

ENUGU FORUM POLICY PAPER 3

DEBATING POLICY OPTIONS FOR NATIONAL DEVELOPMENT

DOES FEMALE SCHOOLING REDUCE EARLY FERTILITY? A Nigerian Experiment



AFRICAN INSTITUTE FOR APPLIED ECONOMICS

ENUGU FORUM POLICY PAPER 3

DEBATING POLICY OPTIONS FOR NATIONAL DEVELOPMENT

DOES FEMALE SCHOOLING REDUCE EARLY FERTILITY?



AFRICAN INSTITUTE FOR APPLIED ECONOMICS

ENUGU FORUM POLICY PAPER 3

Series Theme

DEBATING AND PROPOSING POLICY OPTIONS FOR NATIONAL DEVELOPMENT

Topic:

DOES FEMALE SCHOOLING REDUCE EARLY FERTILITY?

Presenter:

Una Okonkwo Osili, Ph.D

Department of Economics,
Indiana University-Purdue University of Indianapolis, USA



AFRICAN INSTITUTE FOR APPLIED ECONOMICS

128 Park Avenue, GRA, P.O. Box 2147 Enugu, NIGERIA

Tel: +234 (042) 256644, 256035, 300096. Fax: 256035

E-mail: aiaeinfo@aiae-nigeria.org, aiae@infoweb.com.ng www.aiae-nigeria.org

PUBLISHED BY AFRICAN INSTITUTE FOR APPLIED ECONOMICS

FIRST PUBLISHED 2005

© African Institute for Applied Economics

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system, without permission in writing from the copyright owner.

TABLE OF CONTENTS

About Enugu Forum	6
Enugu Forum Policy Papers	9
Abstract	10
DOES FEMALE SCHOOLING REDUCE EARLY FERTILITY? A NIGERIAN EXPERIMENT	11
Introduction	11
Background: Educational Policy in Nigeria and the UPE	13
Data and Empirical Framework	16
The Impact of the UPE	20
Conclusions	29
References	31
<i>Figures</i>	34-25
<i>Tables</i>	36-44
<i>Appendix</i>	45

ABOUT ENUGU FORUM

INTRODUCTION

Opening new spaces for domestic policy dialogue is one of the most important potential gains of democratic governance. Democratic space creates public policy arena in which government can be engaged by private sector and civil society on what it is doing or not doing, and hence be pressured to perform. Since the return to democratic rule in 1999, there has been an upsurge of private sector and civil society engagement with governments on economic policy and development issues. But, the upsurge of civic advocacy on economic and development issues has not been matched with commensurate improvements in the quality of debates on policy alternatives and roadmaps for national development.

ENUGU FORUM is intended to provide a civic arena for proposing and debating policy alternatives and roadmaps towards social, economic and political progress of the country. It is hoped that the FORUM will foster interaction between government and non-state actors towards good governance, accountability and participatory democracy.

IDENTITY AND MISSION

Enugu Forum is a civic platform devoted to intellectual conversation and of policy issues affecting the growth and development of the country. It was founded in 2001 to promote informed and credible avenues of stakeholder dialogue and policy advocacy. It seeks to improve the policy process through high quality debate and non-partisan discourse of alternative solutions to contemporary development questions.

The Forum deploys both intellectual and empirical insight to nurture a shared understanding and objective scrutiny of policy issues on social, economic and political development of the country.

ACTIVITIES

Enugu Forum's activities take several forms:

- ◆ Public Lectures
- ◆ Seminars
- ◆ Workshops



- ◆ Conferences
- ◆ Roundtables

The activities bring together diverse stakeholders including government officials, private sector operators, independent think-pots and civil society to exchange and constructively critique perspectives and experiences on critical policy imperatives. Attendance is by formal invitation.

OUTPUTS

The outputs of the Forum's activities take the form of communiqué outlining key outcomes of discussions, conclusions and recommendations. The presentations and proceedings are further developed into Occasional Papers, Working Papers or Policy Briefs widely circulated to inform, sensitise and enlighten stakeholders.

STRUCTURE AND ORGANISATION

Enugu Forum is structured into a Steering Committee, a Coordinating Committee and the General Members. The Steering Committee governs the Forum through guides and policies agreed in consultation with the General Members. The Coordinating Committee executes the activities and programmes.

MEMBERSHIP

There are two classes of membership: individual and corporate. The Forums' activities are open and can be attended by all interested persons but formal invitations are issued to members and designated guests only. To be a member, one needs to register in the appropriate category. Registration can be done during the Forum's events, or at the Host Organization - *African Institute for Applied Economics, Enugu*.

SPONSORSHIP

Ownership of the Forum resides in the members. It is run on the goodwill contributions from corporate



bodies and individuals. Sponsorship includes provision of venue, refreshments, logistics, and facilitation of Guest Speakers and Resource Persons.

HOST INSTITUTION

The Enugu Forum is hosted by the African Institute for Applied Economics (AIAE) Enugu. AIAE is a non-governmental, not-for-profit and independent organization devoted to economic policy research for the purpose of promoting evidence-based decision making. It is located at 128 Park Avenue, GRA, Enugu, Phone: (042) 256644, 256035, 300096; Fax: (042) 256035. E-mail: aiaeinfo@aiae-nigeria.org, aiae@infoweb.com.ng; <http://www.aiae-nigeria.org>



ENUGU FORUM POLICY PAPERS

Enugu Forum Policy Paper Series publishes the proceedings and outcomes of workshops, conferences, seminars or public lectures held by the Enugu Forum. The Series provides documentation of the topical presentations, debate, comments and perhaps consensus at the Forum.

It is intended to disseminate the Forum's intellectual discourse to a wider audience. The essence is to stimulate broader policy debate and promote multi-perspective dialogue on policy options.

Enugu Forum Policy Papers constitute an advocacy instrument to canvass alternative development solutions and policy roadmaps, for the overall purpose of enriching the policy discourse in the country. The Series also draws attention of government, private sector and civil society to salient dimensions of contemporary development challenges in Nigeria.

Series Editors:

Eboh, Eric Chiedum

Ukeje, Stanley

Ibe, Chidiebere

Ikpo, Kobi P.

Abstract

Rapid population growth has been known to be a problem for low income countries like Nigeria, especially in conditions of very slow economic growth rate. Poverty and high fat fertility have been associated and a key indicator of poverty is low school attending among population.

Policy experts and advocates have taken the view that increase in female education will lower fertility and consequently, population growth rater. The observed association between education and fertility may not be causal. Therefore, studies of the impact of education on fertility has relied on oxogenous variation in exposure.

This study in addition to the question of the causal link between female education and fertility, added on the question of how alterations in educational policy affect schooling and early fertility of women. In Nigeria, in the mid 1950s and again in the mid 1970s free primary education was introduced in the south west and nation-wide respectively. Using national demographic tooth survey.(NDHS) data and comparing cohorts before and after free primary education and also considering changes in schooling inputs during the free primary education programme, the author was able to identify educational and fertility difference in the regions in Nigeria, based on birth control. Using difference in difference estimation, the study reached the conclusion that universal primary education in Nigeria, led to increased schooling outcome, and lower early fertility outcome; and changes in schooling inputs, particularly teacher training institutions are associated with a significant impacts on schooling, marriage and fertility.

DOES FEMALE SCHOOLING REDUCE EARLY FERTILITY? A Nigerian Experiment

I. INTRODUCTION

Over the past two decades, many developing countries have adopted policies to reduce rapid population growth rates. Among policy alternatives, female education is considered a highly effective means of lowering fertility and population growth (United Nations, 1995). Several empirical studies point to a robust, negative association between female education and fertility (Schultz, 1997; Ainsworth et al., 1996). In fact, the negative relationship between female education and fertility has been described as “one of the most clear-cut correlations” in social science literature (Cochrane, 1979). Moreover, there is growing consensus that investments in the education of young girls and women yield additional private and social returns, including improved child health and nutrition outcomes (Schultz, 2002; Thomas, 1991).

There are several reasons grounded in economic theory for why female education may affect fertility. First, female schooling may increase the opportunity cost of childbearing and rearing among educated women (Becker, 1981; Schultz, 1981). Second, education may lower fertility through improvements in child health and reduced rates of child mortality (Lam and Duryea, 1999; Schultz, 1994). Finally, female schooling may affect fertility through knowledge and more effective use of contraceptive methods (Rosenzweig and Schultz, 1985; 1989) or by increasing female autonomy and bargaining power in fertility decisions (Mason, 1986). However, a survey of the existing literature suggests a need for caution in interpreting as causal the observed relationship between female education and fertility (Bledsoe et al., 1999). In particular, a negative association may arise due to omitted variables, such as individual ability or household and community resources, which affect both schooling and fertility decisions. In addition, schooling opportunities often are not randomly placed in communities (Duflo, 2001; Pitt et al., 1993). Furthermore, if fertility choices lead to interruptions in schooling, then fertility may be an endogenous variable within the context of schooling decisions (Angrist and Evans, 1999).

The ideal method to address the issue of causality is to use an exogenous source of variation in schooling that is not related to fertility outcomes. This paper uses this technique by focusing on the Universal Primary Education (UPE) program in Nigeria. The UPE was a large-scale, nationwide program designed to increase educational attainment and was introduced in September 1976. Funded by the federal government, it provided tuition-free primary education and increased the availability of primary school and teacher-training inputs throughout the country, marking a significant change in the



educational opportunities available to Nigerian men and women. During the UPE program, primary school enrollments increased from 4.4 million students in 1974 to 14.5 million primary school students in Nigeria by 1982 (Federal Office of Statistics, *Annual Abstract of Statistics*, various years). The UPE program was discontinued in 1981.

Using the UPE as an exogenous source of variation in primary schooling rates, this paper examines whether female schooling causes reductions in early fertility. First, the paper examines how the UPE affected female education levels by exploiting differences in the extent of the treatment. Second, the paper links these changes in education to fertility outcomes. We employ several empirical strategies, including differences-in-differences and instrumental variable methods, to estimate the relationship between schooling and fertility. This paper joins a growing number of studies that identify the impact of education policies and programs in developing countries¹. Moreover, the paper addresses the question of whether investments specifically in primary education impact fertility, as there is little consensus about what level of education should be expanded to affect fertility outcomes.

Our results suggest that changes in schooling costs and the expansion in primary classroom and teacher training institutions associated with a universal education policy can have a substantial impact on female education and early fertility. We provide evidence that female education has a strong, negative association with early fertility even after accounting for the possible endogeneity of the schooling decision. We also consider alternative explanations for the rapid advances in female schooling and demographic outcomes, including changes in social norms and attitudes towards female education and economic opportunities for women².

This paper is organized as follows: Section II provides background on the UPE program in Nigeria and a descriptive overview of its impact on educational outcomes. Section III presents data sources and the empirical framework. Section IV examines the impact of UPE on educational outcomes and fertility – the treatment in this study – and Section V concludes.

1 For example, Case and Deaton (1999) use data from South Africa to study the impact of increased resources on schooling outcomes. Duflo (2001) relies on an individual's date of birth and region of schooling to identify the impact of a large-scale school construction program in Indonesia on educational attainment and wages. Angrist et. al., (2002) study the impact of school vouchers in Columbia

2 Unlike other related work, however, changes in contraceptive use and legal statutes, such as the legalization of abortion and anti-discrimination laws, are less likely to be relevant in our environment.



II. BACKGROUND: EDUCATIONAL POLICY IN NIGERIA AND THE UPE

Nigeria is an intriguing environment in which to study the impact of female education on fertility. Some of the earliest research on the economic determinants of fertility is based on survey evidence and field research from Nigeria and other parts of sub-Saharan Africa (Van De Walle, 1965; Caldwell, 1968; and Caldwell, 1977). In addition, population growth in sub-Saharan Africa remains among the highest in the developing world, at 3.2 percent a year. A noteworthy feature of the Nigerian environment is the absence of a sustained national family planning program or government efforts to promote modern contraceptive methods (Caldwell et al., 1992).

Since the 1960s, UNESCO and other international agencies have called for universal education. Nigeria's UPE initiative was characterized as "one of the most ambitious education projects in African history" due to the magnitude of the program in terms of government resources and the number of children who benefited (Bray, 1981:1). While the female primary enrollment rate in Nigeria was only 40 percent in 1974, by the end of the program in 1981, it had risen to 104.7 (World Bank, 2002)³. These achievements are particularly impressive given that sub-Saharan and northern Africa have some of the lowest levels of female educational attainment, and many young girls and women have little or no exposure to formal schooling.

Education in Nigeria before the UPE program

Nigeria became independent from the United Kingdom in 1960. Prior to independence, it was divided into four distinct administrative units governed as semi-autonomous regions under colonial rule⁴. The first universal education scheme in Nigeria was launched in the Western region in January 1955⁵. In that year, tuition fees were abolished for all levels of primary schooling. According to S.O. Awokoya, the

3 An enrollment rate is calculated as the percentage of school-aged children who are enrolled in primary school that year. It can be over 100.0 due to the fact that older or younger students may be in the enrollment count.

4 In 1974, there were 12 administrative regions and, in 1976, there were 19 states. Currently, there are over 30 states in Nigeria. The number of states has changed over time to improve equity in the revenue-sharing system at the federal level. Federal government revenue allocations to states and local governments are governed by a formula based on population, need, and, to a lesser extent, derivation.

5 The Western region was a forerunner in education. In 1843, the Methodist mission established the first primary school in the Western region, partially due to its proximity to the Atlantic coast, which enabled the early settlement of the Christian missionaries in this region (Fafunwa, 1974).



Education Minister for the Western region, advances in education were “imperative” and “urgent.”⁶ Following the model of the Western Region, the Eastern region launched a universal primary school program in January 1957 that provided education without fees. However, due to financial difficulties, the program was scaled back to provide free schooling only in the first two years of primary schooling. Lagos, the capital of Nigeria after independence, also introduced a universal primary education program in January 1957 and had achieved near-universal enrollments by the late 1960s.

In this paper, we will use the term “high-intensity” to describe all the states outside the Western region. The Western region includes three states and the former capital territory (Lagos). An important goal of the nationwide UPE program was to reduce education imbalances between the Western region and the rest of Nigeria. In comparison to the Western region of the country, other areas (particularly in the Northern region) of Nigeria lagged in educational access prior to UPE⁷. The UPE provided tuition-free primary education and provided federal capital funds for the construction of primary schools and teacher training institutions, beginning in September 1976. We refer to states outside the Western region as the “high-intensity” states since program induced a significant expansion in educational inputs in these states. The elimination of tuition fees for primary education and capital funds for primary schools and teacher training institutions is likely to have had a greater impact outside the Western Region.

An Overview of UPE

Fueled by revenues from the oil boom of the time, the UPE Program was announced formally on October 1, 1974. Figures 1A and 1B summarize the growth trends in the number of students and primary schools before and after 1976, with information from various years of the *Annual Abstract of Statistics* and *Social Statistics in Nigeria*. As shown in both figures, the introduction of the nationwide UPE had a major impact on the number of primary school students and the number of primary schools.

6 The priority accorded to education was reflected in the Western region’s budget, with primary education consuming nearly 40 percent of the government’s recurrent budget (Nwachukwu, 1985).

7 The distance from the Atlantic coast made it more difficult for Christian missionaries to establish schools in the northern states. In addition, British indirect rule and colonial policy of non-interference in Islamic religious practices meant that primary school enrollment rates, particularly for women, were extremely low in the North.



Figure 1A displays how the number of primary school students increased dramatically after the introduction of UPE. During the first year of UPE, the number of students enrolled in grade 1 increased by 82 percent to 3 million students. This exceeded predictions that only 2.3 million would enroll (Federal Government of Nigeria, 1978-79). These changes were not distributed evenly across the country. As shown in Figure 1A, growth in student enrollment after 1976 tended to be higher in the high-intensity states.

To enable the expansion of primary education, the government needed to construct a large number of new primary school classrooms. According to the *Nigerian Third National Development Plan 1975-80*, the country planned for the provision of 150,995 new classrooms at the primary-school level. Figure 1B shows how this substantial planned growth translated into a large increase in the number of schools in Nigeria. To meet the increased demand for teaching resources, plans were also announced to build new teacher-training institutions and to expand existing teacher-training institutions. According to Nwachukwu (1985), the UPE program required about 80,000 new teachers by 1976, and the government earmarked \$320 million for the construction of teacher-training facilities. In addition to the new primary-school classrooms, the country planned for 6,699 new classrooms in teacher-training institutions (*Nigerian Third National Development Plan 1975-80*)⁸. Figure 1C shows the Federal capital Funds allocated for classroom construction for both high-intensity and low-intensity states.

The Nigerian UPE ended in September 1981 when the federal government handed over the financing of primary schools to states and regional governments. With reduced funding for primary schools, the reintroduction of school fees, and declining oil revenues in the 1980s, primary enrollments fell or stagnated in some states after the program ended (Francis, 1998).

8 The construction projections for primary and teacher-training institute classrooms were based on the 1963 census of primary-school aged children (*Nigerian Third National Development Plan 1975-80*). Therefore, much of the variation in the planned number of classrooms is explained by state population and enrollment rates. Analysis of the projected number of primary-school classrooms found a positive estimate associated with the 1970 state population (coefficient 0.004, standard error 0.0002) and negative estimate associated with the primary-school enrollment rate (coefficient -15.23, standard error 1.943). Likewise, for the number of planned teacher-training institutions, the analysis found a positive relationship with the 1970 state population (coefficient 0.012, standard error 0.0027) and a negative relationship with the enrollment rate (coefficient -0.73, standard error 0.226). The adjusted R-squared was 0.96 for planned classrooms in primary schools and 0.68 for planned classrooms in teacher-training institutions.



III. DATA AND EMPIRICAL FRAMEWORK

The Data: The Nigerian Demographic Health Survey

To study the impact of the UPE program, we use the 1999 Nigerian Demographic Health Survey (NDHS). This dataset is a nationally representative sample containing rich information on socioeconomic and demographic variables for 9,810 Nigerian women, aged 15-49. The NDHS survey is ideal for this study because by design it provides reliable information on levels and trends in education, fertility, and family-planning practices for a large number of women. Table 1 provides summary statistics for the data. To study the impact of the UPE on education and early fertility, we use information from the NDHS on a respondent's region of birth to link individuals to educational policies and institutions.

While the NDHS surveys have many important advantages, the data also have several shortcomings. First, they fail to provide good information on wages or income at the household or individual level. Second, they provide only limited information on the migration status of an individual, and we use an individual's current state of residence to study the impact of the program⁹. Our sample consists of both migrants and non-migrants¹⁰. Finally, because the cohort born after the UPE (1976-1981) were just reaching their middle twenties by 1999, we do not use them as a control group in estimating the impact of education on early fertility.

Estimating the Impact of UPE

Empirical Strategy #1: Differences-in-Differences (DD)

We use the differences-in-differences technique to evaluate the impact of the UPE program on years of completed schooling. By noting that the UPE occurred between 1976 and 1981 and affected certain regions of the country more than others (i.e. the high-intensity states), we examine whether the es in

9 Specifically, we cannot identify the state where an individual was educated if she moved from her place of residence after age six. About two-thirds of our sample has never moved.

10 Appendix Table 1 compares the characteristics of individuals who did and who did not move. We do not find any significant differences between movers and non-movers in average years of schooling completed or primary-school completion. However, non-migrants do tend to be younger and have fewer children than movers.



introduction of universal primary education caused discontinuities in the variables of interest. This approach has been used in recent studies, including Duflo (2001).

The first difference we use is the age at the beginning of the UPE program. Given the timing of UPE, it mainly affected individuals born between 1970 and 1975. We assume that most individuals start school at age 6, and to exposure to the UPE program we use an individual's year of birth. However, one concern with this approach is the possible prevalence of underage and overage enrollments in Nigeria. According to a recent Multiple Indicator Cluster Survey (MICS) conducted by UNICEF in 1999, underage enrollments, overage enrollments, and grade repetitions are likely to be of importance in Nigeria. For example, of the sample of 977 female students enrolled in first grade (primary one), 19 percent were age five, 31 percent were six years of age, and 21 percent were seven years of age. About 4 percent of the sample was 4 years old and about 15 percent were above 7 years of age. The high prevalence of underage and overage enrollments in first grade suggests that the program may have affected individuals other than the main target group. Therefore, the cohort we use for the control group were age 13 to 18 when the UPE was initiated (born between 1958 and 1963) and, therefore, were less likely to be susceptible to overage enrollment.

The second difference we use is by state of residence. The introduction of UPE to Nigeria had varying effects on the states and regions within the country. The low-intensity states (including the former capital of Nigeria-Lagos) had adopted and maintained a policy of universal primary education since the 1950s. Classroom construction at the primary-school and teacher-training levels was less prevalent in the low-intensity states. Thus, the national UPE policy that eliminated school fees in 1976 should have had a comparatively limited impact on primary school enrollments in low-intensity states, while having large effects in the high-intensity states. While schooling levels increased in both high-intensity and low-intensity areas, schooling increased *faster* in the high-intensity areas. In order to account for any general trends that affected all states, individuals in the low-intensity states that did not experience large changes in enrollments and schooling inputs are used as a control group.

Our differences-in-differences estimation can be described as follows:

$$(1) \quad S_{ijk} = \alpha_i + \beta X_{ijk} + \gamma(\text{High Intensity}_k * \text{Young}_k) + \alpha_1 \text{High Intensity}_k + \alpha_2 \text{Young}_k + \epsilon_{ijk}$$



Where i indexes individuals, j indexes cohorts, and k indexes states. S_{ijk} is the years of schooling completed by individual i of cohort j in state k . X_{ijk} includes controls for year of birth dummies, religion dummies, and 1971 state dummies. The parameter $\hat{\alpha}$ is the reduced-form estimate of universal primary education – it measures whether individuals in high-intensity states that experienced large changes due to the UPE program also experienced rapid growth in schooling differently from individuals in states in the western region that did not experience much change due to the UPE program. The variable “high intensity” is a dummy variable that is equal to one if the person was educated in a state that experienced substantial change due to the UPE program (i.e., a high-intensity state). “Young” as a dummy variable captures whether an individual was born between 1970 and 1975, or between the ages of one and six in 1976, when the UPE program was implemented. Otherwise, these variables are equal to zero.

Empirical Strategy #2: Differences-in-Differences-in-Differences (DDD)

Likewise, the DDD estimation strategy can be used to exploit three-way differences. For example, we examine the impact of federal capital funds allocated to states for classroom construction in primary schools (measured in per capita terms):

$$(2) S_{ijk} = \hat{\alpha}_0 + \beta X_{ijk} + \hat{\epsilon} (\text{Schooling Inputs} * \text{Young} * \text{High Intensity}) + \hat{\alpha} (\text{Schooling Inputs} * \text{Young}) + \hat{\alpha}_1 \text{Schooling inputs} + \hat{\alpha}_2 \text{Young} + \hat{\alpha}_3 \text{High Intensity}_{jk} + \hat{\alpha}_{ijk}$$

We use the allocated capital funds for primary school construction in each state per capita to capture key changes in schooling inputs during the UPE program¹¹. We expect that the change in schooling outcomes for women should be larger in the high-intensity states for the “young” because schooling inputs expanded significantly in these high-intensity states. The parameter $\hat{\epsilon}$ is the reduced-form effect of an expansion in schooling inputs associated with the program. More specifically, it measures whether individuals in high-intensity states that experienced large changes in schooling inputs due to the UPE program experienced rapid growth in schooling differently from individuals in states in low-intensity states that did not experience much change in schooling inputs.



Empirical Strategy# 3: Instrumental Variable Approach

To estimate the impact of education on fertility, we use a reduced-form model of the fertility decision. As noted earlier, an important issue within the existing literature concerns the causal interpretation of the effect of education on fertility. If education has a causal effect on fertility, then an expansion in schooling should induce lower fertility rates, holding other variables constant. However, unmeasured individual, household, and community-level constraints and resources may affect both education and fertility decisions. For example, an increase in community wealth or in the level of economic development may lead to higher educational attainment and lower fertility. Furthermore, education may serve as a proxy for less measurable factors, such as ability, cognitive skills, motivation, and parental background, and these factors may be important determinants of a woman's fertility choices (Thomas, 1991). Ignoring these factors would lead to biased estimates of the impact of education on fertility within the context of Ordinary Least Square (OLS) estimation.

Our response to this identification problem is the instrumental variable approach. Valid instruments are variables that affect the level of educational attainment but have no direct impact on fertility. If we assume that the UPE program had no direct effect on fertility, other than through its effect on educational attainment, then exposure to the UPE program can be used to construct instrumental variable estimates of the impact of education on fertility outcomes. An individual's exposure to the UPE program is determined by age and state of schooling. The main dependent variable is the number of children ever born before age 25.

The instrumental variable approach is described as follows:

$$(3) N_{ijk} = \alpha_i + \beta X_{ijk} + \gamma S_{ijk} + \epsilon_{ijk}$$

In the equation (3) above, N_{ijk} represents the number of children born to an individual i of cohort j living in state k before age 25. More formally, OLS estimates may lead to biased estimates if ϵ_{ijk} is correlated with schooling due to unmeasured ability and other factors, such as family background, social norms,

11 Data on allocated federal capital funds for primary classroom construction in 1976 is available for all 19 states in Nigeria. However, information on planned classroom construction detailed in the Third National Development Plan (1970-1975) is only available for 12 states that were in existence at the time the program was announced in 1974.



or community wealth. Two assumptions are required for exposure to the UPE program (which is based on age and region of residence) to be a valid instrument. The first assumption is that exposure to the program is correlated with schooling outcomes (once other explanatory variables have been controlled for). Equations (1) and (2) above form the basis for the first-stage regression. The second assumption required is that the UPE program had no direct impact on fertility – but only through its impact on schooling. We test this assumption in our analysis below.

IV. THE IMPACT OF THE UPE

DD Analysis: The Impact on Education

In our empirical analysis, we first demonstrate the impact of the UPE program on female schooling. Beyond the larger question of how schooling affects fertility, these results allow us to study the impact of a change in education policy on female-schooling decisions. The results also form the basis for our first-stage regression when we investigate the effect of female schooling on fertility outcomes. To identify the impact of the UPE program, we limit our sample to women of two cohorts: those born between 1958 and 1963 (age 13 to 18 when the program started) and those born between 1970 and 1975. Individuals born between 1970 and 1975 were aged 1-6 when the program started and are likely to have been the primary beneficiaries of the program. (We also refer to this cohort as the “UPE cohort.”) In contrast, individuals who were born between 1958 and 1963 may have been too old to benefit from the UPE program and were unlikely to be contaminated with overage enrollment like those born from 1963 to 1969.

We compare the years of schooling for individuals in high-intensity states and low-intensity states. While schooling levels increased in both high-intensity and low-intensity areas, schooling increased *faster* in high-intensity areas. If we assume that the increase in schooling would not have been systematically different across high-intensity states and low-program states in the absence of the program, then the differences-in-differences results can be interpreted as a causal outcome of the program.

Ordinary Least Squares (OLS) estimation may lead to biased estimates of the impact of the UPE program in the presence of unobserved state-level heterogeneity. This is an important concern to deal



because high-intensity states that experienced large changes in enrollments and schooling inputs during the UPE program also had significantly lower educational and social indicators than the low-intensity states prior to the introduction of the UPE. For example, school availability and teacher quality tended to be lower in the high-intensity states, particularly in the northern states. Therefore, all of the models include 1970 state fixed-effects to deal with time-invariant, unobserved heterogeneity at the state-level. The fixed-effects regression allows us to “sweep out” time-invariant, unobserved state characteristics, such as pre-UPE school availability and teacher quality, and initial differences in the level of economic development in the state, which may affect educational attainment. The state fixed effects that we include refer to an individual's state of residence. As mentioned earlier, there were 12 states in Nigeria when the UPE program was announced in 1974.

Table 2 reports the effect of UPE on the completion of more than six years of schooling as well in the number of years of schooling completed. We examine the completion of more than six years of schooling because several authors have argued that low levels of primary-school education may not have a robust negative effect on fertility (Jejeebhoy, 1995; Schultz, 1998).

The top panel of Table 2 (Panel A) displays the experiment of interest. As shown in baseline model, the UPE program is associated with a higher likelihood of completing more than six years of schooling. We also find that UPE appears to have increased years of schooling by 0.63 years in the high-intensity states – although both coefficients are statistically insignificant. All specifications include year of birth dummies, state fixed effects, and religion dummies. We report robust standard errors that are clustered at the 1970 state level and year of birth.

In Columns 2 and 5, we introduce the interaction of the female share of primary-school enrollment in the 1970 state interacted with the young dummy (to account for trends in female enrollments prior to the start of the program). The inclusion of this variable appears to increase the overall impact of the UPE program on schooling and the coefficient is statistically significant at the 1 percent level. In fact, we find that the UPE program is associated with a 16- percentage point increase in the probability that an individual has completed more than six years of schooling. In addition, we find that the UPE appears to have increased years of schooling by 1.13 years in the high-intensity states relative to the low-intensity states.



Another concern that arises in interpreting the results in the baseline model is that our estimates do not account for the impact of time-varying, state-level heterogeneity. In particular, schooling may have increased faster in high-intensity regions not solely because of the UPE program but also due to omitted variables, including time-varying changes in government programs and policies that took place during this period. The UPE program was implemented during the “Oil Boom” era in Nigeria. During this period, there was a significant expansion in public-sector employment, as well as in the wages of civil servants. This expansion in the federal civil-service labor force may be correlated with the timing of the UPE program. To account for this factor, we control for state-level growth in the civil service by interacting the levels of female civil service employment in state of residence with year of birth for the UPE cohort. From Columns 3 and 6, our results are robust to the inclusion of this additional control variable.

The bottom panel of Table 2 provides a robustness check of the results on the overall impact of the program. One concern with the analysis is that schooling outcomes may be higher for the treated cohort not because of the UPE program but rather, due to a pre-existing trend in educational attainment, with younger cohorts receiving more schooling than older cohorts. To address this concern, we compare the 1958-1963 cohort to the 1952-57 cohort. Neither group should have been affected by UPE. If schooling levels were increasing faster in the high-intensity regions (mainly outside the western region) prior to the UPE program, then we should find a spurious significant coefficient for the “young” unaffected cohorts (individuals 13-18 when the program started) when we compare them to older cohorts (aged 19-24 when the program started). When we compare successive cohorts that were unaffected by the program, we find no evidence that schooling was increasing faster in the high-intensity areas prior to the UPE program.

DD Analysis: The Impact on Early Fertility

Table 3 repeats the above analysis focusing on the impact of UPE on fertility. Since the UPE cohort was a relatively young group at the time of the 1999 NDHS survey, we limit our analysis to early fertility indicators. Our key dependent variables here are whether a woman gave birth before age 16 and the number of children born before age 25. All estimates include year of birth dummies, religion dummies, and 1970 state fixed effects). Robust standard errors are clustered at the 1970 state and year of birth levels.



Our baseline estimates for the impact of UPE on early fertility show a negative but insignificant impact on the probability of having a first birth before age 16 and on the number of births before age 25 (Columns 1 and 4). However, once we include controls for 1970 enrollment rates and female civil-service employment rates to address state-level trends, the results become statistically significant. We find that the UPE program appeared to have a negative and statistically significant effect on the likelihood of a first birth before age 16 and on the number of births before age 25. We estimate that program reduced the number of births before age 25 range by -0.93 to -0.95.

We interpret the above results as evidence that the UPE program had an impact on the number of early births primarily through its effect on female schooling. However, we should caution that it is also possible that the number of children born before age 25 may also be lower among the UPE cohort due to other omitted variables that are correlated with the program. One possibility is that cohort difference in contraceptive usage (an omitted variable in our analysis) may be correlated with the timing of the program. We note that changes in the diffusion of modern contraceptive methods are less likely to be important here because the prevalence of modern contraceptive methods remains relatively low in Nigeria (Caldwell et al, 1992).

The bottom panel of Table 3 provides a robustness check of the results on early fertility. If early fertility was decreasing faster in the high-intensity states prior to the UPE program, then we should find a spurious significant coefficient for the young 'unaffected' cohorts when we compare successive cohorts. When we compare successive older cohorts (born before 1963) that were unaffected by the program, we generally find no significant decreasing trends in fertility by cohort and region prior to the UPE program.

DD Analysis: The Impact of UPE Exposure for Different Groups

Because the program had a limited duration (1976-1981), we can examine the impact of exposure to the UPE program for various age groups. Individuals who were born in 1970 and who enrolled in primary school in 1976 (and attended school continuously) were most likely exposed to a maximum of six years of the UPE program. It is possible that women who were over the age of six (but less than 13) when the program was launched may also have benefitted from the program. In addition, individuals born after the program ended (after 1976) may have also enjoyed some benefits if the program had a



long-lasting impact on schooling due to classroom construction and teacher-training efforts. However, we focus our analysis on those born between 1970 and 1975 because they were most likely to have been the key beneficiaries of the program.

Table 4 provides results by location and religion. We note that the program had a larger impact among non-Muslim households. The greater impact of UPE on non-Muslim households can be explained by noting that there may be barriers to improving female access to schooling in Muslim areas. For example, Caldwell (1986) notes that restrictions that limit women's employment opportunities in Muslim regions combined with other factors may reduce educational attainment. The finding that schooling increased faster in urban areas is not surprising given some of the difficulties associated with recruiting qualified teachers in rural areas (Bray, 1981).

The Impact of Educational Inputs on Schooling and Fertility

The results presented in the tables above consider all high-intensity states to be homogeneous. However, our administrative data from states in 1976 suggest that there was a great deal of variation in the program's impact even in the high-intensity states (see Figure 1C). To test the specific aspects of the program that affected schooling and demographic outcomes (other than the elimination of tuition costs), we use data on the allocated federal capital funds in 1976 (the first year of the program) for new primary classroom construction in an individual's state of education (per capita)¹². If changes in schooling inputs during the program induced an expansion in educational attainment, then we expect that these effects will be larger in the high-intensity states (because the program was generally more intensive in these states, as measured by the capital funds allocation for primary school construction per capita – See Figure 1C). The observed allocated expenditure for classroom construction (per capita) in the state captures more accurately the extent to which the UPE program had a large impact on education outcomes in a given state. The 1976 capital funds on primary classroom construction per capita are obtained from the 1979 *Social Statistics in Nigeria*¹³. All the regressions discussed below include year

12 State population estimates are based on the 1953 Population Census in Nigeria. Both the 1963 and 1973 population census yielded highly controversial results. The 1953 census was the last census conducted by the British Colonial Administration and we use only the population of towns greater than 15,000 to maintain consistency in administrative boundaries over time.

13 There were 19 states in Nigeria in 1976 when the program started (an increase of seven states since the program's announcement in 1974). The Federal Capital Funds Allocated to the States in 1976 is reported in *Social Statistics of Nigeria, 1979* p.30. State population estimates are derived using the 1953 population figures. Details of these population estimates by 1976 state are provided in the tables.



of birth dummies, religion dummies, and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels.

From Table 5, we find strong evidence that changes in schooling inputs induced significant increases in years of schooling completed for the UPE cohorts educated in high-intensity areas. To measure the effect of exposure to the UPE program on schooling and fertility, the coefficient of interest is the interaction of the allocated federal capital funds, and whether an individual was of primary school age at the onset of program (i.e., born between 1970 and 1975). The key assumption here is that individuals who were 13 and above when the UPE program began were less likely to benefit from the program.

The results from Table 5 are consistent with large and some significant changes in years of schooling completed for states with changes in schooling inputs. We find striking results associated with per capita classroom construction allocation at the primary school level¹⁴. When we examine data on capital funds for the construction of teacher-training institutions and recruitment of qualified teachers, we find that changes in these schooling inputs also had a large impact on years of completed schooling, and that this effect was larger in the high-intensity states (not shown).

Finally, Table 6 presents results with the number of children born before age 25 as the dependent variable. Here, we investigate the impact of the expansion in schooling inputs (per capita funds for classroom construction) on fertility outcomes. These results provide convincing evidence that the expansion in schooling inputs that occurred during the UPE program are negatively associated with the number of early births measured by the number of children born before age 25. We find that the allocated capital funds for classroom construction in primary schools also had a negative impact on the number of early births. Finally, we should note that the reduction in the number of children born before age 25 associated with allocated capital funds for classroom construction appears to have been greater for the UPE cohort in the high-intensity states.

The Instrumental Variable Strategy

An ideal candidate instrument would affect schooling outcomes, but have no direct impact on fertility.

¹⁴ We can also compare whether allocated funds for classroom construction at teacher-training institutions (per capita) had a larger impact on the years of completed schooling than capital funds allocated for the construction of primary school classrooms.



We use year of birth interacted with capital funds on primary classroom construction per capita (measured at the 1976 state level) as an instrument for schooling in our analysis. As shown earlier, year of birth interacted with the state classroom construction funds per capita had a positive and significant impact on years of completed schooling in the high-intensity states.

We first begin with presenting results from an Ordinary Least Squares (OLS) regression. Table 7 (Column 1) reports OLS estimates of the effect of education on fertility, measured as the number of children ever born before Age 25. These results ignore the endogeneity of the schooling decision. In Column 2, we present indirect least squares results, while in Column 3, we present two-stage least squares estimates of the effect of schooling on fertility. Our results here include 1970 state dummies (Panel A), as well as additional control variables in some specifications to deal with the concern that time-varying and time-invariant heterogeneity at the 1970 state-level may impact our results (Panels B and C). All specifications include controls used in earlier estimation: year of birth dummies, 1970 state fixed effects, and religion dummies.

First, we discuss results from the OLS estimation (Column 1), which ignore the endogeneity of schooling. The OLS results suggest that schooling has a negative and statistically significant impact on the number of children ever born. In particular, an additional year of schooling reduces the number of children ever born by about 0.11. We compare results in Panels A-C and find that our results are robust to the inclusion of additional control variables. Since we have multiple observations for women within a given household, we can also estimate a household fixed effects model to account for unobserved heterogeneity at the household level due to differences in household income or economic status (not shown). The coefficient from the household fixed effects model is slightly lower (-0.107) but not statistically different from earlier results (presented in Column 1).

Our indirect least squares results are presented in Column 2. Here, we use a single instrument – the federal capital allocation for primary school construction in the state of residence (measured in per capita terms) interacted with the “young” cohort dummy. From Column 2, (Panels A) we find that an additional year of schooling reduces early fertility by 0.17. In Panels B and C, we introduce additional control variables, and find that an additional year of schooling reduces early fertility by about 0.34.

In Column 3, we use several instruments (the federal capital allocation for primary school construction



in the state of residence (measured in per capita terms) interacted with year of birth indicators. The results from Column 3 provide additional evidence that when we instrument for schooling, we find that the impact of schooling on fertility becomes more negative. Our estimates from Column 3 suggest that an additional year of schooling reduces early fertility by 0.13-0.26. This indicates that the OLS estimates may underestimate the magnitude of the effect of schooling on fertility. However, most differences between OLS and 2SLS estimates are not statistically significant¹⁵.

We can also compare our estimates on the impact of female schooling on fertility to a number of recent studies that have examined the relationship between fertility and female schooling in developing countries. Ainsworth et. al., (1996) use data from the Demographic and Health Surveys for fourteen sub-Saharan African countries and find that schooling has a negative and significant association with the number of children ever born in 13 out of the 14 countries included in their study. Their point estimates on the impact of an additional year on the number of children ever born range from -0.06 to -0.134, although they do not attempt to instrument for schooling.

Using cross-country panel data, Schultz (1994, 1997) estimates that a one-year increase in adult female years of schooling will reduce fertility by 13 percent or by about 0.5 children per woman. From these studies, female education has a robust negative effect on fertility and population, while family planning and other variables do not appear to have a consistent negative effect.

In the results presented in Table 7, education is assumed to have a linear impact on fertility. A more flexible specification may be required to provide further insights into the impact of education on fertility. In Table 8, Panel A provides estimates of the impact of completing more than six years of schooling, while Panel B examines the impact of completing 4-6 years of schooling and more than six years of schooling (the omitted category is 0-3 years of primary schooling).

Panel A provides convincing evidence that completing more than six years of schooling has a large impact on the number of children before age 25. OLS estimates suggest that completing more than six years of schooling reduces fertility by about 1.11 children. When we instrument for the completion of more than six years of schooling, the negative effect of schooling is more than doubled in magnitude.

¹⁵ Based on standard Hausman test comparisons, we find that there are significant differences (at about the 10% level) between the 2SLS coefficients in Panel C and OLS estimates in Panel A for Columns 1 and 2, but not for other results.



From Columns 3, the completion of more than six years of schooling reduces early fertility by 2.56 compared to the omitted category (0-6 years of schooling).

In Table 8, Panel B, we investigate the impact of schooling using an even more flexible approach. Specifically, we examine the effects of completing 4-6 years of schooling and more than six years of schooling on early fertility (the omitted category is 0-3 years of schooling). From Column 1 (Panel B), our OLS results support our results from Panel A in that while education has a negative impact on early fertility, its impact appears much larger and more robust at higher levels of educational attainment. From Column 3 (Panel B), women with four-to-six years of completed primary schooling are associated with 0.46 fewer children than women who have less than four years of schooling, but this effect is not statistically significant. The 2SLS results in Column 3 suggest the negative effect of schooling becomes only robust for women who have completed more than six years of schooling.

As noted earlier, the completion of one or two years of primary schooling may not have a significant effect on the number of children ever born. In fact, women with incomplete primary schooling may actually have higher fertility rates than women with no schooling, due to the lower prevalence of traditional birth spacing among this group (Cleland and Rodriguez, 1996). Our OLS results (Column 1, Panel C) show that women with 0-4 years of completed primary schooling are associated with 0.80 children than women who have more than four years of schooling. The instrumental variable estimates are even larger (Columns 2 and 3). This supports the finding that completed primary schooling and secondary schooling rather than incomplete primary schooling are strongly negatively linked with the number of children ever born (Schultz, 1998). We find further support that low levels of schooling have a positive impact on early fertility (Panel D).

Taken together, Results in Table 8 (Panels A–D) point to significant non-linearities in the impact of schooling on fertility. There are two potential interpretations of these results. Thomas (1999) discusses two explanations using data from South Africa. One explanation is a humancapital based explanation in which higher levels of primary schooling have a more productive effect in reducing fertility than earlier years. While the higher levels of schooling may lead to a larger negative effect of education on fertility due to productivity differences, it is also likely that selection in the educational attainment process may be useful in explaining this observed nonlinearity. In particular, Thomas (1999) describes this pattern as one of “steps and flats” in which self-selection in educational attainment may drive the



non-linear relationship between education and fertility. Families may choose different levels of education for their female children based on tastes, abilities, and/or resources. For example, women who complete only a few years of primary schooling could be drawn from a different segment of the ability distribution than women who complete more than six years of schooling. Furthermore, women who complete secondary school (particularly in regions with low levels of schooling) are likely to be a highly selective group. Lam and Duryea (1999) and Thomas and Mallucio (1999) also find significant nonlinearity in the effect of schooling on fertility using data from Brazil and Zimbabwe, respectively.

The effect of education on fertility may also depend on the socio-economic environment in which fertility decisions are made. The NDHS provides a rich setting in which to explore the role of contextual factors which may affect the impact of education on fertility. Regarding access to health care, sanitation, and transportation infrastructure, there is a great deal of variation in community variables in our data. We examine the robustness of our results to community fixed effects. The inclusion of community fixed effects allows us to account for the role of timeinvariant observed and unobserved community determinants of fertility. The inclusion of community fixed effects also allows us to deal with the role of social and cultural norms towards education and fertility decisions. Cleland and Rodriguez (1996) highlight the importance of contextual factors in their study of the effect of education on fertility using data from the World Fertility Surveys for thirty-one countries. In particular, the level of economic development in a community, the presence of family-planning programs, employment opportunities for women, as well as the extent of mass schooling can affect the impact of education on fertility. In fact, Caldwell (1980) argues that it is community-level education rather than an individual's educational attainment that affects fertility. Our result on the negative impact of female schooling on fertility appears robust to the inclusion of community fixed effects (not shown). Nonetheless, we find that completing more than six years of schooling consistently is negatively associated with the number of children ever born.

V. CONCLUSIONS

In this paper, we investigate the causal link between education and fertility using a large-scale policy experiment from Nigeria. Results from Nigeria suggest that the change in education policy had a significant impact on both female education and fertility decisions. Based on our preferred specification, we find that exposure to the UPE program is associated with 1.13 to 1.19 years of es are



additional schooling. Under the assumption that exposure to the UPE program is a valid instrument for schooling, we construct 2SLS estimates of the impact of female education on schooling. Our 2SLS estimates are generally higher than OLS estimates, and suggest that an additional year of schooling reduces the number of children born before age 25 by 0.13 to 0.34. We find much larger and significant differences between OLS and 2SLS estimates when we examine the impact on fertility of completing seven or more years of schooling. Our estimates are robust to the inclusion of household and community fixed-effects. We argue that, while OLS estimates often provide an underestimate of the negative effect of schooling on fertility, the endogeneity bias may be relatively small in the linear specification.

Our results provide robust evidence that female education reduces the number of early births. An important topic for future research would be to estimate the social savings associated with higher female schooling. Within the neoclassical framework, lower fertility impacts economic growth through several channels, including lower dependency burdens (share of workers to children in the population), which then increase savings and investment capital. We should note that calculating the social savings from a reduction in fertility would most likely provide an underestimate of the total benefits of increased female schooling since higher female educational attainment likely would also affect wages, child nutrition, child mortality, and other outcomes.

Based on macroeconomic evidence, it is likely that the UPE policy and other programs in the developing world that increase female schooling will have a significant impact on economic growth. Using a Solow growth framework, Knowles et al., (2002) estimate that a 1-percent increase in female education would increase average GDP levels by 0.37 percent. Between 1974 and 1979, the total cost of the UPE program in Nigeria (capital and recurrent expenditure) was about 1.9 billion naira (in 1995 dollars) – on average, about 2 percent of annual real GDP during this period. In comparison, we estimate that the average increase in female schooling associated with the program was just over one year, or female schooling attainment was about 20 percent higher than the sample mean of 5.06. Therefore, the UPE program could have the potential to increase GDP levels by 0.74 percent annually. Moreover, UPE may have also positively affected the outcomes of the children of the affected women. For example, health and schooling indicators for children are known to improve with the level of female education (Schultz, 1998). Therefore, the returns to UPE for Nigeria over the long term may be substantial.



1. Ainsworth, M., Beegle K. and Nyamete, A. "The impact of women's schooling on fertility and contraceptive use: A study of fourteen sub-Saharan African countries." *World Bank Economic Review* 10 (1) (1996): 85-122.
2. Awokoya, S.O. "Proposals for an educational policy." *Western Regional Gazette* 13 (10): 2002.
3. Angrist, J. D., Bettinger, E., Bloom, E., King, E. and Kremer, M. "Vouchers for private schooling in Colombia: Evidence from a randomized natural experiment." *American Economic Review* 92 (5) 2002: 1535-1558.
4. Angrist, J. D., Evans, W.N. "Schooling and labor market consequences of the 1970 state abortion reforms." *Research in Labor Economics* 18: 1999: 75-113.
5. Basu, Alaka Malwade, 1999. *Women's education, marriage, and fertility in South Asia: Do men really not matter? Critical Perspectives on Schooling and Fertility in the Developing World.*
6. Bledsoe, C.H, Casterline, J.B., Johnson-Kuhn, J.A., and Haaga, J.G., eds. 1999. *Critical Perspectives on Education and Family in the Developing World.* National Academy Press, Washington D.C., 138-176.
7. Becker, G. S., 1981. *Treatise on the family.* Harvard University Press, Cambridge.
8. Bray, M., 1981. *Universal primary education in Nigeria: A study of Kano State.* Routledge and Kegan Paul Ltd., London.
9. Caldwell, John C., 1968. The control of family size in tropical Africa. *Demography* 5 (2), 598-619.
10. Caldwell, John C., 1977. "The economic rationality of high fertility: An investigation illustrated with Nigerian survey data." *Population Studies* 31 (1), 5-27.
11. Caldwell, John C., 1980. "Mass education as a determinant of the timing of fertility decline." *Population and Development Review* 6 (2), 225-255.
12. Caldwell, John C., 1986. "Routes to low mortality in poor countries." *Population and Development Review* 12 (2), 171-220.
13. Caldwell, John C., Orubuloye, I. O., Caldwell, Pat, 1992. "Fertility decline in Africa: A new type of transition?" *Population and Development Review* 18 (2), 211-242.
14. Case, A., Deaton, A., 1999. "Schooling inputs and educational outcomes in South Africa." *Quarterly Journal of Economics* 114 (3), 1047-84.
15. Cleland, J., Rodriguez G., 1988. "The effect of parental education on marital fertility in developing countries." *Population Studies* 42 (3), 419-442. 25
16. Cochrane, S.H., 1979. *Fertility and education: What do we really know?* Johns Hopkins Press, Baltimore.
17. Duflo, E., 2001. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment." *American Economic Review* 91 (4), 795-813.
18. Glewwe, P., 2002. "Schools and skills in developing countries: Education policies and socioeconomic outcomes." *Journal of Economic Literature* 11 (2), 436-482.



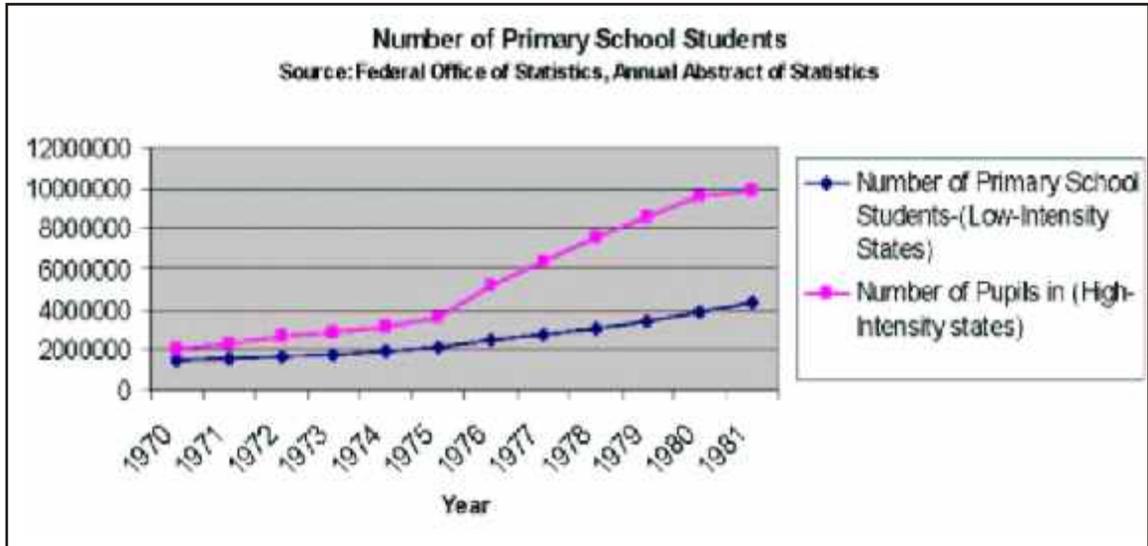
19. Hirschman, C., 1985. Premarital socioeconomic roles and the timing of family formation: A comparative study of five Asian societies. *Demography* 22, 35-59.
20. Fafunwa, Babs A., 1974. *History of education in Nigeria*. Allen and Unwin, London.
21. Federal Government of Nigeria, 1978-1979. *Implementation Committee for the National Policy on Education blueprint*.
22. Federal Ministry of Economic Development and Reconstruction, Central Planning Office, 1975. *Third national development plan, 1975-1980*. Lagos, Nigeria.
23. Federal Office of Statistics, various years. *Annual Abstract of Statistics*.
24. Federal Office of Statistics, various years. *Social Statistics in Nigeria*.
25. Francis, Paul A., 1998. *Hard lessons: Primary schools, community and social capital in Nigeria*. World Bank Technical Paper No. 420, Africa Region Series. World Bank, Washington D.C.
26. Jejeebhoy, S. J., 1995. *Women's education, autonomy and reproductive behavior: Experience from developing countries*. Oxford University Press, New York.
27. Klasen, Stephan, 2002. "Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development." *World Bank Economic Review* 16 (3), 345-73.
28. Knowles, Stephen, Lorgelly, P., Owen, P., 2002. "Are educational gender gaps a brake on economic development? Some cross-country empirical evidence." *Oxford Economic Papers* 54 (1), 118-49.
29. Lam, D., Duryea, S., 1999. "Effects of schooling on fertility, labor supply and investments in children, with evidence from Brazil." *Journal of Human Resources* 34 (1), 160-192.
30. Mason, K.O., 1986. "The status of women: Conceptual and methodological debates in demographic studies." *Sociological Forum* 1, 284-300.
31. Nwachukwu, A.E., 1985. *An historical analysis of the roots of universal public primary education in Nigeria (1900-1980)*. University of Kansas, Ph. D. Dissertation.
32. Odaga, A., Heneveld, W., 1995. *Girls and schools in sub-Saharan Africa: From analysis to action*. World Bank, Washington D.C.
33. Pitt, M., Rosenzweig, M.R., Gibbons, D. M., 1993. "The determinants and consequences of the placement of government programs in Indonesia." *World Bank Economic Review* 7 (3), 319-348.
34. Rosenzweig, M. R., Schultz, T.P., 1985. "The demand and supply of births and its life-cycle consequences." *American Economic Review* 75 (5), 992-1015.
35. Rosenzweig, M. R., Schultz, P. T., 1989. "Schooling, information, and nonmarket productivity: Contraceptive use and its effectiveness." *International Economic Review* 30 (2), 457-77.
36. Schultz, P. T., 1994. "Human capital, family planning, and their effects on population growth." *The American Economic Review* 84 (2), 255-260.
37. Schultz, P. T., ed., 1995. *Investment in women's human Capital*. University of Chicago Press, Chicago.



38. Schultz, P. T., ed., 1997. "Demand for children in low income countries." in Mark Rosenzweig and Stark, O. eds. *Handbook of Population and Family Economics* 1A. The Netherlands Elsevier Press, Amsterdam.
39. Schultz, Paul T., E. D., 2002. Why governments should invest more to educate girls. *World Development* 30: 207-225.
40. Schultz, Paul T., 1994. "Studying the impact of household economic and community variables on child mortality." *Population and Development Review* 10 (0), 215-235.
41. Thomas, D., 1999. *Fertility, education and resources in South Africa. Critical Perspectives on Schooling and Fertility in the Developing World.*
42. Thomas, D., Maluccio, J., 1996. "Fertility, contraceptive choice and public policy in Zimbabwe." *World Bank Economic Review* 10 (1), 189-222.
43. Thomas, D., Strauss, J., Henriques, M., 1991. "How does mother's education affect child height?" *Journal of Human Resources* 26 (2), 183-211.
44. UNESCO, 1971. "Education In Nigeria", *Educational Projects for External Aid* Vol. 1 Report 560 Paris: UNESCO
45. UNICEF *Multiple Indicator Cluster Survey*, 1999.
46. Van de Walle, Etienne, 1965. "An approach to the study of fertility in Nigeria." *Population Studies* 19 (1), 5-16.
47. World Bank, 1996. "Poverty lines: A joint publication of the Policy Research and Poverty and Social Policy departments of the World Bank." No. 1. World Bank, 2002. African Development Indicators, database. 27

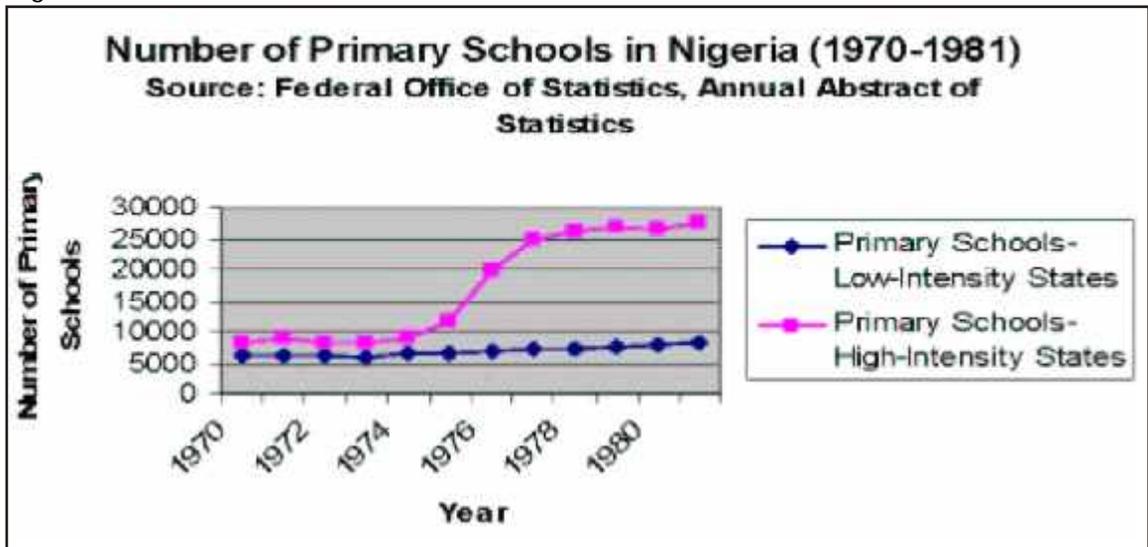


Figure 1A



Source: Federal Office of Statistics (various years), *Annual Abstract of Statistics*. Lagos, Nigeria

Figure 1B



Notes: High-intensity states refer to states outside of the Western region, while low-intensity refers to states of the Western Region (defined to include Lagos, the former capital territory).

Sources: Nigeria Federal Office of Statistics (various years), *Annual Abstract of Statistics*.
Nigeria Federal Office of Statistics (various years), *Social Statistics in Nigeria*.



Figure 1C

<i>State-1976¹</i>	<i>Region²</i>	<i>Federal Capital Funds Allocated for Primary School Population Construction³</i>	<i>Population Estimate⁴</i>	<i>Federal Capital Funds per capita</i>	<i>Capital Funds Allocation RANK</i>
Oyo	Low-Intensity/Western-Region	1744305	1243090	1.40	19
Ogun	Low-Intensity/Western-Region	321524	166274	1.93	18
Ondo	Low-Intensity/Western-Region	717838	219741	3.27	17
Borno	High-Intensity/Non-Western Region	2601302	77730	33.47	16
Anambra	High-Intensity/Non-Western Region	8342532	213561	39.06	15
Lagos	Capital Territory	13890626	267407	51.95	14
Kaduna	High-Intensity/Non-Western Region	11116441	145440	76.43	13
Rivers	High-Intensity/Non-Western Region	5821876	71634	81.27	12
Imo	High-Intensity/Non-Western Region	8271194	93633	88.34	11
Kano	High-Intensity/Non-Western Region	12131038	130173	93.19	10
Sokoto	High-Intensity/Non-Western Region	8369744	87845	95.28	9
Kwara	High-Intensity/Non-Western Region	9538412	94264	101.19	8
Bauchi	High-Intensity/Non-Western Region	2973215	29075	102.26	7
Gongola	High-Intensity/Non-Western Region	5005510	47643	105.06	6
Bendel	High-Intensity/Non-Western Region	10062666	76092	132.24	5
Niger	High-Intensity/Non-Western Region	2025000	12810	158.08	4
Plateau	High-Intensity/Non-Western Region	6287450	38527	163.20	3
Benue	High-Intensity/Non-Western Region	3175804	16713	190.02	2
Cross-River	High-Intensity/Non-Western Region	10256206	46705	219.60	1

Notes:

¹ At the time of the UPE announcement, there were 12 states. In 1976, the number of states in Nigeria increased from 12 to 19.

² During the colonial era, Nigeria was divided into 3 administrative regions: West, East, and North

³ The Federal Capital Funds Allocated to the States in 1976 is reported in Social Statistics of Nigeria, 1979 p.30. Only capital funds released to states are available and not actual expenditures on classroom construction

⁴ Our state population estimates are based on the 1953 Population Census in Nigeria. Both the 1963 and 1973 population census yielded highly controversial results. The 1953 census was the last census conducted by the British Colonial Administration. Only towns with more than 15,000 people are included in calculating our state population estimate due to changes in administrative boundaries.



Table 1A: Summary Statistics, 1999 Nigerian Demographic and Health Surveys

	<i>Mean</i>	<i>Std Dev</i>
<i>Dependent Variables</i>		
Number of Children Born (at the time of the survey)	2.16	(2.78)
Number of Births before Age 25	1.27	(1.68)
First Birth before Age 16	0.14	
First Birth before Age 18	0.25	
Years of Education: Female	5.00	(4.71)
Completed more than six years of education: Female	0.34	(0.47)
<i>Year of Birth</i>		
Born 1976-1981	0.22	
Born 1970-1975	0.16	
Born 1964-1969	0.13	
Born 1958-1963	0.10	
Born 1952-1957	0.06	
Born 1946-1951	0.02	
<i>Religion and Ethnicity</i>		
Muslim	0.44	
Christian	0.54	
Other Religion	0.02	
Hausa	0.24	
Yoruba	0.22	
Ibo	0.14	
Other Ethnicity	0.40	
<i>Residency Characteristics</i>		
Low-Intensity State (Western Region)	0.18	
High-Intensity State (Non-Western Region)	0.82	

Number of Observations 9810



Table 1B: Summary Statistics, State Characteristics

	<i>Mean</i>	<i>Std Dev</i>
1. 1970 State Characteristics (N=12)¹		
State Female Share in Primary School Enrollment in 1970	33.74	(6.69)
Official Gross Primary School Enrollment Rates in 1970	53.70	(49.91)
Projected Number of Primary Schools Classrooms	12583	(9195)
Projected No. of Classrooms –Teacher-Training Institutes	514	(367)
2. 1976 State Characteristics 1976 (N=19)²		
Federal Government Capital Funds Allocated to the 1976 State for UPE Program (Primary School Construction) in 1976 (in naira)	6455404	(4145556)
Average Population (1953 census estimates)	160465.1	(272468.2)
Projected Enrollments in Grade 1-1976 (in '000)	120.94	(53.06)
Actual enrollments in Grade 1 -1976 (in '000)	157.48	(79.53)
Population (1963 census estimates)	2843827	(1269354)
Projected Population in 1976 (Based on 1963 census)	4013221	(1773927)
Area in square miles	18034.95	(14476.54)
State Female Civil Service Employment	1312	(3993)

Notes: The sample for analysis includes all respondents in the 1999 NDHS.

There were 12 states in Nigeria in 1974 when the UPE program was first announced.

In 1976, due to the creation of several new states there were 19 states in Nigeria.

State population estimates are based on the 1953 Population Census in Nigeria. Both the 1963 and 1973 population census yielded highly controversial results. The 1953 census was the last census conducted by the British Colonial Administration and we use only population of towns greater than 15,000 to maintain consistency in administrative boundaries.

Sources: Nigeria Federal Office of Statistics (various years), *Annual Abstract of Statistics*. Nigeria Federal Office of Statistics (various years), *Social Statistics in Nigeria*.

number of states in Nigeria to 19 states.



Table 2: The Impact of the UPE Program on Schooling (DHS 1999)

A. Experiment of Interest

Treatment Group: Born 1970-1975 (Age 1-6 in 1976)

Control Group: Born 1958-1963 (Age 13-18 in 1976)

Dependent Variable	Completed More than Six Years of Schooling Years of Schooling			Years of Schooling		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	0.04	0.16 ***	0.16 ***	0.63	1.13**	1.19**
High-Intensity State	(0.04)	(0.06)	(0.06)	(0.48)	(0.44)	(0.63)
Observations	2926	2926	2926	2926	2926	2926

B. Unaffected Cohorts (Robustness Check)

Treatment Group: Born 1958-1963 (Age 13-18 in 1976)

Control Group: Born 1952-1957 (Age 19-24 in 1976)

Dependent Variable	Completed More than Six Years of Schooling Years of Schooling			Years of Schooling		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1958-63 *	-0.22	-0.005	-0.007	-0.22	0.16	0.17
High-Intensity State	(0.56)	(0.06)	(0.06)	(0.44)	(0.67)	(0.67)
Observations	1815	1815	1815	1815	1815	1815

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort.



Table 3: The Impact of the UPE Program on Fertility

A. Experiment of Interest

Treatment Group: Born 1970-1975 (Age 1-6 in 1976)

Control Group: Born 1958-1963 (Age 13-18 in 1976)

Dependent Variable	First Birth Before Age 16			Number of Births Before Age 25		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	0.04	-0.10***	-0.10***	-0.03	-0.93***	-0.95***
High-Intensity State	(0.04)	(0.04)	(0.04)	(0.14)	(0.18)	(0.18)
Observations	2926	2926	2926	2926	2926	2926

B. Unaffected Cohorts (Robustness Check)

Treatment Group: Born 1958-1963 (Age 13-18 in 1976)

Control Group: Born 1952-1957 (Age 19-24 in 1976)

Dependent Variable	First Birth Before Age 16			Number of Births Before Age 25		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1958-63 *	0.06***	-0.014	-0.13	0.06	-0.28	-0.27
High-Intensity State	(0.04)	(0.04)	(0.04)	(0.19)	(0.24)	(0.23)
Observations	1815	1815	1815	1815	1815	1815

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort.



Table 4: The Impact of UPE by Location and Religion

A. Experiment of Interest

Treatment Group: Born 1970-1975 (Age 1-6 in 1976)

Control Group: Born 1958-1963 (Age 13-18 in 1976)

Dependent Variable	Completed More than Six Years of Schooling			First Birth Before Age 16		
	Urban	Non-Muslim	Muslim	Urban	Non-Muslim	Muslim
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	0.31***	0.17**	0.005	-0.15**	-0.08**	-0.12
High-Intensity State	(0.07)	(0.07)	(0.11)	(0.06)	(0.04)	(0.09)
Observations	966	1608	1322	970	1608	1323

B. Unaffected Cohorts (Robustness Check)

Treatment Group: Born 1958-1963 (Age 13-18 in 1976)

Control Group: Born 1952-1957 (Age 19-24 in 1976)

Dependent Variable	Completed More than Six Years of Schooling			First Birth Before Age 16		
	Urban	Non-Muslim	Muslim	Urban	Non-Muslim	Muslim
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1958-63 *	0.07	-0.0009	-0.07	0.07	0.05	0.01
High-Intensity State	(0.08)	(0.07)	(0.08)	(0.07)	(0.04)	(0.06)
Observations	590	1004	815	590	1004	815

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort.



Table 5: The Impact of the UPE Program on Schooling: Using Federal Capital Allocation to States for Primary School Construction in 1976 to measure program intensity in state of residence.

A. Experiment of Interest

Treatment Group: Born 1970-1975 (Age 1-6 in 1976)

Control Group: Born 1958-1963 (Age 13-18 in 1976)

Dependent Variable	Completed More than Six Years of Schooling			Years of Schooling		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	0.0007***	0.0010***	0.0010***	0.009***	0.010 ***	0.010 ***
Classroom Construction Funds (per capita)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Observations	2926	2926	2926	2926	2926	2926

B. Unaffected Cohorts (Robustness Check)

Treatment Group: Born 1958-1963 (Age 13-18 in 1976)

Control Group: Born 1952-1957 (Age 19-24 in 1976)

Dependent Variable	Completed More than Six Years of Schooling			Years of Schooling		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	-0.00006	-0.005	-0.0000	-0.0004	0.0015	0.0014
Classroom Construction Funds (per capita)	(0.0003)	(0.003)	(0.0003)	(0.0003)	(0.003)	(0.003)
Observations	1815	1815	1815	1815	1815	1815

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort.



Table 6: The Impact of the UPE Program on Fertility: The Impact of the UPE Program on Schooling: Using Federal Capital Allocation to States for Primary School Construction in 1976 to measure program intensity in state of residence.

A. Experiment of Interest

Treatment Group: Born 1970-1975 (Age 1-6 in 1976)

Control Group: Born 1958-1963 (Age 13-18 in 1976)

Dependent Variable	First Birth			No of kids born before Age 25		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	0.0005***	0.0005***	-0.0005***	-0.002*	-0.002***	-0.003***
Classroom Construction Funds (per capita)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Observations	2926	2926	2926	2926	2926	2926

B. Unaffected Cohorts (Robustness Check)

Treatment Group: Born 1958-1963 (Age 13-18 in 1976)

Control Group: Born 1952-1957 (Age 19-24 in 1976)

Dependent Variable	Completed More than Six Years of Schooling			Years of Schooling		
	Baseline Model	Adding Female Enrollment	Adding Female Civil Service	Baseline Model	Adding Female Enrollment	Adding Female Civil Service
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1970-75 *	-0.00006	-0.005	-0.0000	-0.0004	0.0015	0.0014
Classroom Construction Funds (per capita)	(0.0003)	(0.003)	(0.0003)	(0.0003)	(0.003)	(0.003)
Observations	1815	1815	1815	1815	1815	1815

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort.



Table 7: Estimates of the Impact of Education on Fertility: An Instrumental Variable Approach

Federal Capital Allocation to States for Primary School Construction in 1976 interacted with Year of Birth is the key instrument(s) for Years of Schooling
Dependent Variable: Number of Kids Before Age 25

<i>Specification</i>		OLS	ILS: <i>Instrument(s) Used</i> Yr7075*1976 State Capital Allocation for Classroom Construction	IV <i>Year of Birth Dummies*1976 State Capital Allocation for Classroom Construction</i>
		(1)	(2)	(3)
A	Controls: Year of Birth Dummies, Religion Dummies, 1970 State Fixed Effects	-0.11*** (0.007)	-0.17** (0.11)	-0.13* (0.08) [0.44]
B	Controls: Year of Birth Dummies, Religion Dummies 1970 State Fixed Effects, Young Cohort*1970 female enrollment	-0.11*** (0.007)	-0.34** (0.14)	-0.26*** (0.09) [0.25]
C	Controls: Year of Birth Dummies Religion Dummies 1970 State Fixed Effects, Young Cohort*1970 female enrollment Female Civil Service Employment*Year of Birth	-0.11*** (0.007)	-0.34** (0.14)	-0.26*** (0.09) [0.27]
	Number of Observations	2926	2926	2926

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level. All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort. P-values from an overidentification test are shown in square brackets.



Table 8: Impact of Education on Fertility: Specification Checks An Instrumental Variable Approach: Federal Capital Allocation to States for Primary School Construction in 1976 interacted with Year of Birth is the key instrument(s)

Dependent Variable: Number of Kids Before Age 25

Specification	OLS	ILS: Instrument(s) Used: Yr7075*1976 State Capital Allocation for Classroom Construction	IV Year of Birth Dummies*1976 State Capital Allocation for Classroom Construction
	(1)	(2)	(3)
A. Spline Estimation (0-6 years of schooling is the omitted category)			
more than six years of schooling	-1.11*** (0.07)	-3.38*** (1.36)	-2.56*** (0.91) [0.35]
B. Spline Estimation (0-3 years is the omitted category)			
4-6 years of schooling	0.20** (0.09)		-0.46 (2.33)
more than six years of schooling	-1.11*** (0.08)		-2.78* (1.44) [0.27]
C. Spline Estimation (five or more years is the omitted category)			
0-4 years of schooling	0.80*** (0.08)	2.80*** (1.08)	2.06*** (0.79) [0.14]
D. Spline Estimation (OLS results) (no formal schooling -- omitted category)			
One	0.06 (0.42)		
Two	0.32 (0.37)		
Three	0.66 (0.28)		
Four	0.02 (0.33)		
Five	-0.01 (0.27)		
Six and more years of schooling	-0.78 (0.08)		
Number of Observations	2926	2926	2926

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.

All estimates include 1970 state fixed effects. The baseline model includes the following controls: year of birth dummies, dummy variables for religion and 1970 state fixed effects. Robust standard errors are clustered at the state and year of birth levels and shown in parentheses. Additional controls where specified include an interaction term between the young cohort and primary school state female enrollment in 1970 and an interaction term between year of birth and female civil service employment in the 1976 state for the young cohort. P-values from an overidentification test are shown in square brackets.



Appendix 1: The Summary Statistics for "Moved" versus "Never Moved" Sample

	Never Moved (Sample for analysis)		Moved (Excluded from sample)		T-Statistic	
	Mean	Std Dev	Mean	Std Dev	Mean Diff	T-Stat
Demographic Variables						
No. of Births before Age 25	1.27	(1.68)	1.60	(1.78)	0.33***	[9.15]
First Birth before Age 18	0.25	(0.43)	0.30	(0.46)	0.05***	[4.85]
Yrs of Education: Female	5.00	(4.71)	4.94	(4.95)	-0.06	[-0.65]
Yrs of Education: Husband	5.50	(5.66)	5.32	(5.58)	-0.18	[-1.19]
Completed Seven Years of Schooling: Female	0.335	(0.47)	0.34	(0.47)	0.005	[0.46]
Age of Female						
Age at First Marriage	17.14	(4.39)	17.09	(4.49)	-0.05	[-0.45]
Living with Parents	0.34	(0.47)	0.31	(0.46)	-0.03***	[-3.07]
Age of Head	46.33	(13.83)	46.04	(14.02)	-0.29	[-1.47]
Year of Birth						
Born 1976-1981	0.22	(0.41)	0.20	(0.40)	-0.02*	[-1.75]
Born 1970-1975	0.16	(0.37)	0.20	(0.40)	0.04***	[4.95]
Born 1964-1969	0.13	(0.34)	0.17	(0.38)	0.04***	[4.79]
Born 1958-1963	0.10	(0.31)	0.15	(0.36)	0.05***	[6.55]
Born 1952-1957	0.06	(0.24)	0.07	(0.26)	0.01**	[2.36]
Born 1946-1951	0.02	(0.13)	0.03	(0.16)	0.01***	[2.77]
Religion and Ethnicity						
Muslim	0.44	(0.50)	0.43	(0.50)	-0.01	[-1.27]
Christian	0.54	(0.50)	0.55	(0.50)	0.01	[0.93]
Other Religion	0.015	(0.12)	0.018	(0.14)	0.003	[1.3]
Hausa	0.24	(0.42)	0.25	(0.43)	0.01	[1.13]
Yoruba	0.22	(0.41)	0.15	(0.36)	-0.07***	[-8.52]
Ibo	0.14	(0.35)	0.19	(0.39)	0.05***	[6.54]
Residency Characteristics						
Urban	0.34	(0.47)	0.31	(0.46)	-0.03***	[-3.07]
Observations		6208		3602		

* Significant at 0.1 level. ** Significant at 0.05 level. *** Significant at 0.01 level.