than that between latent household economic well-being and consumption expenditures. Second, consumption expenditures are likely to be more accurately measured than earnings or income (Apleton (2002)); this is especially the case for our sample which consists purely of rural households most of which have agricultural production as their main income source. As is often discussed in poverty analysis not all household members require the same level of consumption to reach the same level of utility; children and adults, for example, have different caloric requirements. We therefore use two different measures of consumption. First, a per capita measure in which all household members carry equal weight. Second, an adult-equivalent measure, where different types of household members are assigned a weight depending on their age and sex, and total consumption is

⁸The effect may even be negative if the participants' Labor supply declines during participation.

⁹ In the largest sample we use (Section 6 explains the different samples) about 17 per cent of the participating households, or 79 households, have more than one participant; of these only 6 households have more than 2 participants.

divided by the sum of these weights. The major problem with both measures is that they are to a certain extent arbitrary. We present results for the logarithm of both measures.

5.2 Instrumental Variables

As instruments we use the access to an adult literacy program in the community and the dominant religion of the community. We capture the access to an adult literacy program with three variables. First, a dummy variable which is equal to one if there is, or has been, an adult literacy program in the community and zero otherwise. Second, since the first variable refers to both current and past programs, the second variable is equal to one if there are currently nobody enrolled into the program and zero otherwise. There may be no current enrollment for a number of reasons. The number of potential participants may have been exhausted if the program has been in the area for a long time or the quality of the program is so bad that nobody wants to participate. It is also possible that there are not enough resources for the program to continue operations or that it is simply closed due to the time of year. It is not possible to establish which provider(s) offered the program from the community questionnaire, just as it is not possible to determine which type of program the individual participant took part in. This is a problem since there are significant differences between programs and over time within a program.¹⁰ Hence, we are not able to determine whether some programs are more successful than others in increasing the standard of living of its participants.

As described above 20 households are selected from each enumeration area (EA), but in some EAs the households are located in more than one community. Although the community questionnaire enumerators were supposed to collect information on which households belong to which communities this did not happen making it impossible in some cases to map a household to a unique community. The final program variable is therefore a dummy variable, which is equal to one if there is a community in the EA that had or currently has an adult literacy program and there are one or more communities within the EA that *do not* have a program and zero otherwise.¹¹ This variable is included to capture the additional cost of participation if travel between

¹⁰See the discussion of the curricula for different programs in Appendix ??.

¹¹Hence, if all communities within the EA have programs the variable is zero and the same is the case if none of the communities have a program.

communities is required to participate. We unfortunately cannot tell the distance between the different communities within an EA since the Ghana Statistical Service does not release that information for privacy reasons.

The second set of instruments reflects the dominant religion of the community. This is based on a question in the community questionnaire which asks what the major religion practiced by the residents of the community is. We group the responses into five groups: Catholic, other Christian, Islam, no religion and Traditionalist, with the excluded group being Traditionalists.¹² Note that no religion here refers to “no religion” being the major religion and not to absence of a major religion.

As mentioned above one requirement for a good instrument is that it significantly affects the decision to participate, but has no direct effect on consumption per capita and is uncorrelated with the unobservable heterogeneity. This is likely to hold for both our sets of instruments. To support our claim we present the effect and significance of the instruments and also show the F-test for all instruments being jointly equal to zero for the participation estimation results. We also discuss the validity of the two sets of instruments below.

The availability of an adult literacy program in one’s community is likely to be an important factor in the decision to participate, but it is unlikely that it will have any direct effect on consumption, especially after controlling for other community characteristics (see below). Whether there is a literacy program also is unlikely to be correlated with the unobservable household heterogeneity, such as the innate ability of household members. One potential problem with using the presence of an adult literacy program is the possibility of endogenous program placement as discussed by [Rosenzweig and Wolpin \(1986\)](#) and [Pitt, Rosenzweig, and Gibbons \(1995\)](#). If the programs are not randomly distributed, as may, for example, be the case if the government aims to place programs where there are many illiterates, this can bias the estimates of the effectiveness of the program. As discussed in [Pitt, Rosenzweig, and Gibbons \(1995\)](#) there is relatively little that can be done to overcome this problem unless longitudinal data are available. Furthermore, it is difficult to establish the direction of the bias without knowing the “rule” for distribution of the programs. We try to minimize the potential

¹²Other Christian include Anglican, Presbyterian, Methodist, Pentecostal, Spiritualist and other Christians. Besides the groups mentioned there is also an option for “other”, but no community had that as the main religion.

bias by including district dummies, as discussed below, although it is clearly still possible that programs are not randomly placed within a district. The number of different agencies and NGO's involved in adult literacy programs are also likely to help in reducing the bias, since it becomes more likely that the program are randomly distributed or placed according to criteria which are unrelated to what we are examining.¹³

Our second set of instruments, the major religions of the area, are less prone to “program placement” effects but are still likely to affect participation without affecting expenditures directly or be correlated with unobservable household characteristics. Being in an area with organized religion may, for example, influence the probability of participation through campaigns arranged by the churches, but the presence of a major religion is unlikely to directly affect household consumption or be correlated with unobservable heterogeneity. One issue with using religion as an instrument is that the effect on participation is likely to be weaker and more indirect than the presence of an adult literacy program.

5.3 Independent Variables

We divide the independent variables into household and community variables. The household variables include information on land, activity of the household, education and household structure. The land variable is a dummy for whether the household owns land, while the activity of household variable is a dummy for the household not being an agricultural household. The latter is based on households not reporting any agricultural activities.

An important part of the household variables is the education variables, since these are likely to significantly affect both participation and the standard of living of a household. Unfortunately, the education module in GLSS 4 asked only about highest level completed or highest qualification attained and not years of schooling. We use the highest level completed as the basis for our education variables. We divide educational attainment into five groups: No education, primary school, middle school or junior secondary school, vocational training and secondary or above.¹⁴ To reflect the different educational attainment of household members we use the percentage of adults (25-55

¹³This assumes that there is no national plan or coordination which the individual organizations follow.

¹⁴The “no education” group includes, besides from no education, also kindergarten and koranic stage.

years) in the household who has completed the various levels of education, with no education being the excluded variable.¹⁵

We capture the structure of the household with two variables. The first is the median age of the adults in the household and the second is the percentage of adults in the household who are female.

The community variables reflect the level of development for the household's immediate area and hence the potential for income generation. We include dummies for whether the community is served by banks, hospitals, schools and public transportation. Another characteristic which is likely to have an impact both on the participation decision and the standard of living of the household is the access to the areas outside the community. This is captured by the presence and condition of roads. There can either be a road that runs through the community or not. If not, there is generally access to a road in a neighboring community. Furthermore, the road in question can either be passable all year or be impassable part of the year, for example because of rain. We therefore include four dummy variables for road access and condition, with an all-year passable road in the community being the excluded category. The final measure of access to income generation is the presence and frequency of a market in the community. There are three possibilities: A daily market, a weekly market or no market in the community. The excluded category is no market.¹⁶

Finally, we include district dummies. There are 110 districts in Ghana and they are generally more homogenous than the regions they are located in. The advantage of including the district dummies is that we should be able to better compare households facing similar circumstances and therefore be more confident about the estimated effect of adult literacy course participation. Since our sample is only from rural areas we have a total of 95 districts, but in our largest sample 7 of those are excluded since they predict failure perfectly in the participation estimation (for comparison there are 23 excluded districts in our smallest sample).

¹⁵Six households that have members who belong to a residual group, "other education", have been excluded since it is not clear how that group fits in with the "regular" education levels.

¹⁶Since we do not know the exact location of the communities it is possible that the household may in fact be located close to a market even though the community questionnaire does not identify a market. The same is the problem for road access.

6 Results

We first examine the determinants of whether the household has one or more members who have participated in an adult literacy program. This is the first step of the 2SLS procedure described above. We then turn to the estimated effect of participation on household welfare, measured by consumption. We present results for two measures of consumption, per capita adult equivalent consumption and unadjusted per capita consumption. Finally, we show how literacy and numeracy are related to participation and characteristics of the participant and her fellow household members.

Table 2: Household Participation in Adult Literacy Programs

	Model I	Model II	Model III	Model IV	Model V
Instruments					
Literacy program in community	0.3719** (0.1795)	0.4352** (0.1971)	0.4225** (0.1970)	0.3026 (0.2701)	0.8586** (0.3571)
None currently enrolled in literacy program	-0.6949*** (0.1674)	-0.8111*** (0.1848)	-0.7932*** (0.1798)	-0.8393*** (0.2402)	-0.7366*** (0.2384)
Not all communities in EA has program	0.0046 (0.1960)	-0.0294 (0.2121)	-0.0306 (0.2072)	-0.3002 (0.2816)	-0.4097 (0.3583)
Main religion: Catholic	0.7766* (0.3948)	0.6563* (0.3911)	0.6342 (0.3913)	0.4883 (0.4733)	-0.2357 (0.3985)
Main religion: Christian	0.6320* (0.3572)	0.5468 (0.3508)	0.5396 (0.3521)	0.1301 (0.4011)	-0.5830* (0.3281)
Main religion: Islam	0.4595 (0.3097)	0.4538 (0.3144)	0.4539 (0.3136)	0.2029 (0.3558)	0.3884 (0.3632)
Main religion: none	1.0043** (0.4747)	0.9779** (0.4834)	0.9972** (0.4824)	0.8720 (0.5683)	1.7988** (0.6901)
Explanatory Variables					
Owens land	0.0029 (0.0960)	-0.0165 (0.1026)	-0.0141 (0.1025)	-0.1112 (0.1223)	-0.3520* (0.1877)
Non-farming household	-0.5270** (0.2294)	-0.3970* (0.2211)	-0.3949* (0.2284)	-0.5355* (0.2845)	-1.1785*** (0.3612)
Percent adults with primary education	-0.0018 (0.0015)	-0.0016 (0.0016)	-0.0017 (0.0016)	-0.0018 (0.0016)	
Percent adults with middle/JSS education	-0.0061*** (0.0022)	-0.0058*** (0.0021)	-0.0057*** (0.0021)		
Percent adults with vocational education	-0.0004 (0.0043)	0.0018 (0.0043)			
Percent adults with secondary or above	-0.0061** (0.0028)				

Table 2: Household Participation in Adult Literacy Programs -
Cont.

	Model I	Model II	Model III	Model IV	Model V
Median age of adults	0.0148** (0.0071)	0.0146** (0.0072)	0.0150** (0.0073)	0.0054 (0.0073)	-0.0056 (0.0078)
Percent female adults	-0.0044*** (0.0015)	-0.0046*** (0.0016)	-0.0047*** (0.0016)	-0.0056*** (0.0014)	-0.0057*** (0.0017)
Bank in community	-0.5355* (0.2729)	-0.3977 (0.2644)	-0.3841 (0.2603)	-0.2928 (0.3296)	-0.6123 (0.3700)
Hospital in community	1.7497*** (0.5415)	1.6429*** (0.5319)	1.6678*** (0.5284)	2.1142*** (0.6242)	3.0203*** (0.6306)
School in community	-0.3835** (0.1802)	-0.3692** (0.1866)	-0.3659** (0.1845)	-0.2565 (0.2518)	-0.2164 (0.3123)
Public transportation	-0.0108 (0.1834)	-0.0986 (0.1803)	-0.1169 (0.1820)	0.0014 (0.2113)	-0.0005 (0.2322)
Road in community (not passable all year)	0.2341* (0.1279)	0.2100 (0.1305)	0.2019 (0.1305)	0.1976 (0.1758)	0.2022 (0.2282)
No road in community (closest road passable all year)	-0.5604 (0.5930)	-0.5759 (0.5929)	-0.5934 (0.5887)	-0.5283 (0.6239)	-0.3769 (0.5523)
No road in community (closest road not passable all year)	-0.3950 (0.2819)	-0.4133 (0.2924)	-0.3338 (0.2902)	-0.2777 (0.4105)	-0.4257 (0.3918)
Daily market in community	-0.7516*** (0.1562)	-0.7538*** (0.1627)	-0.7521*** (0.1665)	-0.9011*** (0.2926)	-0.4738* (0.2675)
Weekly market in community	0.3733** (0.1891)	0.4732** (0.1941)	0.4768** (0.1930)	0.5711** (0.2436)	0.6727*** (0.2472)
Constant	-1.5483*** (0.4994)	-1.3914*** (0.4903)	-1.4504*** (0.4897)	-0.7316 (0.5189)	0.4328 (0.5346)
District dummies	Yes	Yes	Yes	Yes	Yes
F-test (all instruments equal to 0)	6.42***	6.35***	3.64***	3.65***	4.36***
Observations	2789	2549	2525	1406	1073

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%; Robust standard errors in parentheses

6.1 The Determinants of Participation at the Household Level

Table 2 shows the results of the first step probit model for five different specifications. The five models estimated differ in the educational attainment of adult household members. Model I includes all households where information on the dependent and explanatory variables are available. The remaining models gradually exclude households according to the educational attainment of adult household members. Model II excludes all households where there is at least one adult who completed secondary or above, while Model III additionally excludes all households where at least one adult has completed vocational education. Model IV excludes households where at least one adult has completed middle or junior secondary education, so that the highest level of education for this sample is primary education. Finally, Model V includes only households where primary education has not been completed (although it is possible that some of the household members have had some education).

The most important variables in Table 2 for our further analysis are the instruments. As expected there is a statistically significant and positive effect of the presence of an adult literacy program on the participation, except in Model IV. Whether anybody is currently enrolled does, however, have a consistently significant negative effect on participation as expected. The last of the program variables, the dummy to capture whether some communities in the enumeration area does have access while other do not, is statistically insignificant for all models. Religion appears to be a weaker instrument; only the dummy for the main religion being none is consistently significant (and positive) for all five models. The F-tests show that the two sets of instruments are jointly significant in all cases. Hence, to the extent that the instruments are uncorrelated with unobservable household characteristics that affect the likelihood of participation they appear to be valid instruments.

The results for the explanatory variables are generally identical between the five models. A household which owns land is less likely to have a member participate in a literacy program than a household without land although the effect is only significant for the smallest sample. If the household is a non-farming household, i.e. has not engaged in any farming activities during the twelve months prior to the first interview date, its members are significantly less likely to participate. The presence of a daily market in the community has a significantly negative effect while the presence of a weekly market has

a significantly positive effect.

We measure education in the household by the percent of adult household members who have achieved a certain educational attainment with the excluded category being no education (including Koranic education). Interestingly, increasing the percentage of adults who have completed primary education has no significant reducing effect on the likelihood of the household having a member participate in an adult literacy program. One possible explanation for this is low quality of instruction in primary schools leaving primary school completers with low skill levels. The percentage of household members who has completed the two steps following primary education, middle school/JSS and secondary education (includes education above secondary) show significant negative effects. Our remaining educational variable, the percent of household members who have done vocational training, has no significant effect on participation, which may be because of the low number of individuals in the sample with vocational training.

6.2 The Effect of Participation on Consumption

Tables 3 and 4 present the results of the second step of our regression model, the determinants of household consumption. In Table 3 we use the log of per adult equivalent consumption, while Table 4 show the results for the log of consumption per capita without correction for age of household members. Our preferred measure is per adult equivalent consumption with the per capita results presented for comparison. The results are essentially the same for the two measures of household consumption. Each model corresponds to the models discussed above that is, starting with Model I, which includes the full sample, gradually excluding households based on the highest education level completed, one level at a time. Model V is the most reduced model, based only on the sample of households in which no adult members have completed any formal education.

Our main variable of interest is the indicator for whether the household has one or more members who has participated in an adult literacy program. As discussed above we use the predicted probability of participation as our instrument. For the first four models, there is no significant effect on household consumption from participation in an adult literacy program for either of the two consumption measures. For the model estimated using only households where no adult members have completed any form of formal education (Model V) there is, however, a substantial positive and statistically

significant impact from adult literacy course participation.

While there is no effect on consumption from owning land there is a substantial and statistically significant, positive effect on consumption from being a non-agricultural household. The most likely reason for this is that the indicator variable captures households living in rural areas who have steady and (relatively) well paid jobs, such as government officials or serve as middlemen between farmers and city markets.

The education variables all have significant and positive effects on consumption. As expected the size of the positive effect on consumption increases with the education level. Note that the effect of vocational education is close to that of the secondary education variable, even slightly higher.¹⁷

The evidence for the community variables is mixed. Having a bank in the community has a statistically significant and positive effect on consumption, probably owing to this variable proxying for the economic infrastructure of the area, including (potential) access to credit. Having access to a road which is not passable all year has a statistically significant negative impact on consumption (omitted category is access to a road, which is passable all year). Similarly, not having access to a road in the community (disregarding the quality of the road) has a statistically negative effect on consumption, as well.

6.3 Skills Acquisition and Participation

This section presents a descriptive analysis of the effects of participation on literacy and numeracy based on the participant's education and that of her other household members. One potential problem with using our current data for analyzing the effect on skills acquisition from participation is that we miss several important aspects of the participation experience. We know whether somebody has participated, but we do not know *when* a person participated in a program, for *how long* she participated and *how much effort* she put into the program and, finally, we do not know *which* provider offered the program. Contrary to the previous analyzes we use individual data here since we are interested in the effect of participation on the individual's skills. The analysis is currently entirely descriptive in nature and this should be kept in mind when examining the results.¹⁸

¹⁷The survey does not allow us to establish the level of regular education for a respondent with vocational training.

¹⁸A detailed econometric analysis is research in progress.

Table 3: Effects on (log) Per Adult Equivalent Consumption of Participation

	Model I	Model II	Model III	Model IV	Model V
Participation (Endogenous)	0.1261 (0.2961)	0.0888 (0.2994)	0.0818 (0.2880)	0.1277 (0.2337)	0.3906* (0.2201)
Owns land	0.0225 (0.0349)	0.0298 (0.0365)	0.0316 (0.0366)	0.0041 (0.0519)	0.0001 (0.0571)
Non-farming household	0.1970** (0.0844)	0.2024** (0.1021)	0.2005* (0.1020)	0.2050* (0.1191)	0.2125* (0.1119)
Percent adults with primary education	0.0010** (0.0005)	0.0009* (0.0005)	0.0009* (0.0005)	0.0011* (0.0006)	
Percent adults with middle/JSS education	0.0018*** (0.0005)	0.0017*** (0.0005)	0.0017*** (0.0005)		
Percent adults with vocational education	0.0055*** (0.0015)	0.0063*** (0.0019)			
Percent adults with secondary or above	0.0045*** (0.0007)				
Median age of adults	-0.0054*** (0.0019)	-0.0050** (0.0020)	-0.0049** (0.0020)	-0.0007 (0.0022)	0.0028 (0.0027)
Percent female adults	0.0005 (0.0004)	0.0004 (0.0005)	0.0003 (0.0005)	0.0005 (0.0006)	0.0004 (0.0007)
Bank in community	0.2011** (0.0932)	0.2265** (0.0902)	0.2283** (0.0886)	0.2583*** (0.0963)	0.3324*** (0.1069)
Hospital in community	0.2670 (0.2937)	0.2428 (0.2950)	0.2446 (0.2913)	0.5267** (0.2599)	0.2024 (0.2760)
School in community	-0.0991 (0.0828)	-0.1005 (0.0786)	-0.1013 (0.0798)	-0.0941 (0.0859)	-0.1045 (0.0758)
Public transportation	-0.0203 (0.0723)	-0.0223 (0.0707)	-0.0313 (0.0698)	-0.1112 (0.0817)	-0.1719* (0.0900)
Road in community (not passable all year)	-0.2165*** (0.0528)	-0.2170*** (0.0545)	-0.2130*** (0.0542)	-0.2660*** (0.0765)	-0.2902*** (0.0906)
No road in community (closest passable all year)	-0.4238*** (0.1064)	-0.4258*** (0.1085)	-0.4290*** (0.1068)	-0.5082*** (0.1088)	-0.5504*** (0.1277)
No road in community (closest not passable all year)	-0.0515 (0.1050)	-0.0192 (0.1045)	-0.0245 (0.1041)	-0.0525 (0.1098)	-0.0519 (0.1189)
Daily market in community	-0.0491 (0.0764)	-0.0520 (0.0721)	-0.0557 (0.0701)	0.0593 (0.0734)	0.1389 (0.0919)
Weekly market in community	-0.0474 (0.0688)	-0.0383 (0.0754)	-0.0357 (0.0743)	0.0039 (0.0877)	-0.0292 (0.0979)
Constant	14.0308*** (0.1686)	14.0391*** (0.1662)	14.0077*** (0.1594)	13.9172*** (0.2079)	13.6231*** (0.2657)
District dummies	Yes	Yes	Yes	Yes	Yes
Observations	2789	2549	2525	1406	1073
R-squared	0.46	0.45	0.45	0.43	0.43

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%

Robust standard errors in parentheses

Table 4: Effects on (log) Per Capita Consumption of Participation

	Model I	Model II	Model III	Model IV	Model V
Participation (Endogenous)	0.0239 (0.2793)	-0.0300 (0.2847)	-0.0371 (0.2723)	0.0246 (0.2228)	0.4548* (0.2341)
Owns land	0.0303 (0.0351)	0.0415 (0.0364)	0.0439 (0.0366)	0.0173 (0.0506)	0.0281 (0.0622)
Non-farming household	0.2032** (0.0838)	0.2133** (0.0983)	0.2112** (0.0983)	0.2160* (0.1170)	0.2467** (0.1135)
Percent adults with primary education	0.0013*** (0.0005)	0.0013*** (0.0005)	0.0013*** (0.0005)	0.0014** (0.0006)	
Percent adults with middle/JSS education	0.0018*** (0.0005)	0.0018*** (0.0005)	0.0018*** (0.0005)		
Percent adults with vocational education	0.0057*** (0.0016)	0.0070*** (0.0019)			
Percent adults with secondary or above	0.0049*** (0.0007)				
Median age of adults	0.0009 (0.0019)	0.0016 (0.0020)	0.0016 (0.0019)	0.0053** (0.0022)	0.0083*** (0.0027)
Percent female adults	-0.0005 (0.0004)	-0.0007 (0.0005)	-0.0007 (0.0005)	-0.0003 (0.0006)	-0.0001 (0.0007)
Bank in community	0.2151** (0.0895)	0.2615*** (0.0863)	0.2644*** (0.0845)	0.2800*** (0.0918)	0.3835*** (0.1097)
Hospital in community	0.2428 (0.3152)	0.2071 (0.3172)	0.2108 (0.3135)	0.5257* (0.2979)	0.1561 (0.3068)
School in community	-0.1047 (0.0827)	-0.1104 (0.0794)	-0.1116 (0.0805)	-0.0941 (0.0864)	-0.1146 (0.0800)
Public transportation	-0.0431 (0.0726)	-0.0511 (0.0714)	-0.0600 (0.0705)	-0.1511* (0.0812)	-0.2281** (0.0936)
Road in community (not passable all year)	-0.2265*** (0.0519)	-0.2205*** (0.0539)	-0.2165*** (0.0536)	-0.2786*** (0.0743)	-0.3128*** (0.0918)
No road in community (closest passable all year)	-0.4683*** (0.1047)	-0.4720*** (0.1035)	-0.4750*** (0.1017)	-0.5661*** (0.1024)	-0.5921*** (0.1290)
No road in community (closest not passable all year)	-0.0808 (0.1113)	-0.0487 (0.1127)	-0.0561 (0.1123)	-0.0920 (0.1196)	-0.1242 (0.1329)
Daily market in community	-0.0611 (0.0715)	-0.0729 (0.0663)	-0.0796 (0.0643)	0.0508 (0.0647)	0.1375 (0.0915)
Weekly market in community	-0.0325 (0.0740)	-0.0231 (0.0810)	-0.0217 (0.0798)	0.0190 (0.0936)	-0.0330 (0.1006)
Constant	13.6115*** (0.1665)	13.6162*** (0.1664)	13.5796*** (0.1590)	13.4610*** (0.2038)	13.1777*** (0.2792)
District dummies	Yes	Yes	Yes	Yes	Yes
Observations	2789	2549	2525	1406	1073
R-squared	0.49	0.47	0.47	0.46	0.44

NOTE: * significant at 10%; ** significant at 5%; *** significant at 1%

Robust standard errors in parentheses

Tables 5 and 6 present tabulations of the skills (literacy and numeracy) by education levels and sex. For each combination there are four figures of interest. The first is the cell size, the second is the distribution between participants and non-participants in percent, the third is the percentage of persons who can read either English or a Ghanaian language and the fourth is the percentage of persons who can do simple written calculations.

In Table 5 the two first columns show the results for people who have not participated and participated, respectively, while the last four columns show the results divided by sex. What is immediately clear is that the adult literacy programs have only modest effects as far as providing literacy skills to participants is concerned. The two education levels of most interest are no education and primary since these two groups account for close to 90 percent of all participants in literacy programs. Although the percentage that can read either English or a Ghanaian language increases by around ten percentage points with participation for both no education and primary education there are still very few who can read after participation if they have not been to school and just over fifty percent of participants with primary education who can read. The results for numeracy correspond to the results for literacy, except that there are slightly fewer who can do calculations among people with primary education who have participated compared to those who have not participated.

If we divide by sex of the participants it is clear that the lack of progress is especially pronounced among women with no education, while men of the same group fare much better (although it is still less than twenty percent who can read afterwards). This is a significant issue since about half of all participants are women without any completed education. Hence, without a strong impact on this group the possibilities for overall gains of programs may be limited.

Since there is a possibility of people learning from each other Table 6 shows the percentages of people who can read or do written calculations by the participants' education level and the highest education level of other adults in the household. The group of households with only one adult is captured by the last two columns, "No Others". We concentrate on those participants who have no completed education. It is especially of interest that the participation rate is relatively high among those who live together with people with both middle schooling and secondary schooling and above. For both of those groups over twenty percent participate, while it is only fifteen percent of those with no other adult household members who participate.

Table 5: Literacy and Numeracy by Participation and Sex

Education level	Attend literacy course		Literacy by Sex and Participation			
	No	Yes	Male		Female	
			No	Yes	No	Yes
None / Koranic	2018	429	584	145	1434	284
	82.47	17.53	80.11	19.89	83.47	16.53
	3.12	11.66	6.51	19.31	1.74	7.75
	6.69	14.45	11.47	22.07	4.74	10.56
Primary	522	72	200	26	322	46
	87.88	12.12	88.50	11.50	87.50	12.50
	42.34	52.78	56.50	61.54	33.54	47.83
	61.30	59.72	75.00	65.38	52.80	56.52
Middle	1349	53	811	30	538	23
	96.22	3.78	96.43	3.57	95.90	4.10
	93.48	92.45	97.16	90.00	87.92	95.65
	96.15	96.23	98.52	96.67	92.57	95.65
Vocational	30	3	17	0	13	3
	90.91	9.09	100.00	0.00	81.25	18.75
	100.00	100.00	100.00	.	100.00	100.00
	100.00	100.00	100.00	.	100.00	100.00
Post Middle	268	2	214	2	54	0
	99.26	0.74	99.07	0.93	100.00	0.00
	99.25	100.00	99.53	100.00	98.15	.
	99.63	100.00	99.53	100.00	100.00	.
Total	4187	559	1826	203	2361	356
	88.22	11.78	90.00	10.00	86.90	13.10
	43.97	25.40	64.02	35.96	28.46	19.38
	48.94	28.80	68.24	39.41	34.01	22.75

NOTE: The first number is cell size, the second number is distribution in percent. The third number is the percentage that can read either English or a Ghanaian Language and the fourth number is the percentage that can do written calculations.

One possible interpretation of this is that literacy may not be shared within

Table 6: Literacy and Numeracy by Maximum Education of Other Adults in Household and Participation

Education level	None / Koranic		Primary		Middle		Vocational		Post Middle		No Others	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
None / Koranic	921	185	117	24	299	87	6	3	46	17	629	113
	83.32	16.68	82.98	17.02	77.58	22.42	66.67	33.33	73.02	26.98	84.77	15.23
	2.28	12.97	5.98	4.17	6.02	8.05	0.00	33.33	15.22	11.76	1.59	13.27
	5.43	15.68	9.40	16.67	9.03	12.64	0.00	0.00	21.74	5.88	5.88	15.04
Primary	108	18	64	6	135	24	3	1	26	4	186	19
	85.71	14.29	91.43	8.57	84.91	15.09	75.00	25.00	86.67	13.33	90.73	9.27
	44.44	61.11	43.75	66.67	34.07	37.50	0.00	0.00	50.00	75.00	46.24	57.89
	67.59	55.56	53.13	50.00	55.56	70.83	33.33	0.00	65.38	25.00	64.52	63.16
Middle	319	9	142	8	430	15	5	1	93	3	360	17
	97.26	2.74	94.67	5.33	96.64	3.36	83.33	16.67	96.88	3.13	95.49	4.51
	93.42	88.89	97.89	87.50	92.09	100.00	100.00	0.00	93.55	100.00	93.33	94.12
	96.87	88.89	98.59	100.00	95.12	100.00	100.00	100.00	97.85	100.00	95.28	94.12
Vocational	7	1	3	3	5	1	2	1	8	5	5	1
	87.50	12.50	100.00	100.00	83.33	16.67	100.00	100.00	100.00	100.00	83.33	16.67
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Post Middle	43	1	20	1	82	1	8	1	46	69	69	1
	97.73	2.27	100.00	100.00	98.80	1.20	100.00	100.00	100.00	100.00	100.00	100.00
	97.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.55	98.55
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.55	98.55
Total	1,398	214	346	38	951	128	24	5	219	24	1,249	150
	87.15	15.81	90.47	13.23	89.10	18.60	85.07	28.33	91.42	21.73	89.58	13.27
	29.76	21.03	56.94	31.58	57.52	25.78	62.50	20.00	73.52	33.33	40.43	28.67
	34.48	22.90	60.12	39.47	62.88	35.16	66.67	20.00	78.54	20.83	45.88	30.67

NOTE: The first number is cell size, the second number is percentage that can read either English or a Ghanaian Language and the third number is the percentage that can do written calculations.

households to the same extent in Ghana as in other countries that have been analyzed (See [Basu, Narayan, and Ravallion 2002](#) and [Gibson 2001](#)).

There does not appear to be a positive effect of increasing other household members' education on a participant's probability of becoming literate. The highest percentages of literate participants who have no prior completed education or primary education are in the group with no other adult household members. Furthermore, the percentage of literate persons with no schooling is almost three times as high for those in households where the highest education of other adults is none as compared to those in households with primary education being the highest level (13.0% and 4.2% respectively). A possible explanation for this could be that people in households with educated members use a higher standard for when they consider themselves literate. One indication of this is that the literacy rate is higher among non-participants in households with no educated members and households with no other adults than it is for non-participants in households where primary education is the highest level. This holds for both participants with no and primary education. If there is an inflated sense of skill level among participants with no education who live as either the only adults in the household or in a household with no educated members then the results presented in [Table 5](#) *overestimate* the skill level after participation. This is especially a problem since about 45 percent of all participants come from these two groups.

7 Explaining the Differential Effect of Program Participation

As shown there is a significant, positive effect on consumption from having a household member participate in an adult literacy program only for households where no adult members have completed any formal education. Given the amount of resources used on the literacy programs by both providers and participants this result requires further analysis. This section briefly discusses potential reasons for the results and how to test for these.

There are a number of potential explanations for why there might be no significant effect of participation in general. First, the skills taught in the program may not have a very high return in most of the rural areas. Second, the "income generating activities" promoted in the program may be of a poor quality or they may be suggested to so many people that the general

equilibrium effect is to depress the price / market so much that there is no effect. Finally, participants' consumption may be reduced because of foregone earnings during program participation or because they are diverting resources towards their "income generating activities" in order to derive a larger benefit later. This obviously will only hold for current or recent participants which probably do not represent a large fraction of the participants. What is clear, however, is that none of these factors are much help in explaining why there is a significant effect when there are no educated household members, while there is no significant effects in any of the other models.

Although we find only small positive effect of participation on the skill levels of participants, as discussed in the last section, it is still entirely possible that either participants acquire other skills that we are not able to capture or that we measure the increase in skills with a substantial error. That participants do in fact learn something can be seen from the positive effect on consumption for households' with no educated adult members. Also, given that our sample is purely rural our results are consistent with the findings in [Jolliffe \(2002\)](#): That only the most educated member's education matters for income generation in rural Ghana.¹⁹ In a more educated household participation is unlikely to increase the participating member's human capital level to a point where it is higher than that of somebody who have completed primary education or higher and hence it is unlikely to have any effect on household income and therefore consumption.

The question is then, why do people who live in a household with more educated members participate in a program with little apparent effect on their household's consumption? This is closely related to the question, why would somebody participate if there are already one or more household members who are literate and literacy is shared within the household as suggested by [Basu and Foster \(1998\)](#) and [Basu, Narayan, and Ravallion \(2002\)](#)?²⁰ Most of the households in our sample are agricultural households and hence there is no direct benefit of participation on an individual's wages, although it is possible that participation would increase the potential wage if the household member decided to leave the household. Hence, one likely hypothesis is that participation is a means to gaining a better bargaining position within

¹⁹[Jolliffe \(2002\)](#) uses an earlier version of the GLSS, but there is little reason to expect that significant changes have occurred in what determines income between that survey and ours.

²⁰See also [Gibson \(2001\)](#), who looks at health outcomes.

the household.²¹ If this is the case then that would also imply that literacy is not shared in rural Ghana to the extent found by [Basu, Narayan, and Ravallion \(2002\)](#) in Bangladesh. In fact, if the hypothesis is confirmed then participation of members from educated households is inefficient in that participation is costly and does not add to household income. This would be consistent with [Udry \(1996\)](#), who finds that the allocation of time between men's and women's plots in Burkina Faso is inefficient implying that the decisions within the household is not pareto optimal as has otherwise been assumed in the literature on household decision making.

There are two parts to our test of the hypothesis. First, we will examine what determines whom in a family decides to spend the time and effort required to participate in an adult literacy program. Second, we will examine whether participation improves the bargaining power of participants. Since there is obviously no direct information on this we will use the time allocation of household members and consumption patterns to proxy for bargaining power.²² The analysis of the hypothesis is currently research in progress.

8 Conclusion

This paper examines the effect of adult literacy program participation on household consumption in Ghana. We find that in most cases there is no significant effect on consumption from participation after allowing for self-selection into the program. For households where no adults have completed any formal education there is, however, a substantial positive and statistically significant effect on household consumption. This points towards the potential importance of adult literacy programs for the parts of the population that have not participated in the formal education system.

We also analyze whether participants learn to read and write; that is, do the programs achieve their stated objective of making participants literate. Although this part of the analyses is purely descriptive it is clear that the effectiveness of the programs is not as high as could be desired. It is an intriguing result that the only segment of the households for which there is

²¹See, for example, [McElroy and Horney \(1981\)](#), [Bourguignon and Chiappori \(1992\)](#), [Browning, Bourguignon, Chiappori, and Lechene \(1994\)](#) and [Behrman \(1997\)](#).

²²An alternative is to examine whether, for example, health or education for children are better in educated households where women has participated in adult literacy programs; the idea being that women has a stronger preference for those outcomes than men.

a statistically significant effect of participation is that with households with no educated members. We suggest a likely hypothesis for this result: That participation in households with educated members is a way of increasing the participants' bargaining power. We also discuss how this hypothesis could be tested.

Previous studies of the determinants of household consumption typically find a strong positive effect of education on the standards of living. It is often argued that the most important effect of education is to enable individuals to gain and process information. Key ingredients of this information processing are reading, writing and calculations skills. Our findings both confirm these results on the effects of education and extend them by finding an impact of participating in non-formal adult education, as well. This is an area that has so far received little attention in the literature. In a population where many adults cannot read or write, adult literacy programs may be a cost-effective way of improving people's livelihood, especially in those households consisting of adults with no completed education or which are single adult households. Our analyses suggest that more attention should be paid to examining the potentially beneficial impacts of adult literacy programs on economic and social development.

There are two directions in which future research could beneficially go. The first is analyzing the pattern of participation, especially in households where there are already educated household members, to test whether the participation decision reflects a desire to improve the bargaining power within the household. The second is an improvement in data availability and quality, especially with respect to information on participation. Ideally, future data should include information not only on whether an individual participated in an adult literacy program, but also when she participated, for how long and in which program. This data would help improve the precision of the results of future research on adult literacy programs and their possible effects on skills and economic and socioeconomic outcomes.

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