

Africa's Education Enigma? The Nigerian story

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MOTIVATION

1. Anecdotal evidence in contrast with conventional wisdom on returns to education in Africa.
2. Very few papers using the IV strategy for estimating returns to education for African countries.
3. In the 90s, there was a rise in the proportion of the educated poor and fall in enrollment in several countries in Africa.
4. Importance of looking at Nigeria in Africa.

QUESTIONS

1. What are the returns to education in Nigeria?
2. Did returns to education change significantly overtime in Nigeria?

WHAT I DO

I estimate the average returns to education in Nigeria using the **instrumental variable approach** and other modern econometric techniques like OLS. The instrument is constructed based on a quasi experiment in Nigeria.

[Further discussion on instrument later on in the presentation].

SUMMARY OF FINDINGS

1. I find low returns to education in Nigeria in the 90s. Specifically I find a 3.6% increase in income for every extra year of schooling in 1997/1998 .

These estimates are in contrast to the high returns conventionally believed to be characteristic of African countries (7-20)%

2. I also find that there are significant time differences in returns to education in Nigeria. Returns to education dropped more than 10% between 1985 and 1992.

The results are robust to different econometric specification and subgroups of the population.

CONTRIBUTIONS OF THIS STUDY

1. This paper provides the first estimates of returns to education, using a good instrument, in a West African country.
2. The results draws attention to two major issues with education outcomes in Africa not previously highlighted: **low returns to education** and **time differences in returns to education**.

When returns to education are low, people would invest less in education. However, this could be problematic if education has high social returns/externalities. Time differences are also important since fluctuating returns make investment in education risky and could lead to lower participation.

3. The low returns to education in Nigeria provides some insight regarding two phenomena in the 90s: reduced enrollment in schools in Africa in the early 90s and increased emigration from Africa in general.

Outline for remainder of presentation

1. Summary of Literature in Africa
2. Description of data sets
3. Estimation strategy
4. Results
5. Robustness checks
6. Implication/recommendations

Summary of RTE Literature for Africa

Returns to schooling estimates in Africa

Authors	Country	Time	Range of Schooling Coefficients	
			OLS	IV
Aromolaran (2002)	Nigeria	1996-1999	1.5- 21.4%	
Psacharopoulos (1985)	Kenya	1970	16.4%	
Kahyarara et al (2004)	Kenya	2000	6.1-27.7%	18.4%
Psacharopoulos (1985)	Botswana	1989	38-99%	
Van der Gaag and Vijverberg (1989)	Cote d'ivoire	1986	20.1%	
Schultz (1994)	Cote d'ivoire	1987	12.1-13.6%	
Lucas and Stark (1985)	Botswana	1979	19.1%	
Ram and Singh (1988)	Burkina Faso	1980	9.6%	
Mingat and Jarousse (1985)	Senegal	1985	21.3-33.7%	
Larnbropoulos and Karadjia (1999)	Egypt	1997	5.2%	
Kazianga (2002)	Burkina Faso	1994/1998	9.2-44.5%	
Kahyarara et al (2004)	Tanzania and	2001	3.4%-46.9%	0%
Psacharopoulos (1985)	Somalia	1983	13-59.9%	
Bennell and Malaba (1991)	Zimbabwe	1987	5.1-48.5%	
Dalben (1998)	South Africa	1994	4.1%	19.1-28.1%
Mokitimi and Nieuwoudt (1995)	Lesotho	1987	10.6-16.5%	
Ephraim & Zgovu (2001)	Malawi	2000	9.41%	
Glewwe (1996)	Ghana	1989	7.3%-8.5%	0- 3.9%
Siphambe (2000)	Botswana	1993/94	3.3-14%	
Lasbille and Tan (2005)	Rwanda	1999-2001	12.2-17.5%	
Dabalén (1998)	Kenya	1994	16.0%	0.15%
Jones (2001)	Ghana	1995	7.1%	

DATA

1. Cross-sectional data from the [National Consumer Expenditure Survey](#) (NCS) of the Federal Office of Statistics (FOS) in Nigeria for 1985, 1992 and 1996.

Potential limitations of the NCS

- NCS has information only on household heads.
 - The NCS has information on levels of education, and not years.
 - Over-sampling of urban areas in 1992 and 1996.
2. [The General Household Survey of Nigeria \(GHS\)](#) which is similar to the Labor Standard Measurement Survey (LSMS). The survey periods used are 1997/1998 and 1998/1999.

Estimation Technique

Approach: Mincer equation estimation of returns to schooling

Strategy

Step 1: As a benchmark, estimate the returns to schooling from equation 1 using OLS.

Step 2: Using equation 1 and 2, estimate the returns to schooling in a 2SLS framework at each year of available data [pooled estimates would also be derived for completeness].

$$\log(y_i) = \alpha + \beta S_i + \phi X_i + \kappa X_i^2 + \rho D_i + \varepsilon_i \quad (eq.1)$$

$$S_i = \lambda_0 + \lambda_1 Z_i + v_i \quad (eq.2)$$

S_i is years of schooling, y_i is income, X_i is age of individual i and D_i are all other possible exogenous variables, Z_i are vectors of instruments ε_i and v_i are uncorrelated error terms, α and λ₀ are the intercept term, β is the returns to education/schooling.

Identification: Instrumental variables

The IV approach in this analysis hinges on finding observable covariates affecting schooling, uncorrelated with possible omitted variables in the wage equation.

Instrument for schooling

Length of exposure of individuals to a free education program, with exogenous timing in its implementation in Nigeria, called Universal Primary Education (UPE).

[The UPE instrument was first used by Osili and Long (2003).]

Fig 1: Geopolitical regions and states in Nigeria

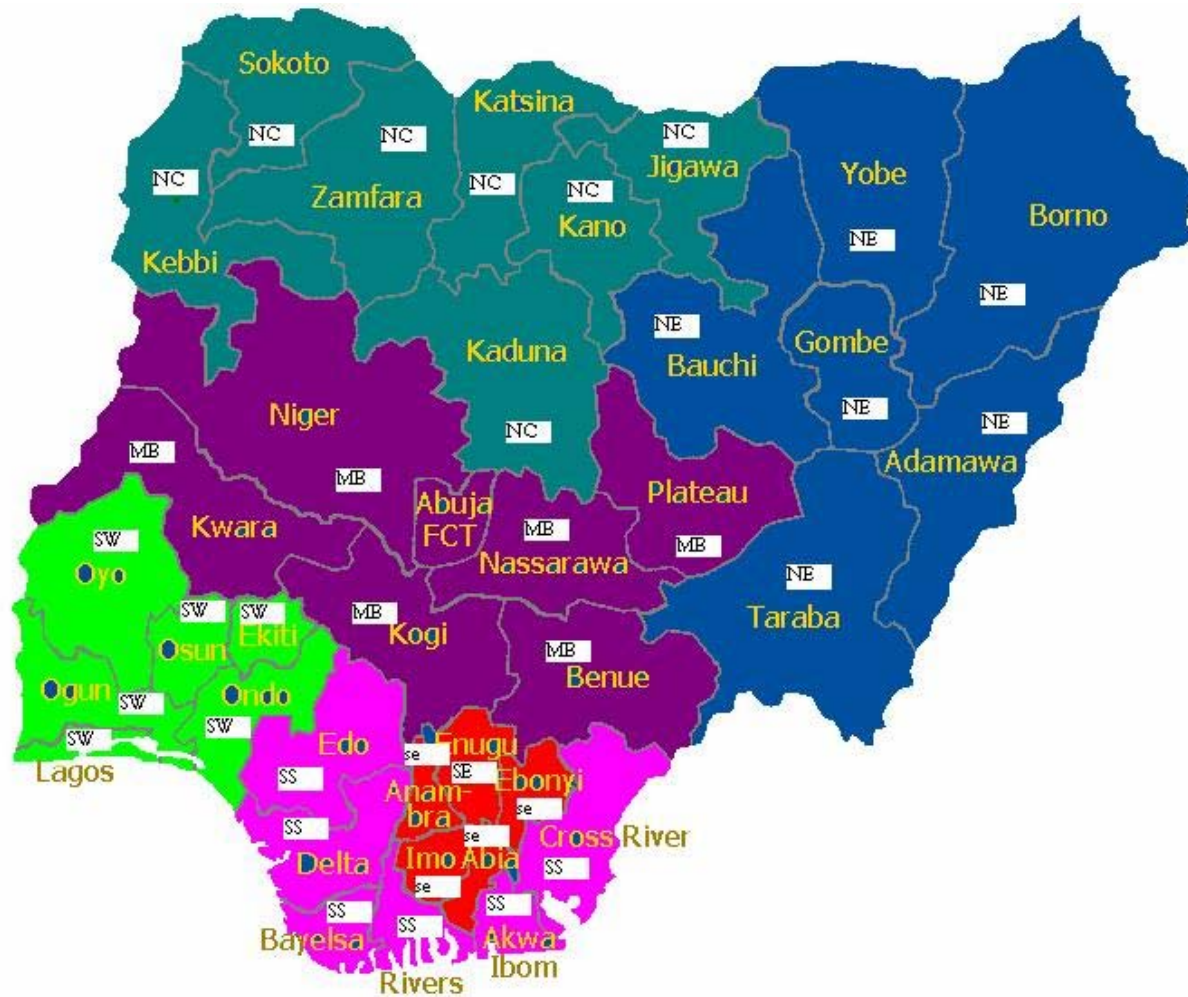


Fig 2: Timeline for free education in Nigeria

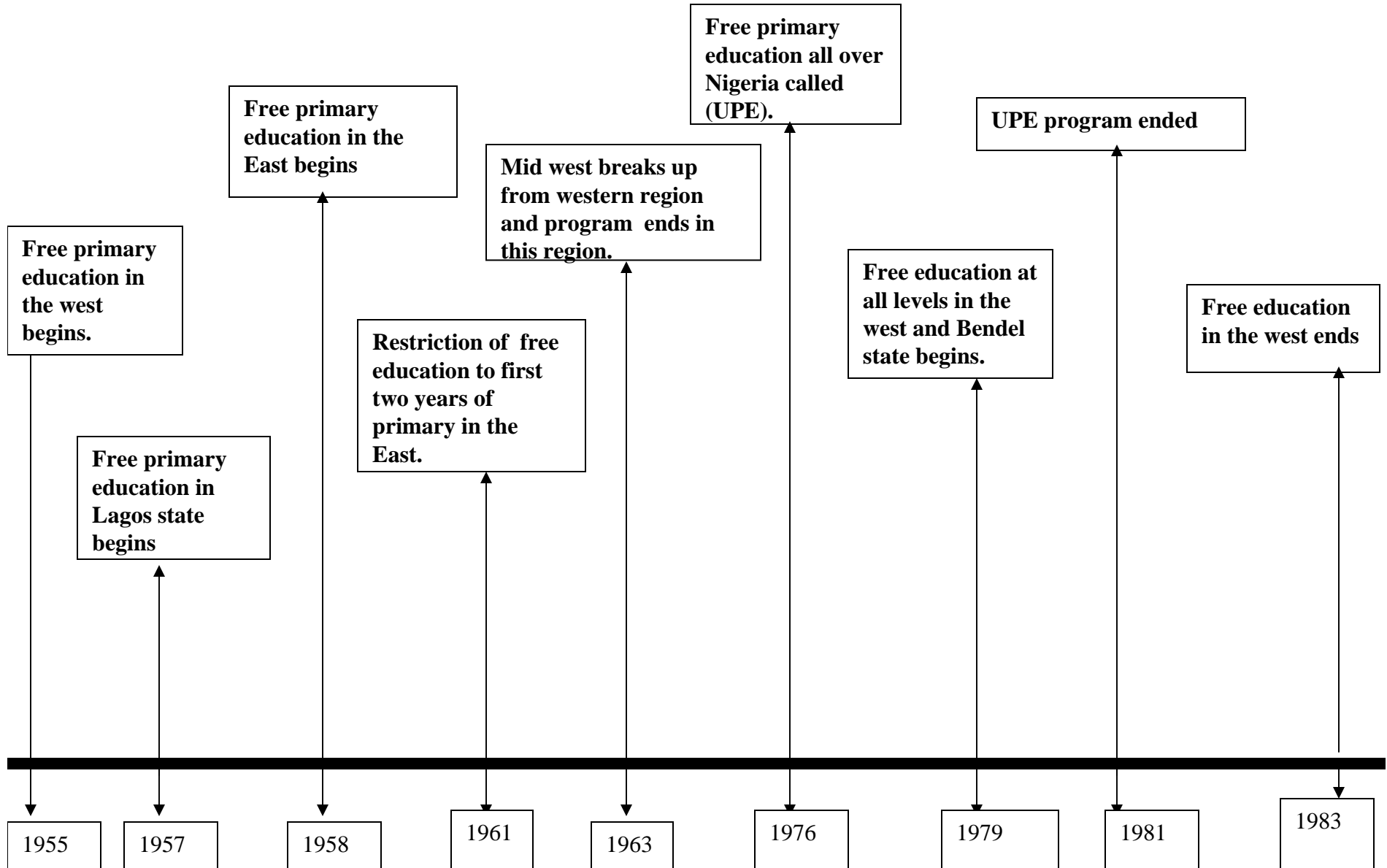
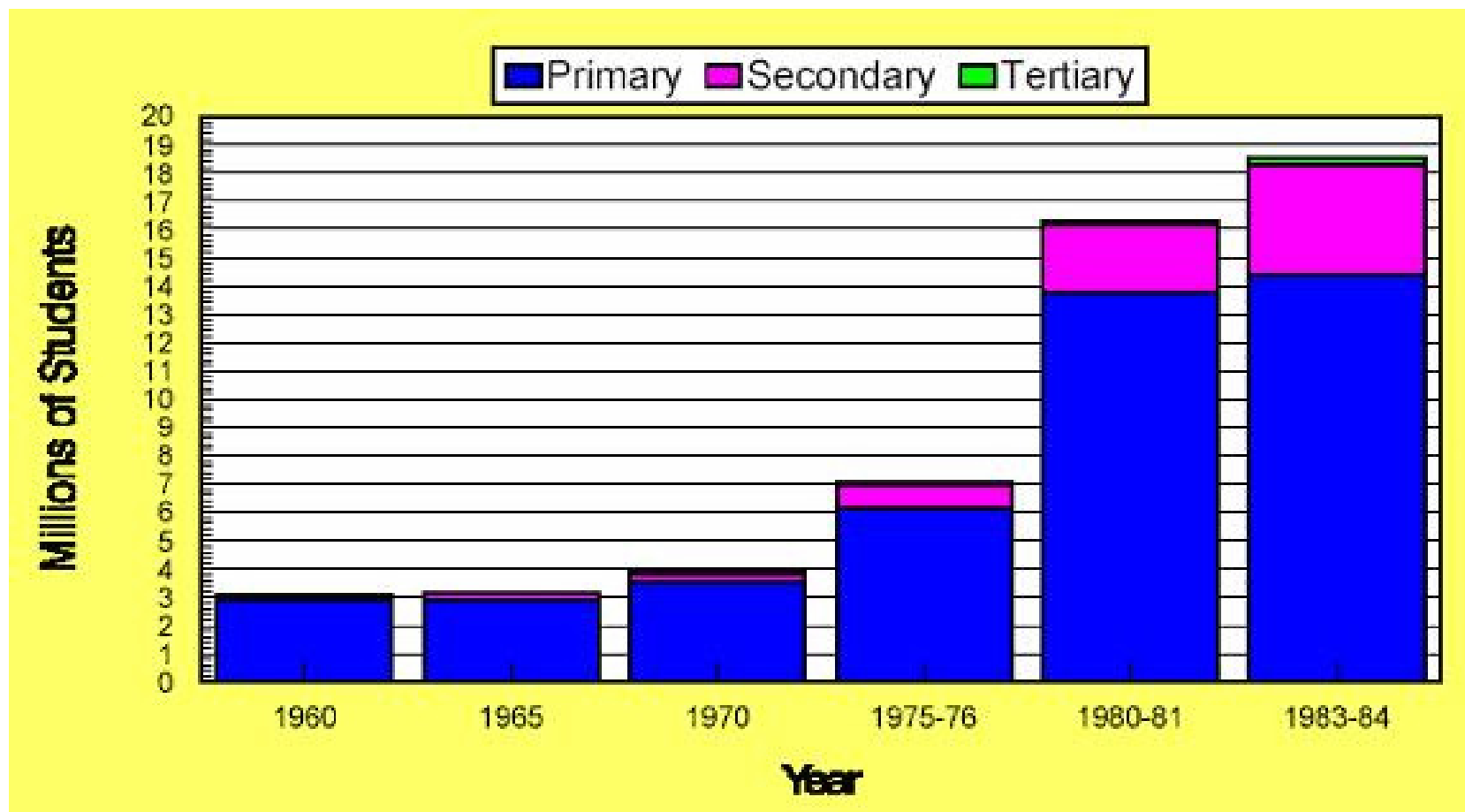


Fig 4: Changes in Enrollment in Nigeria



Why the UPE makes a good instrument

It satisfies the characteristics of any good instrument

1. Relevant

2. Satisfies exclusion restrictions

Possible channels through which this condition could be violated were examined noting no systematic relationship (quality of education, teacher's earning potential).

3. Exogenous

Program implementation across region and time was due to exogenous factors not linked with income. For example implementing UPE was not linked to needs or demands of regions or oil boom but rather taste of the unelected leader and education officer.

Summary of OLS vs 2SLS (1985, 1992 and 1996)

Schooling	1985		1992		1996		All	
	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)	(OLS)	(IV)
Using the length of exposure instrument								
1st Stage results								
UPE exposure	Na	0.19*	NA	0.17*	NA	0.14*	NA	0.18*
<i>R</i> ²	Na	0.12	NA	0.30	NA	0.32	NA	0.27
2nd Stage results								
RTE using IV	0.07*	0.13*	0.027*	0.022	0.028*	0.053**	0.040*	0.013
	(0.003)	(0.05)	(0.04)	(0.06)	(0.002)	(0.03)	(0.001)	(0.03)
Reduced form est.								
IV	0.024*	NA	0.004	NA	0.008**	NA	0.002	NA
	(0.01)		(0.01)		(0.005)		(0.004)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*5% and **10% significance levels. Reduced form estimate of the instrument is derived by estimating a wage equation with the instrument instead of years of schooling using OLS. F statistic always high. cohort dummies included where appropriate. NA- not applicable

Robustness checks carried out

1. Estimate returns to education by gender.[[Table 5](#)]
2. Estimate returns to education by sector.[[Table 5](#)]
3. Estimate returns by single individual households.[[Table 6](#)]
4. Estimate returns to education for wage worker and self employed.[[Table 6](#)]
5. Estimate returns to education by cohorts of birth.[[Table 7](#)]
6. Checked for potential self-selection bias.[[Table 8](#)]

Returns to education estimates after correcting for selectivity

	OLS	2SLS	Heckman	Heckman2	pscore1	pscore2
IV (Length of exposure)						
1997/98	0.026* (0.001)	0.037* (0.014)	0.035* (0.017)	0.036* (0.02)	0.035* (0.014)	0.036* (0.014)
1998/99	0.027* (0.001)	0.030* (0.01)	0.027* (0.011)	0.027* (0.011)	0.030* (0.01)	0.030* (0.01)
pooled	0.026* (0.001)	0.027* (0.011)	0.027* (0.013)	0.029* (0.013)	0.026* (0.01)	0.027* (0.01)

*5% and **10% significance levels

pscore1-propensity score estimation with linear probability model and pscore2 -propensity score calculation with probit model. Heckman- maximum likelihood and Heckman2- two step consistent estimates.

Summary of Results

1. Selectivity is not an issue as comparisons between the 2SLS estimates of returns to schooling with controls are very similar to estimates after correcting for potential selectivity with most of the different selection correction techniques.
2. Correcting for selectivity, the estimates of average returns to education in Nigeria in 1997/98 & 1998/99 are 3.6% and 3.0% respectively for every extra year of schooling which is very low.
3. The null hypothesis of no significant time differences in returns to education is rejected. Time differences in returns to education exist. The returns were at an all time high in the mid

IMPLICATION

As these results indicate returns to education within the range of 2-5% for Nigeria, and most previous papers have estimated returns to education for other African countries mostly in the range of 7-20% using estimation techniques that could be prone to biased estimates, there is a possibility that returns to education is being overstated for some other countries in Africa. Hence, another look at other African countries using better econometric techniques might be insightful.

Policy recommendation

The Nigerian government has to focus strongly on understanding why returns to education is low in general in Nigeria and then find ways of stimulating higher returns. One way of doing this, is to sponsor more academic research aimed at understanding this phenomenon.

Second, as the returns to education for men is twice that for women, policy makers might consider whether programs to encourage educated women to actively take part in the workforce at their level of expertise would be useful.

THE END

THANK YOU