Economics & Religious Implications On Adult Literacy In Sub-Saharan Africa

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ABSTRACT

Although literacy rates have improved somehow in recent years, there are still large numbers of people that are illiterates in developing countries. This paper examines the impact of public education expenditures, the percentage of urban population and religious affiliation on adult literacy rate in Sub-Saharan Africa. In this study, a cross-sectional data of 34 Sub-Saharan African countries with adequate data information were analyzed. The results from the ANOVA and Ordinary Least Square (OLS) regression analysis are quite conclusive - that urban population, government expenditures on education and religious affiliations do have strong statistical impact on literacy.

INTRODUCTION

The educational systems of Sub-Saharan Africa have experienced natural and human-made disasters. These disasters include increased debt burden, poor governance, and inadequate funding. Literacy improving efforts are constantly disrupted by wars and economic/political disasters. These unfortunate and sobering facts do contribute tremendously to the increasing number of adult illiterates in many Sub-Saharan African countries.

Human capital theory has given researchers the basic framework for analyzing the demand for education from the viewpoint of social and private rate of returns. Mincer (1962) and Becker (1964) were the first to analyze the subject area, followed by others of relevant estimations from different nations.[1] Education plays a central and critical role in one's ability to respond to constantly changing opportunities that development presents. Basic education serves as a foundation for an improved condition of life. These improved and expected improvements are not only for those who are young but also for adolescents and adults who have been missed by that system. Illiteracy is a major obstacle to poverty alleviation. A long-standing observation about education is that it helps in transforming people from being passive to active citizens. It is generally agreed that more educated individuals take a more active role in civic life and politics than those with little or no education.

The economic impact of education to any society can be observed from the micro and macro perspectives. From both the micro and macro points of view, investments in education are mainly based on the perceived rates of returns to both secondary and higher education.[2] Expenditure on education is an investment that leads to the formation of human capital. This formation could be either for the individual or for society at large. In a simplified form, the rate of return to investment in education $\boldsymbol{R}$ can be specified as:

$$\boldsymbol{R = (Y_1 - Y_0)/N(Y_0 + C_1);}$$

Where $\boldsymbol{Y_1}$ and $\boldsymbol{Y_0}$ refer to the mean income of workers who are educated and uneducated respectively. $\boldsymbol{N}$ is the number of years of schooling it takes for someone to become literate, and $\boldsymbol{C_1}$ is the annual cost of keeping someone in school.

Notable results of studies on the rate of return of investment in education are not far off the yield of more conventional investments. According to Psacharopoulos (1991), the returns to investment in education in advanced

countries are roughly the same as those of investment in physical capital, while in developing countries, the returns to education stand at a much higher level.[3] The patterns that have emerged from empirical studies do show that rate of returns to education decline by level of schooling. The returns to primary education are higher relative to returns to secondary education, and the later, are higher than returns to university education (see Psacharopoulos, 1991).

From the macro perspective, investments in education do result in growth in the economy, measured in terms of Gross Domestic Output (GDP). A standard aggregate production function can be expressed as $Y = K^a(AL)^b$, where Y represents the overall output of the economy, K is the stock of capital (both human and physical capital); L and A are labor and the productivity of labor respectively. The contributions of K and L can further be expressed as $G_Y = (W_K \bullet G_K) + (W_L \bullet G_L) + F$, where G_Y stands for the growth rate of total income or output, G_K and G_L are growth rates of capital stock and labor force respectively. W_L and W_K represent the shares in total income of wages and returns to capital respectively. The final term, F, is the rate of change in total factor productivity, which improves with investment in education. Apart from these mentioned improvements in the overall economy, investment in education has many other contributions to social values – which do come under the heading of externalities. Improved self confidence among women in male-dominated developing countries is among the more consistently documented social values impact of adult literacy. This self-confidence can lead to empowerment, self-esteem, and self-efficiency. Apart from these positive effects, literate parents (especially mothers) do send their children to school more often and give stronger supports to the education of their children. This means that adult education and primary school for children work together to advance literary for all. Investment in human capital also has a much wider social impact on society. Education promotes open-mindedness and the ability to adapt to new techniques and situations. As the overall literary rate of a nation improves - especially, female literary – the desire to define self solely in terms of off-springs decreases. Education increases the opportunity cost to woman staying at home and induces her to participate in the Labor market.

Theoretical Framework

Although literacy rates have improved somehow in recent years, there are still large numbers of illiterates in developing countries, representing nearly 25 percent of the world's youth and adults. According to Meier and Rauch (2005), significant disparities in educational opportunities persist both in enrollment rates, which capture educational flows, and in average years of schooling, which represent the stock of education among the public.[4] This disparity is more pronounced among the rural residents, due to the lack in educational opportunities. In most of Sub-Saharan Africa, the government provides most of the funding for public education. Research has shown that the government plays a more important role in the economies of nations where human development is high than in countries where it is medium or low. In developing countries, especially Sub-Saharan Africa, both government and non-government agencies have responsibility for funding literacy programs.[5] According to UNESCO Report (2002), government funding for education ranged from 55 to 65.9 percent, while parents and communities provided 17.5 to 27.2 percent in 2001. Some larger companies have become involved in literacy programs for their own employees and supplies because the skills acquired can be of great importance in work situations.

There seems to be some variations in literacy rates among different rural, ethnic and religious groups in Sub-Saharan Africa. Also, there seems to be some differences in literacy rates due to ethnic differences. Ethnic groups that had the earliest exposure to Western culture seem to have benefited tremendously from that experience and data do show that they do have higher literacy rates than ethnic groups that had a later contact. These existing rural, ethnic and religions disparities could be contributing to adult literacy. Religions and ethnic diversity may contribute to literacy rate and subsequently impact the stability and development of any nation (Human Development Report, 2004).[6]

Generally, urban centers are favored by government officials in most developing nations especially, in the allocation of government institutions and infrastructures. Such favoritism can involve the allocation of local public services; such as, public libraries, telecommunications, schools and efficient transportation services. Migration decisions are stronger with education. Although education makes an average worker aware of employment opportunities elsewhere, nevertheless, the income differential between the urban and rural sectors of Sub-Saharan Africa account for the main reason for migration. The decision to migrate from rural to urban areas is functionally related to the urban-rural real income differential and the probability of obtaining an urban job.[7] Many rural

residents that migrate to urban areas do so for economic reason. Not all new migrants are quickly absorbed in the modern formal sector on their arrival to the cities. Most are absorbed initially in the urban informal sector. The informal sector entrants are, on average, slightly less educated than those who entered the formal sector jobs. According to Banerjee (1983), the likelihood of moving from the informal sector to the formal sector jobs improved with education.[8] The informal sector jobs serve as a holding place for newly arrived rural migrants. It becomes a temporary place for many newly arrived migrants to stay and gain all the required knowledge needed for making a smooth transition to the formal sector. During their stay in the informal sector, most workers attend classes in many of the evening/night schools that offer quick training in computer skills, typing, nursing aid jobs, etc. These human capital enrichment activities do help them tremendously in obtaining gainful employment in the formal sector.

Because literacy contributes to the economic and social performances, it is necessary to conduct a study on the role of public expenditure on education, urban population, and religious diversity on adult literacy in Sub-Saharan Africa. This paper examines: a) the role of public education expenditures on adult literacy; b) the impact that the percentage of urban population may have in explaining changes in adult literacy; and c) finally, if there is any significant contributing impact of religious affiliation in explaining differences in adult literacy of Sub-Saharan Africa.

DATA AND VARIABLES

To address these research questions, the paper uses a cross-sectional data of 34 Sub-Saharan African countries. The data was obtained from the 2005 Human Development Report. Only Sub-Saharan African countries with adequate data information were chosen. The paper uses ANOVA and OLS (Ordinary Least Squares) regression methods of analysis to answer the research questions. Cross tabulation analysis was employed to bring to light some unique characteristics of the data.

Dependent Variables

Three separate variables were use to measure literacy. Adult Literacy Rate (ALR) which is the percent of adult that can read or write. Adult Female Literacy Rate (AFL) which is the percent of adult female that can read or write. Finally, Education Index (EDI) measures a country's achievement in both adult literacy and combined primary, secondary and tertiary gross enrolment. EDI is made up of two indices- the index for adult literacy and the combined gross enrolment of students. These two indices are combined to create the education index, with two-thirds weight given to adult literacy and one-third weight given to combined gross enrolment (Human Development Report, 2005).

Explanatory Variables

Public expenditure on education as a percentage of GDP (PEG) accounts for the subsidies to private education at primary, secondary, and tertiary levels. PEG is expected to have a positive impact on literacy. Urban Population Percentage (UPP) accounts for the percentage of the total population that resides in urban areas. UPP is expected to have a positive impact on literacy. The last explanatory variable is the percentage of population that is of the Islamic Faith (REL). The role of religion is more complex than one may expect. According to Christian Science Monitor (2003), many African countries tie for the lowest literacy rate on the continent. Mauritania and Somalia, both Muslim countries have some of the lowest literacy rates. Botswana and South Africa, both Christian nations have one of the highest literacy rate. Ethiopia and Sierra Leone both predominantly Christian nations, are also among the Sub-Saharan African countries with the lowest literacy rates.

Table 1: Descriptive Statistics

Variables	Minimum	Maximum	Mean	Std. Dev
ALR	13.80	90.00	56.92	21.83
EDI	0.16	0.81	0.54	0.18
AFL	8.10	90.30	48.92	24.14
UPP	10.00	61.70	34.73	13.00
REL	0.01	100.00	30.99	31.31
PEG	0.60	10.40	3.48	2.29

Note: ALR – Adult Literacy Rate; EDI – Education Index; AFL – Adult Female Literacy Rate; REL - % of Population that are of the Islamic Faith; UPP - % of Population that resides in Urban Areas; and PEG – Public expenditure on education as a % of GDP.

It is very difficult to conclude from here that religion is the main contributing factor in explaining literacy differences in Sub-Saharan Africa. Is religion not a factor? It is a mixed bag. There may be some other equally, or more important contributing factors – such as, the prevalence of civil conflict, the degree of government involvement, or corruption, that may be contributing to the literacy rates in Sub-Saharan Africa. Nevertheless, there seems to be some historical evidence that does appear to give an indication that some relationship do exist between literacy and the early establishments of schools and churches in most Sub-Saharan Africa. According to Klem (2002), most of the early church missionary movement in Sub-Saharan Africa, especially West Africa, worked on the assumption that literacy was essential to evangelism, and church growth. The major impact of missions in West Africa was the introduction of literacy through the establishment of schools. These historical facts imply that countries that were the beneficiaries of the early Christian mission schools have enjoyed a much higher literacy rate than others. Given these historical facts, one will expect REL to be negatively related to literacy.

RESULT

Table 1 shows the descriptive statistics of all the variables used in this study. As illustrated in table 1, the minimum adult literacy rate of 13.80 percent occurred in Burkina Faso, while the maximum adult literacy rate of 90.00 percent was observed in Zimbabwe. It is interesting to note that the population of Zimbabwe is predominantly of the Christian Faith, while Burkina Faso is predominantly of the Islamic Faith. The data also showed that about 1 percent of the population of people in Zimbabwe is of the Christian Faith while 100 percent of Mauritanians practice the Islamic Faith. The adult female literacy rate in Mauritania was 31.9 percent, lower than the overall mean female literacy rate of 48.92 percent. Adult female literacy rates were particularly low for most of Sub-Saharan Africa, with the exception of two Southern African countries, Botswana and Lesotho. Botswana and Lesotho do have higher female literacy. The highest adult female literacy in Sub-Saharan Africa was Lesotho, with 90.30 percent adult female literacy rate, while the lowest rate of 8.1 percent was observed in Burkina Faso.[16] ANOVA tests were done to analyze if religion played any role in explaining adult and female literacy rates among Sub-Saharan African countries. Table 2 showed the ANOVA for the role of religion on adult literacy. Given that the two dominant religion in Sub-Saharan Africa are Islam and Christianity, the countries were divided into two based on the percentage of the people that practiced the Islamic faith. Given the computed mean for REL was 30.99, one category of countries represented those that were predominantly of a Non-Islamic Faith (i.e., REL $\leq$ 30.99); while the other category were made up of nations the were predominantly of the Islamic Faith (i.e., REL > 30.99).

Table 2: Descriptive Statistics and ANOVA for the Role of Religion on Adult Literacy.

Descriptive

Categories	N	Mean	Std. Dev.	Std. Error	Min.	Max.
REL ≤ 30.99	20	68.57	15.36	3.43	33.60	90.00
REL > 30.99	14	40.28	18.93	5.06	13.80	69.40
Total	34	56.92	21.83	3.74	13.80	90.00

ANOVA

	Sum of Squares	Df	Mean Square	F	Sign.
Between Groups	6591.57	1	6591.57	23.08	0.00
Within Groups	9141.25	32	285.66		
Total	15732.82	33			

The ANOVA result shown in table 2 indicates that ALR had a mean score of 68.57 percent for countries with REL ≤ 30.99, while countries with REL > 30.99 had a lower mean of 40.28. The two means are statistically different at 1 percent level. The ANOVA test result displayed in table 3 shows the role of religious affiliation of Africans on adult female literacy. Similar to result illustrated on table 2, adult female literacy was much higher in countries with REL ≤ 30.99 (mean of 60.97) than in countries with REL > 30.99 (mean of 31.72); and the two means were found to be statistically different at 1 percent. This finding implies that nations with a high percentage of her citizen belonging to the Muslim religion do on average have a lower female literacy rate than countries with a low Muslim population.

Table 3: Descriptive Statistics and ANOVA for the Role of Religion on Adult Female Literacy

Descriptive

Categories	N	Mean	Std. Dev.	Std. Error	Min.	Max.
REL ≤ 30.99	20	60.97	19.91	4.45	22.60	90.30
REL > 30.99	14	31.72	18.92	5.06	8.10	62.20
Total	34	48.92	24.14	4.14	83.10	90.30

ANOVA

	Sum of Squares	Df	Mean Square	F	Sign
Between Groups.	7042.71	1	7042.71	18.48	0.000
Within Groups.	12189.95	32	380.94		
Total	19232.66	33			

An OLS regression was performed to analyze the effects and significance of each explanatory variable in explaining adult literacy and female literacy rates among Sub-Saharan Africa. The regression models used in analyzing the relationship are shown below as:

$$ALR_i = \beta_1 + \beta_2 UPP_i - \beta_3 REL_i + \beta_4 PEG_i + \varepsilon_i \quad \text{..... (i)}$$

$$EDI_j = \alpha_1 + \alpha_2 UPP_j - \alpha_3 REL_j + \alpha_4 PEG_j + \varepsilon_j \quad \text{..... (ii)}$$

$$AFL_k = \lambda_1 + \lambda_2 UPP_k - \lambda_3 REL_k + \lambda_4 PEG_k + \varepsilon_k \quad \text{..... (iii)}$$

Where **β**'s, **α**'s, and **λ**'s represent the coefficient estimates and, ε's represent the stochastic terms. The regression results are shown on table 4. The preliminary results do indicate that percentage of the population that resides in urban areas was statistically significant in explaining changes in adult and female literacy rates in Sub-

Saharan Africa. The greater the percentage of the population that resides in urban areas, the higher the adult and female literacy rates. Also, religious affiliation of the citizens was found to be statistically significant in explaining adult and female literacy rates. Public expenditure on education was statistically significant in explaining changes in all the three measures of literacy rates. This strengthens the point that government role is effective in improving literacy.

CONCLUSION

The ability to read conveys many positive messages. Lind (1997) observed that the individual empowerment effects associated with literacy is quite strong especially in a male dominated society of Africa. There has been some research conclusion that education transforms people from passive subjects to active citizens. Drawing from South Asia experiences, Saldanaha (2000) observed that basic education has had especially strong connections with the growth of a broadly based civil society and poverty alleviation.

The results are quite conclusive that urban population and religious affiliation do have strong statistical impact on literacy. Also of equal importance is the positive role of government expenditure on education in helping improve literacy rates in Sub-Saharan Africa.

Table 4: OLS Estimates of Adult Literacy (ALR), Education Index (EDI) and Adult Female Literacy (AFL) on different Explanatory Variables. (n=34)

	Model 1 Dependent Variable (ALR)	**Model 2 Dependent Variable (EDI)**	**Model 3 Dependent Variable (AFL)**
Explanatory Variables.	Coeff. Estimates	Coeff. Estimates	Coeff. Estimates
Constant	34.785	0.467	49.829
% of population that resides in urban areas (UPP)	0.248 (2.09)**	0.290 (2.465)**	0.265 (2.291)**
% of population that is Muslim (REL)	-0.586 (-4.711)*	-0.667 (-5.41)*	-0.682 (-5.610)*
Public expenditure on Education as a % of GDP. (PEG)	0.333 (2.635)*	0.194 (1.545)***	0.192 (1.555)***
R-Square	0.596	0.602	0.613
Adj. R Square	0.555	0.568	0.575
F- Statistics	14.737	15.128	15.868

Note: t statistics are given in parentheses.
** Statistically significant at the 1% level*
*** Statistically significant at the 5% level*
****Statistically significant at 13% level.*

ENDNOTES

[1] For reviews of relevant findings, see Psacharopoulos,"Returns to education: An updated international comparison," *Comparative Education,* 17, pp. 321-341, 1981; "Returns to education: A further international international update and implications," *Journal of Human Resources,* 20, pp. 583-604, 1985; & Psacharopoulos, & Patrinos, "Returns to investment in education: A further update," *Education Economics,* 12, pp. 112-134, 2004.

[2] For evidence on the results of the analysis of rates of returns to higher education, see Menon, "Perceived rates of return to higher education: Further evidence from Cyprus," *Economics of Education Review,* 27, pp. 39-47, 2006.

[3]Psacharopoulos, George, "The Economic Impact of Education," in *Leading Issues in Economic Development,* edited by Gerald Meier and James Rauch, Oxford University Press, Oxford, pp. 189-193, 2005.

[4] There are no magic bullets when it comes to improving student performance. "Instead, policy makers must turn to new organizations, and new incentives if we are to improve schools," according to Professor Hanushek. For more, see Hanushek, Eric, "Interpreting Recent Research on Schooling in Developing Countries," in *Leading Issues in Economic Development,* edited by Gerald Meier and James Rauch, Oxford University Press, Oxford, pp. 201-205, 1995.

[5] Federal, state & local governments are the main providers of education in Sub-Saharan African countries. The real question borders on effectiveness. Results are inconclusive regarding the effectiveness of governments in impacting youth literacy. See, Okpala, Amon & Comfort Okpala, "The Effects of Public School Expenditure & parental Education on Youth Literacy in Sub-Saharan Africa," *Journal of Third World Studies,* vol. XXIII, # 2, pp.203-212, Fall, 2006.

[6] Some have argued that religious and cultural diversity could be obstacles to literacy and subsequently on economic development, empirical evidence is yet to prove that. See, "Cultural Liberty in Today's Diverse World," *Human Development Report,* pp. 1-45, 2004.

[7] Differences in economic opportunities between the rural and urban centers of Developing Nations have played an important role in the decision to migrate to urban centers. See, Todaro, Michael, "A Model of Labor Migration & Urban World Unemployment in Less Developed Countries," *American Economic Review,* pp. 139-142, March, 1960.

[8] Analyzing data from India, Banerjee discovered that the informal sector employment is a temporary staging post for new immigrants on their way to formal sector employment. Also, education improved the chances of mobility to the formal sector employment. For further reading, see Banerjee, Biswajit, "The Role of the Informal Sector in the Migration Process: A test of Probabilistic Migration & Labor Market Segmentation for India," *Oxford Economic Papers,* 35, pp. 411, 414-420, 1983.

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