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A reassessment of the effects of female education and employment on fertility in Nigeria

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Abstract

This paper reassesses the nexus between female education, employment and fertility in Nigeria. The four Demographic and Health Surveys (DHS) that have been conducted in the country (1990–2008) were analysed. Between 1990 and 2008, the educational status of women improved appreciably and the proportion of illiterate women in the country declined from 57.2 to 35.8 per cent. Multivariate analysis suggests that female education was inversely related to the indicators of fertility ($P<0.01$). The association between working away from home and fertility indicators was negative in the pooled data ($P<0.01$), but this association was mixed in separate surveys. Self- employment manifested a positive relationship with the indicators of fertility ($P<0.01$). Female education remains a valid channel through which a sustainable fertility decline can be achieved in the country. A vigorous drive to promote female education in all parts of the country is recommended. Girl child education in the north should be stressed.

1 Introduction

Nigeria is the most populous black nation in the world with a population of about 167 million, and a natural growth rate of 2.9 per cent per annum. Out of every four black Africans one is a Nigerian. Although the Nigerian government in its first population policy in 1988 (revised in 2004) pegged the number of children per woman at four, the country's Total Fertility Rate (TFR) is still as high as 5.6—one of the highest fertility levels in the world (Population Reference Bureau 2012). This is not surprising because the Nigerian government did not realise that the population growth rate of the country was one of the barriers to socio-

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economic development that must be addressed until the late 1990s. The realisation was not a very effective one, either, as one retained much of the *laissez-faire* attitude with regard to the population issue that dominated the previous considerations. Consequently, a population policy predicated on a voluntary family planning strategy funded mainly by international donors came into being (Wusu 2011). The effect of that policy on fertility is still quite minimal. It is not even entirely clear if the onset of fertility transition in the country reported earlier (Orubuloye 1995) is still on course or if it has stalled as Bongaarts (2008) found. In fact, fertility trend in the country has been described as quite undulating. It fell at a time and later showed a rise (Garenne 2008). The fertility pattern in Nigeria has therefore been characterised by a mixture of ups and downs over the last five decades (see Table 1). Thus, the TFR has fluctuated between 6.6 and 5.6 since 1965.

Given the country's TFR, there is no signal that a sustainable fertility decline will be realised. It is therefore imperative to further appreciate the forces underlying the fertility situation in the country. This paper is an attempt to re-examine two interrelated factors that have been identified as significant predictors of fertility: female education and labour force participation. The main objective of this study is to reassess the contribution of these factors to fertility behaviour in the country. It seeks to answer the two cardinal questions drawn from this objective: what are the levels of female education and labour force participation in Nigeria? What is the prevailing relationship between female education, labour force participation and fertility in the country?

Table 1:
Total fertility rates from various sources, Nigeria 1965–2012

Year	TFR	Source
1965	6.6	NPC 1984
1970	6.5	,,
1975	7.0	,,
1981/82	6.5	NDHS 2003
1983/86	7.4	,,
1986-90	6.0	,,
1991	5.9	,,
1999	5.2	NDHS 1999
2003	5.7	NDHS 2003
2008	5.7	NDHS 2008
2011	5.6	PRB 2012

Note: NPC=National Population Commission; NDHS=Nigeria Demographic and Health Survey; PRB=Population Reference Bureau.

2 Effects of female education and labour force participation on fertility

The new home economics and the proponents of the uncertainty reduction theory regarding the value of children were among the first to undertake a comprehensive theoretical analysis of the relationship between female education, labour force participation and fertility (Vikat 2004). Female schooling and labour force participation are among the most significant determinants of demographic processes, especially fertility, that have been reported in demographic literature (Van de Walle and Van de Walle 1995; Beets 2008; Shapiro and Gebreselassie 2008; Neels and Wachter 2010).

To start with, female education and labour force participation are interrelated factors that have long been recognised to be inversely related to fertility though context variations exist. Exposure of women to Western education enables them to delay marriage, reduce family size preferences, become more knowledgeable on contraception and adopt modern reproductive attitudes. Educated women tend to have high aspirations for themselves and their children. They often realise that it would be difficult to actualise their dreams if they had many children, so they use modern contraceptives to limit their family size (Okojie 1995; Bongaarts 2010).

Furthermore, it can be expected that more educated women would possess a higher level of autonomy and decision-making power, and consequently be able to employ modern contraceptives to space their children and limit childbearing. This picture suggests that high fertility might have persisted in sub-Saharan African countries owing (mainly or partly) to limited female literacy in the region. Recent studies in different parts of less developed regions have corroborated this assumption indicating that female education exerts profoundly negative effect on fertility (Dharmalingam and Morgan 1996; Kirk and Pillet 1998; Capo-Chichi and Juarez 2001; Adhikari 2010; Bongaarts 2010; Lutz et al. 2010).

Recent evidence has shown that in Nigeria female schooling has improved substantially over the last two decades. At least the gaps between male and female school enrolment and mean grades completed have decreased significantly across all age groups and it is even somewhat skewed in favour of females in certain areas (Heaton and Forste 1998; Grant and Behrman 2010). For instance, the ratio of literate young women to men aged 15 to 24 years was 76.8 per cent in 1990 but increased to 95.7 per cent in 2007 (World Bank 2010). If it is true that female schooling exerts negative effects on fertility in Nigeria, as a result of rising education levels, why is the average number of children per woman still as high as six or more in some areas? The critical question is whether education is still inversely related to fertility in Nigeria. This question is an important one in view of the recent findings reported for developed countries indicating that education is no longer a significant determinant of fertility; that if alternative childcare is both available and is affordable, the typical expected inverse relationship between

female education and fertility is likely to be obliterated (Musick et al. 2009; Van Bavel and Rozanska-Putek 2010; Rindfuss et al. 2010). So what is the situation in Nigeria?

It is conventional wisdom that female labour force participation is incompatible with childbearing and when it is widespread, the probability is almost certain that fertility begins to decline (Dxon-Mueller 2000; DeRose 2002; Vikat 2004; Beets 2008). It is important to note at this juncture that the effect of female labour force participation on fertility is likely to be dependent on the exact type of occupation, its compatibility with childbearing responsibilities, and on whether the woman works at home or at some other location. Employment that does not allow women to combine work with childbearing is considered a critical factor in promoting fertility decline (McDonald 2000; Perticara 2006). For instance, Launov and Klasen (2006), in a study of the determinants of fertility decline in the Czech Republic, identified increased education enrolment and difficulties in combining employment and childbearing as the most significant driving forces of the rapid fertility decline. However, in some societies, especially in Western countries, the irreconcilability of female labour force participation and childbearing has begun to diminish owing to policies that encourage the compatibility of women participation in labour force and childbearing (Vikat 2004; Hilgeman and Butts 2009). Hence, Neels and Wachter (2010) in their literature review suggest that the relationship between labour force participation and fertility varies from one society to another. But in sub-Saharan Africa, to a large extent, such encouraging policies do not exist and at present might not even find justification because of the high-fertility regime prevailing. Nigeria, as an example, does not have any such policy.

From a global perspective, the International Labour Organisation (ILO) and other relevant services have been promoting female labour force participation in various countries. As a result, female labour force participation is rising almost everywhere in the world, exerting negative effect on fertility through its major proximate determinants (Dixon-Mueller 2000). In Nigeria, female labour force participation increased from 36 per cent in 1990 to 39 per cent in 2009 (World Bank 2011). Although the increase of three per cent is small, it was expected to influence fertility in the country. It is shocking, however, to note that the Nigerian TFR is still as high as 5.6. One question that may come to mind here is—in what types of occupation are women engaged in Nigeria? This question is important because the nature of job determines the probability, and the length, of maternal leave which is likely to influence the relationship between labour force participation and fertility. In addition, the findings of previous studies on the relationship between labour force participation and fertility do not cohere; some studies have found that there is indeed a significant relationship between female labour force participation and fertility (e.g. DeRose 2002) while others have reported that further clarifications are needed on this relationship (e.g. Lloyd 1991; Kravdal and Rindfuss 2007).

In the light of the above question and the absence of perfect harmony in the findings of previous studies on the relationship between female labour force participation and fertility, it is a significant research goal to reassess this relationship. It is against this background that the present study seeks to analyse the prevailing relationship between an increasing female labour force participation and fertility in Nigeria.

3 Data and methods

Analysis in this study was based on the four Nigeria Demographic and Health Survey (DHS) data collected in 1990, 1999, 2003 and 2008. The four data sets were chosen to reflect the trend for a period of over 18 years. In line with the focus of this study, individual women of reproductive ages (15-49 years) data sets were used. The four data sets were downloaded after necessary approval was obtained from Measure DHS, and merged into a single data file before relevant variables were selected. The sample size of each survey is shown in Table 2. The SPSS version 17.0 was used in the analysis. In order to enhance the national representativeness of the data sets, the weighting process was executed. The samples were weighted using the sample weight variable (v005) designed by Measure DHS. This process involved multiplying v005 by 1,000,000 at the compute variable environment of SPSS and the computed variable applied to the data file.

Table 2:
Sample size for Nigeria Demographic and Health Surveys, 1990–2008

Survey year	Sample size
1990	8.781
1999	9.810
2003	7.620
2008	33.385

Children ever born and number of living children were selected as indicators of fertility which was the dependent variable this study seeks to explain. From the title, four variables were identified to represent education and labour force participation: highest educational attainment, respondent's occupation, whether a respondent works at home or away, and whom she works for. However, the respondent's occupation was excluded in model construction because there is a high correlation between this variable and educational attainment. In other words, the effect of labour force participation on fertility was measured through educational attainment. Given that the main objective of the study is to assess the effect of these variables on the indicators of fertility and since the indicators of fertility are continuous variables, the ordinary least-square (OLS) regression technique was adopted in the construction of explanatory models.

All the independent variables were categorical and they were recoded through dummy variables where each category was coded as 'yes' = 1, 'otherwise' = 0. This process was adopted to estimate the effects of each of the categories in the multivariate regression models. In addition, the variable 'whom a woman worked for' was reclassified into two categories from three. 'Work for someone else' and 'work for a family member' were collapsed into one. Consequently, the variable now has two categories: employee and self-employed. In constructing the models, the age of respondents was included in order to control for its effect on the dependent variable. Indeed, when it was introduced into the models the R^2 value increased significantly indicating an improved explanatory power of the models. Age at first marriage was also introduced initially as a way of controlling for its effect; however, it was eventually excluded because it added no value to the model. In fact, the explanatory strength decreased drastically when it was introduced.

The analysis started with a kind of trend analysis in which case the percentage distribution of respondents by all the variables included in the models was undertaken. The purpose here was to illustrate how the indicators have fared over the last two decades and to also provide a description of the variables included in the multivariate regression models. Models were built for children ever born and number of living children for 1990, 1999, 2003 and 2008 separately in the first stage. The aim was to examine the consistency of the effects of the independent variables in each of the surveys over a period of almost two decades. In the second stage, the four data sets were combined to form a pool. A model was constructed to examine the effect of the independent variables on fertility indicators in the pooled data set to demonstrate how the indicators would behave using pooled data compared to separate data sets.

4 Results

Table 1 shows the percent distribution of the respondents across the independent and dependent variables included in the models. The table reveals that there was a slight increase in the proportion of women with at least primary schooling (the proportion illiterate declined from 57.2 per cent in 1990 to 37.7 per cent in 1999 but increased to 41.6 per cent in 2003 and declined again to 35.8 per cent in 2008). The proportion of women with secondary and post secondary education increased steadily from 17.1 per cent and 1.9 per cent, respectively, in 1990 to 35.9 per cent and 8.9 per cent in 2008. The proportion of women not working went up from 38.8 per cent in 1990 to 57.9 per cent in 1999 but declined steadily from 2003 (41.7 per cent) to 38 per cent in 2008. The proportion of women working at home increased in 2003 and declined to 41.1 per cent in 2008 while the proportion working in places away from home declined in 2003 and showed a rise in 2008 (58.9 per cent). Although the proportion of women who were

employees or self-employed did not exhibit a stable pattern, the proportion of employees increased from 8.9 per cent in 1990 to 27.6 per cent in 2008 and the proportion self-employed declined from 91.1 per cent in 1990 to 72.4 per cent in 2008.

Table 3:
Percent distribution of women by level of education and employment, 1990–2008

Characteristics	**Percent**			
	1990	**1999**	**2003**	**2008**
	n=8.781	**n=9.810**	**n=7.620**	**n=33.385**
Highest education				
No education	57.2	37.7	41.6	35.8
Primary	23.9	27.6	21.4	19.7
Secondary	17.1	29.5	31.1	35.7
Post-secondary	1.9	5.2	5.9	8.9
Occupation				
Not working	38.8	57.9	41.7	37.5
Professional/Teachers/ Managerial	4.3	4.1	5.7	5.3
Sales	29.0	22.1	32.7	29.1
Agricultural/allied	24.0	9.3	12.0	15.3
Service/Manual/unskilled	3.9	5.0	7.9	12.8
Where she worked				
At home	34.6	34.7	43.6	41.1
Away from home	65.4	65.3	56.4	58.9
Whom she worked for				
Employees	8.9	32.4	24.6	27.6
Self-employed	91.1	67.6	75.4	72.4
Median age of women	27.0	25.0	26.0	27.0
Median CEB	3.0	2.0	2.0	2.0
Median number of living children	2.0	2.0	2.0	2.0

As indicated in the previous section, the two indicators of fertility used in the study are children ever born (CEB) and the number of living children. Table 2 shows the OLS regression coefficients for the selected predictors of children ever born among Nigerian women from 1990 to 2008 controlling for current age of the respondents. The objective here was to trace the effects of the predictors over the eighteen-year period. As we can observe in the Table, the R^2 of the models was between 0.548 and 0.629 indicating an explanatory power between 55 per cent and 62 per cent. Education exhibited a statistically significant inverse relationship with children ever born in all the surveys from 1990 to 2008. The negative coefficients show that women with at least primary education are likely to have had fewer children ever born compared to their illiterate counterparts. In the four data sets, secondary education (1990 (β=-0.116), 1999 (β=-0.160), 2003 (β=-0.191) appears to exert the most important influence on CEB among women up to 2003. In 2008, post-secondary education exhibited a slightly higher coefficient (β=-0.242) compared to secondary education (β=-0.231). This

suggests that post secondary education had the strongest negative effect on fertility among women.

Table 4:
Coefficients of OLS regression assessing the associations between female education, female employment and children ever born, NDHS 1990–2008

Variables	Beta Coefficients			
	1990		1999	
	β	t	β	t
Highest Education				
No education (r)	-	-	-	-
Primary education	-0.015*	-2.005	-0.037**	-5.135
Secondary education	-0.116**	-14.402	-0.160**	-22.009
Post-secondary education	-0.087**	-11.351	-0.158**	-24.288
Where she worked?				
Work at home (r)	-	-	-	-
Work away	-0.007	-0.765	0.000	0.067
Whom she worked for?				
Employees (r)	-	-	-	-
Self-employed	0.070**	7.742	0.029**	4.057
Constant	-35.831		-39.077	
R^2	0.548		0.629	
F Statistic	1775.572**		2774.818**	
(N)	(8780)		(9809)	
	2003		2008	
	β	t	β	t
Highest Education				
No education (r)	-	-	-	-
Primary education	-0.052**	-6.634	-0.063**	-16.384
Secondary education	-0.191**	-22.975	-0.231**	-56.998
Post-secondary education	-0.170**	-22.339	-0.242**	-65.082
Where she worked?				
Work at home (r)	-	-	-	-
Work away	-0.042**	-5.357	-0.058**	-15.536
Whom she worked for?				
Employees (r)	-	-	-	-
Self-employed	0.039**	4.917	0.034**	8.918
Constant	-34.934**		-61.915**	
R^2	0.620		0.621	
F Statistic	2073.677**		9117.996**	
(N)	(7619)		(33,384)	

Notes: * P value <0.05, ** P value <0.01, (r)= reference category. Age of respondents was controlled for in the models.

With the exception of the 1999 survey, working away from home manifested a negative relationship with CEB in all the surveys, indicating that women who worked away from home were likely to have a lower fertility than their counterparts working at home. The size of the coefficients also increased consistently from 1990 (β=-0.007) to 2008 (β=-0.058). Self-employment was

positively related to CEB in all the surveys (1990, β=0.070; 1999, β=0.029; 2003, β=0.039; 2008, β=0.034). The positive coefficients suggest that women who were self- employed were more likely to have more CEB than their counterparts who were employees.

The model on CEB tested above using individual surveys was also tested using pooled data from all four surveys to examine the behaviour of variables in the model. The objective here is to demonstrate the behaviour of the relationship between the indicators of female education/employment and CEB in pooled data. A striking pattern of the effects of the indicators of education and employment on CEB emerged (Table 5). It is similar to what was observed in the analysis of separate data sets. Education was negatively related to CEB. The increase in coefficients along with the level of education was evident in this relationship. This means that the higher the level of education, the lower the CEB. Employment away from home was negatively related to CEB compared to working at home as well. On the other hand, self- employment exhibited a positive relationship with CEB. This finding is also similar to that of separate analysis of the surveys.

Table 5:
Coefficients of OLS regression assessing the associations between female education, female employment and children ever born, pooled data NDHS 1990–2008

Variables	Beta Coefficients	
	β	t
Highest Education		
No education (r)	-	-
Primary education	-0.049**	-17.062
Secondary education	-0.199**	-66.592
Post-secondary education	-0.200**	-72.728
Where she worked?		
Work at home (r)	-	-
Work away	-0.040**	-14.074
Whom she worked for?		
Employees (r)	-	-
Self-employed	0.041**	14.123
Constant	-89.484**	
R^2	0.612	
F Statistic	15638.130**	
(N)	(59595)	

Notes:* P value <0.05, ** P value <0.01, (r)= reference category.Age of respondents was controlled for in the model.

Table 6 shows the coefficients of the OLS regression assessing the association between female education, female employment and the number of living children among sampled women in the four surveys. From the R^2 values, between 50 per cent and 61 per cent of the variations in the number of living children among the women could be attributed to indicators of education and employment.

Apparently, with the exception of primary schooling in 1990 (β=0.018, P<0.05) and 2003 (β=0.002, P>0.05), education was inversely related to the number of living children in all the surveys. Apart from the 1990 survey which exhibited no clear pattern, in all other surveys the effect on the number of living children progressed with the level of education. Post-secondary schooling was most important in terms of the size of the coefficients (1999, β=-0.135, P<0.01; 2003, β=-0.128, P<0.01; 2008, β=-0.205, P<0.01). It is striking to note that the 2008 data generated the highest coefficients compared to the three previous ones.

Surprisingly, the variable working away from home was positively related to the number of living children in 1990 (β=0.031, P<0.01) and 1999 (β=0.016, P<0.01) surveys but negatively related to this fertility indicator in the 2008 survey (β=-0.030, P<0.01). The association was not significantly related in the 2003 survey. Self-employment was significantly related to the number of living children in all the surveys. The relationship was positive, implying self-employment resulted in higher number of living children compared to employees in the 1990, 1999, 2003 and 2008 surveys.

Table 7 presents the OLS coefficients assessing the associations between education, employment and the number of living children among the sampled women, using pooled data of the four surveys. All the independent variables were significantly related to the number of living children. Education presents an interesting result and the pattern is similar to what was observed in separate analysis of the surveys. The categories were negatively related to the number of living children. The negative coefficients suggest that the number of living children declines with increasing educational status among the women (primary β=-0.007, P<0.05; secondary β=-0.154, P<0.01; post-secondary β=-0.167, P<0.01). Unlike the mixed result observed in separate analysis of the surveys, working away from home was inversely related in the pooled data (β=-0.013, P<0.01). This situation indicates that, on average, women who worked in locations away from home were more likely to have smaller number of living children compared to those who had paid work right in their homes. On the other hand, self-employment was positively related to the indicator (β=0.045, P<0.01). This is consistent with the finding in separate analysis of the surveys. It also indicates that self-employed women were more likely to have more children compared to those who worked for someone else.

Table 6:
Coefficients of OLS regression assessing the association between female education, female employment and Number of Living Children, NDHS 1990–2008

Variables	**Beta Coefficients**			
	1990		**1999**	
	β	**t**	**β**	**t**
Highest Education				
No education (r)	-	-	-	-
Primary education	0.018*	2.151	-0.011	-1.548
Secondary education	-0.091**	-10.651	-0.132**	-17.674
Post-secondary education	-0.070**	-8.986	-0.135**	-20.323
Where she worked?				
Work at home (r)	-	-	-	-
Work away	0.031**	3.365	0.016*	2.296
Whom she worked for?				
Employees (r)	-	-	-	-
Self-employed	0.066**	6.928	0.029**	3.956
Constant	-32.836		-39.548	
R^2	0.497		0.610	
F Statistic	1444.522**		2560.647**	
(N)	(8780)		(9809)	
	2003		**2008**	
	β	**t**	**β**	**t**
Highest Education				
No education (r)	-	-	-	-
Primary education	0.002	0.263	-0.018**	-4.362
Secondary education	-0.132**	-14.798	-0.181**	-42.026
Post-secondary education	-0.128**	-15.594	-0.205**	-51.771
Where she worked?				
Work at home (r)	-	-	-	-
Work away	-0.014	-1.656	-0.030**	-7.536
Whom she worked for?				
Employees (r)	-	-	-	-
Self-employed	0.057**	6.630	0.040**	9.979
Constant	-33.153		-60.145	
R^2	0.560		0.573	
F Statistic	1614.522**		7454.826**	
(N)	(7619)		(33384)	

Notes: * P value <0.05, ** P value <0.01, (r)= reference category. Age of respondents was controlled for in the models.

Table 7:
Coefficients of OLS regression assessing the associations between female education, female employment and Number of Living Children, pooled data NDHS 1990–2008

Variables	Beta Coefficients	
	β	t
Highest Education		
No education (r)	-	-
Primary education	-0.007*	-2.464
Secondary education	-0.154**	-48.825
Post-secondary education	-0.167**	-57.629
Where she worked?		
Work at home (r)	-	-
Work away	-0.013**	-4.208
Whom she worked for?		
Employees (r)	-	-
Self-employed	0.045**	14.514
Constant	-86.909	
R^2	0.567	
F Statistic	12994.302**	
(N)	(59594)	

Notes: * P value <0.05, ** P value <0.01, (r) =reference category. Age of respondents was controlled for in the model.

5 Discussion

The effects of female education and employment on fertility in Nigeria have been re-examined. Using datasets from four nationally representative surveys conducted between 1990 and 2008, the trend of the effects over a period of 18 years has been demonstrated. Descriptive analysis indicates that between 1990 and 2008, the educational status of women improved appreciably, thus reducing the proportion of illiterate women of reproductive ages in the country. In a similar vein, the proportion of women who were employees and worked away from their homes increased significantly.

From the analysis of separate surveys and pooled data, three major findings emerged: First, female education is inversely related to the two indicators of fertility. Inverse relationship indicates that with at least primary schooling, but more so with secondary and post- secondary levels of schooling, women might realise smaller family sizes relative to their illiterate counterparts. The emphasis here is that education remains an important factor that can be explored with a view to achieve a desirable fertility decline in Nigeria. It has a direct impact on other social variables that can promote fertility decline. Most educated women probably live in urban areas with high access to family planning information and the relevant facilities. Due to the fact that such women are usually engaged in the formal sector, there could be high demand on their time. Also, they have better access to modern contraceptives, thus facilitating the actualisation of a small

family size goal. These conditions most probably promote a small-family culture which is a significant precursor of sustainable fertility decline. Thus, education does not only position women to possess modern reproductive health goals (small family size), it also predisposes them to access information on strategies for actualising such goals. This finding corroborates the reports of earlier studies indicating an inverse relationship between education and fertility in developing countries (Capo-Chichi and Juarez 2001; Adhikari 2010; Lutz et al. 2010; Bongaarts 2010).

However, there is a legitimate concern. In fact, there already was a boost in female education in Nigeria in terms of enrolment rate and mean grade completed (Grant and Behrman 2010), and education was inversely related to fertility. Why then is the TFR still as high as 5.6? In this respect it is important to note that the national TFR masks existing regional fertility differentials in the country. For instance, the 2008 NDHS indicates that the TFR in the northern region lies between 5.4 in the north central region and 7.3 in the northwest, while the southern region ranges between 4.8 in the southeast and 4.5 in the southwest (NPC and ICF Macro 2009). Though a TFR of about 5 is still quite high, it is apparent that the northern region contributes more to the high national fertility. Notorious pronatalist behaviour still persists in the northern part of the country compared to what prevails in the south. The situation in the north is not unexpected given the high level of illiteracy and Islamic fundamentalism predominant there. An example of the latter is *Boko Haram,* an Islamic sect which has been wreaking havoc in the region by insisting on the eradication of Western education. In addition, there is a popular aversion to the use of modern contraceptives which is rooted in religion.

The implications of inverse relationship between education and fertility indicators for family size might become more obvious in the country with time. However, it should be noted that this expectation is a function of sustained efforts to make quality female schooling widespread all over Nigeria. Particular emphasis should be on addressing issues of religious fundamentalism and cultural practices such as girl child marriage which is rampant in the north. These are significant barriers to female education in the northern region of the country. The Universal Basic Education (UBE) and the *Almajiri* School (AS) policies of the present administration, however, are likely to lay the foundation for nationwide sustainable fertility decline in the country. It is important to promulgate a law that makes it compulsory for school- age children to be in school and corruption should not be allowed to impede the implementation of the education policies.

As highlighted earlier, occupation was significantly related to education. Its association with fertility indicators was measured through education. The second finding emanates from the association between other indicators of employment—such as where a woman works (at home or away from home), whether employed or self-employed—and fertility. In this case, a mixed result emerged. In the 1999 survey, women who worked away from home were more likely to report more

CEB. Similarly, in the 1990 and 1999 surveys, the same category of women reported a higher number of living children. Conversely, in other surveys and the pooled data, women who worked away from home were more likely to report fewer CEB and lower numbers of living children. This mixed result could be attributed to the influence of traditional or cultural practices on the relationship between working away from home and fertility.

The existence of thriving traditional family practices where mother-in-law and other extended family members are readily available to assist in baby care is likely to counteract the expected inverse relationship between female employment and family size. In addition, the descriptive analysis indicates that most of the occupations that women in the country pursue are of a type that improves compatibility with reproductive responsibilities. For instance, over 40 per cent of the sampled women engaged in sales and agricultural allied activities in 2008. These occupations are likely to facilitate achieving a large family size since such activities do not really place much demand on the woman's time. So even if they work away from home, it is easier to combine childbearing responsibilities with such jobs. Policies offering maternity leave for women to deliver and nurse newly born babies as well as the availability of crèches near places of work becoming standard in the country are likely to enhance the possibilities of women to combine their occupational responsibilities (even if they work away from home) and the burden of childbearing. This situation ultimately promotes the prevalence of larger family sizes (DeRose 2002; Launov and Klasen 2006; Perticara 2006). However, women who engage in some formal employment, especially those that take them away from home, will find it difficult to combine the responsibilities of their jobs and childbearing. The incompatibility of women roles in such jobs with large family size seems to show the best way to smaller numbers of children among women in Nigeria. Therefore, the mixture of occupations compatible with childbearing and those that are not might have influenced the mixed result.

Self-employment manifested in the third finding a positive association with fertility indicators. Suffice it to point out in this respect that, according to the surveys, the majority of the women were self-employed. They were involved in sales and agricultural/allied activities. Such occupations or trades are most compatible with raising large families which ultimately delays the fertility transition. On the other hand, women who work for someone else are likely to engage in formal jobs or occupations that may increase the opportunity cost of having large families. Hence, such women are most likely to envisage a small family size. So while working for someone else is likely to restrict family size, self-employment may encourage a larger family size. Therefore, the present analysis suggests that as long as the majority of women is self-employed, sustainable fertility decline may be delayed in Nigeria.

This study has some limitations that must be mentioned. First, the cross-sectional nature of DHS data makes it difficult to draw causal relations. It is therefore important to bear this in mind when interpreting the results reported

here on the relationships between female education, female employment and fertility. Second, the most recent DHS data analysed in the present study are from 2008. It is possible that within this period of about four years significant changes have taken place in the variables employed in the analysis, and owing to such changes the picture painted about the association assessed might have been slightly altered. Third, the four standard surveys conducted in the country so far were involved in the analysis to portray a trend. Although the surveys did employ similar sampling designs, the trend analysis that has been undertaken is likely to have suffered from slight variations in the quality of fieldwork as evidenced in different standard errors reported in different surveys. In addition, the 1999 DHS was reported to have suffered considerable underreporting of births. This accounted for the low TFR reported—5.2 (NPC 2000). In a similar vein, though the 2003 DHS was of better quality it recorded a slightly higher standard error relative to previous surveys and the one after it. This might have influenced the representativeness of the sample and some of the variables involved in the analysis in the present study.

6 Conclusion

Despite the limitations highlighted above, the present study identifies important associations between female education, female labour force participation and fertility in Nigeria. There has been slight improvement in female education and consequently the number of females in the labour force has increased. My analysis in the study reveals three main valid conclusions with far-reaching policy implications. First, female education in the country remains inversely related to fertility. Therefore, promoting female schooling in all parts of the country—with particular emphasis on the northern region—is very likely to result in a rapid fertility decline in Nigeria. Second, if more women are employed working for other persons, particularly in jobs that take them away from home, the opportunity cost of raising large families may increase significantly and thus discourage high fertility. Third, female labour force participation in the country characterised largely by self-employment and occupations compatible with rearing large numbers of children may not promote a small family size norm, thus delaying the fertility transition.

In the final analysis, female education appears an uncompromising social medium through which reproductive attitudes can be directly or indirectly altered. As for the direct effect, education has the potential to increase age at first marriage and thereby reduce the likelihood of high fertility. It can also increase women's personal expectations of life and their dreams for their children. Realising that such expectations cannot be attained with a large family size, coupled with the fact that education provides information on how to manage their reproductive lives, educated women tend to embrace small family size goals. On

the other hand, education also affects fertility indirectly through labour force participation (especially in the formal sector) of women. Education positions women to participate in the labour force which also increases their opportunity cost of bearing and rearing children. As a result of this incompatibility, women who have minimum of secondary education in the country are likely to embrace smaller family sizes. Therefore, a vigorous drive to promote education, especially girl child schooling in all parts of the country, and particularly in the northern regions, is a sure way to a sustainable fertility decline. This policy direction is imperative as the present fertility levels in the country, if left unchecked, will continue to fuel rapid population growth with the attendant implications for Nigeria's socio-economic development.

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