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**Working Paper**

## Within and between gender disparities in income and education benefits from democracy

IZA Discussion Papers, No. 3221

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Uwaifo Oyelere, Ruth (2007) : Within and between gender disparities in income and education benefits from democracy, IZA Discussion Papers, No. 3221, Institute for the Study of Labor (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/34770>

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Ruth Uwaifo Oyelere

December 2007

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Discussion Paper No. 3221  
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## **ABSTRACT**

### **Within and Between Gender Disparities in Income and Education Benefits from Democracy**

There is data evidence that welfare has improved post democracy in Nigeria. However, the distribution or concentration of the benefits in subgroups of the population is unknown. In this paper, the question of differential welfare impacts, across and within gender, post democracy in Nigeria is explored. I make use of simple econometric tools to test two null hypotheses. First, there is no disparity in the income and returns to education benefits of the shift to democracy across gender in Nigeria. Second, there are no within gender disparities of the shift to democracy on income and returns to education in Nigeria. From the results, both null hypotheses are rejected. Though men and women benefited from reforms post democracy, gender differences exist. Specifically, I find on average higher income benefits for men post democracy. Nigeria. However, disparities in income benefits are at lower levels of education. Men and women have similar income benefits at the tertiary level. Interestingly, I find the reverse when considering returns to education. On average, women experienced a greater change in returns to education post democracy in Nigeria but this disparity is primarily at the tertiary level. I also find inequality has increased post democracy in Nigeria, more so among women than men.

JEL Classification: O15, P00, J16, D63

Keywords: gender, democracy, income gap, disparities, returns to education, Nigeria, inequality

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# 1 Introduction

For most of her independent life, Nigeria has been controlled by the military government. Between 1986 and 1998, Nigeria experienced its worst political regimes since its independence. Political instability, pervasive corruption and poor military government with extractive institutions were the hallmarks of this period. Another important characteristic of the extended military government was the worsening status of women in Nigeria, which had already suffered important setbacks during the colonial era (see Pearce, 2001). During this period, gender disparities that existed during the colonial era were amplified directly by the government setup, and indirectly by the worsening economic conditions (see Attoe, 2002).

In May 1999 Olusegun Obasanjo became the president of Nigeria, ushering in the present democratic dispensation. The period between 1999 till date has been the longest stretch of democratic government in Nigeria. The democratization of Nigeria led to a lot of political, economic and institutional reform that have been growth producing and welfare improving (see Okonjo-Iweala and Osafo-Kwaako, 2007). Also, several policies and programs were put in place to empower woman and reduce gender disparities. These include: increase in female school enrollment, discouraging discrimination in the work place (for example lower pay for women doing the same work as men; limited chances of overtime work, in-service training, and slower upward mobility) and reducing labor market disadvantages of women.<sup>1</sup> There is evidence that

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<sup>1</sup>A specific example of an initiative setup for women empowerment is National Economic Empowerment Development Strategy (NEEDS).

the shift to democracy improved the welfare of the average Nigerian (FOS 2001). What we do not know is if these economic reforms increased income and the returns or benefits of education, equally for men and women, and equally among men and women in terms of their level of education. These are the basis of the questions I address in this paper.

The motivation for considering these questions is linked in part with the expectation that the increased attention and focus on women post democracy, should lead to an equal or higher increase in income and returns to education for women in comparison to men. Unfortunately, there is anecdotal evidence that the gender income gap not only widened post democracy, but the within gender income gap across education levels also deepened.<sup>2</sup> This paper investigates the validity of these controversial claims that could have significant policy implications.

I make use of data from the General Household Survey (GHS) of Nigeria in this analysis. To test the first hypothesis, I calculate mean income pre and post democracy across gender. Using a difference in difference approach, I estimate the change in the income gap across gender in Nigeria. In addition, using a Mincerian earnings function, I estimate the average returns to schooling for men and women pre and post democracy, calculate the difference in difference in the returns to education and test for statistical significance. To test the second hypothesis, I calculate the Gini coefficient for men and women in Nigeria pre and post democracy. I also calculate the change in mean income at each education level, within gender, post democracy.

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<sup>2</sup>See Johnson and Markham, (2004) for anecdotal evidence on gender inequality.

In addition, I estimate separately for men and women average returns to education at the primary, secondary and tertiary level. Subsequently, I compute the change in the returns to education estimates post democracy and test for statistical differences across education levels.

This paper contributes to knowledge in three ways. First, the literature has emphasized both economic and noneconomic reasons to close the gender gap in developed and developing countries. However, econometric evidence to support these reasons in African countries are limited. This paper adds to that limited literature, providing empirical evidence of higher private returns to education for women, which is one of the economic arguments for women's education. Second, there is little empirical evidence on the role of a significant institutional change, like a move to democracy or a change in policies in reducing or widening the gender income gap. This paper adds to that literature, providing evidence of this effect from the most populous African country - Nigeria. Finally, this paper highlights how within gender disparities can increase with institutional change, which can be important for policy design and targeting.

## **2 Related Literature Review**

According to Pommerehne (1978), a more democratic system, is likely to produce political outcomes that are closer to the preferences of the median voter than a less democratic system. Consequently, a shift to democracy or a shift in institution towards more democratic institutions can be expected to raise individuals' well-being

ceteris paribus.

There is a growing literature that looks at distributional benefits of changes in institutions or the influence of specific institutions on redistribution among groups in the population. Early empirical studies of the 60's and the 70's that looked at the relationship between democracy and inequality were comprehensively surveyed by Sirowy and Inkeles, (1990). They conclude based on their review of 12 previous studies that political democracy does not widely exacerbate inequality. Sirowy and Inkeles, (1990) result is quite different from the findings of Gradstein and Milanovic (2004), who surveyed the more recent literature. They conclude that the recent evidence indicates an inverse relationship between measures of democracy, based on civil liberties and political rights, and inequality. Interestingly, there are some exceptions in the literature to this inverse relationship. Take for example, Milanovic et al's (2001) cross-country empirical analysis, covering 126 countries from 1960–98. They find that in Judeo-Christian societies, increased democratization appears to lead to lower inequality. In contrast, in Muslim and Confucian societies, it has an insignificant effect. Inequalities among different forms of democracies has also been studied. For example, Feld et al (2006) addressed this issue using information from the Swiss federal tax office. They find that inequality is not reduced to a lesser extent in direct than in representative democracies for a given initial income distribution.

Apart from empirical evidence, the link between differences in institutions and economic outcomes like inequality has been discussed theoretically. Lipset (1959) and Lenski (1966) both present the theoretical case on the link between democracy



and inequality in the mid 20th century. More recently, Feld et al (2006) show that in more representative democracies, inefficiencies in income redistribution might occur as actual redistribution deviates from the preferred level, and this could lead to benefits from groups which are not the neediest ones. There are many other papers that consider theoretically and empirically the relationship between income or inequality and democracy.<sup>3</sup> Its important to mention that despite the large related literature on democracy and its impact, it appears that there are no papers that look directly at the relationship between democracy or institutional change and groups within a society. For example, studies looking at the effect of democratic institutions on the economic gap between men and women in the society. Also, there is very little in the literature on how institutional change can affect within group differences in economic outcomes, though a lot of studies have looked at general within country effects (see Feld et al, 2006). A possible explanation is a premise that institutional change should affect groups like men and women similarly. Besides, institutional change should not cause an increase in inequality but a reduction in inequality (see Gradstein and Milanovic, 2004). Another explanation for the gap in the literature may be the problem of identifying a causal link between institutional change and changes in inequality across groups. It is also important to mention that most of the papers above are based on developed countries or on cross-country regressions that include very few African countries. This is one reason why the simple analysis in this paper is useful.

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<sup>3</sup>Milesi-ferretti, Perotti and Rostangno (2002) study using a panel of OECD countries, Acemoglu and Robinson (2000), Acemoglu et al (2004), Rodrik and Rigobon (2004), Minier (1998) and Glaeser et al (2004) are examples of such papers.

Nigeria a developing country in Africa is considered in this paper. Using a natural experiment via a sudden shift to democracy, I provide evidence of disparate impacts of democratic reform across gender.

## General Background

For most of her early independent life, Nigeria was controlled by the military government, which continued the extractive institutions of colonial rule. The military government first took over in 1966 toppling the elected civilian regime in a coup d'état. Several authors have written on the military government in Nigeria and its negative impact on every sector of the economy.<sup>4</sup> Between 1986 and 1998, Nigeria experienced its worst political regimes since its independence. Political instability, pervasive corruption and poor military government with extractive institutions were the hallmarks of this period. Besides, labor markets were stifled and wages were sometimes compressed and controlled by the military government. The last military regime is known to be the most oppressive, corrupt and divisive. This regime ended abruptly with the death of General Sanni Abacha on the 8th of June 1998.

The end of military rule in 1998 was followed by a transition government which lasted until May 1999. It was led by General Abdusalam Abubakar, a high-ranking commander in the late general's cabinet. It was a period of setting up the institutional and political framework for the shift to democracy. In May 1999, Olusegun Obasanjo became the president of Nigeria.

At the inception of the Obasanjo administration in 1999, the morale of Nigerians

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<sup>4</sup>Examples of authors on this subject are Dibia (2000), Nwagwu (2002) & Sanda et al (1987).

was at the lowest ebb because of several problems that characterized the past military regimes. These problems include: unemployment, high level of corruption, total decay of infrastructure, malfunctioning public utilities, inefficient state enterprises and soaring inflation. Within a few months of democratization, political, economic and institutional areas for reforms, to deal with these issues, were identified. Over the next few years, many reforms were initiated including the liberalization of key sectors of the economy, restructuring of the public service, review of government budgeting and taxation laws, governance and institutional strengthening, and debt management (see Okonjo-Iweala and Osafo-Kwaako, 2007).

Along with these reforms, several policies and programs were put in place to improve education and health, reduce women's disadvantage in the labor market, encourage investments and improve labor market outcomes in general. A specific example of female empowerment post democracy is the government appointing more women with expertise into top government positions. The president appointed the former vice president of World Bank, who happened to be a Nigerian, as minister of finance and also appointed Mrs. Akunyili who presently heads Nigeria's food and drugs enforcement agency (NAFDAC). In addition, several regulations were put in place to ensure that political and non-political appointments and government contracts were awarded solely on expertise and education. This is in contrast to pre-democracy when appointments were more arbitrarily and linked mostly to social networks.

Another big change in Nigeria post democracy is the business climate. Post 1999,

several international firms returned to Nigeria and new international and local firms entered the market. Factors that led to the change in the investment climate include: large-scale economic reforms, political stability, improvement in enforcing the rule of law and the existence of a skilled local labor force.

Though there are differences in opinion on the impact of the shift to democracy, the anecdotal and data evidence leans more in favor of positive welfare impacts. There is data evidence that on average, welfare has improved in Nigeria post democracy [FOS, 2004]. The issue I address in this paper is if the shift to democracy caused differential benefits across gender and within gender.

## **Description of Datasets**

This study makes use of cross-sectional data from the General Household Survey (GHS) of Nigeria. The GHS is one of the major sample surveys carried out by the Federal Office of Statistics (FOS). This survey is a supplemental module of the National Integrated Survey of Households (NISH), which is run in line with the United Nations Household Survey Capability Program. The survey sample was drawn randomly from all the 36 states in Nigeria including the Federal Capital Territory, Abuja. The NISH sampling design is a two-stage replicate sample method, which is a common random sampling procedure. It is the only survey in Nigeria that resembles the Living Standards Measurement Survey (LSMS) of the World Bank in terms of coverage. The Federal Office of Statistics (FOS) in Nigeria conducts this survey yearly and data are collected from randomly selected households during the

four quarters of the year.<sup>5</sup> I make use of data from 1997/1998, 1998/1999, 1999/2000 and 2005 for answering both questions. The data contains information on 32,024 households in 1997/98 with 131,477 observations, 24,889 households in 1998/99 with 106,325 observations and 34,105 households in 1999/2000 with 149,411 observations, 28,268 households in 2005 with 97,689 observations. Data from these four surveys are comparable as the same sampling procedure was used in the four surveys. To ensure that the data are comparable over time, current monetary values are deflated to base year prices.<sup>6</sup>

This dataset is appropriate for the analysis since it consists of detailed information on every member of the household. For example, I have information on the education of each member of the household not only by level, but also by years of schooling. I also have information on region of residence, age, literacy, marital status, sector of employment and sector. In addition monthly income for those working are also included. I will explore the range of this dataset in answering the questions posed. A drawback of the survey is that different households are surveyed yearly.<sup>7</sup>

### **Evidence of General Welfare Improvements Post Democracy**

As mentioned above, there is macroeconomic evidence of improvements in Nigeria post democracy. In this section I provide evidence of these general improvements post democracy using microeconomic data. First in table one, I present summary statistics of key demographic and economic variables pre and post democracy. I

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<sup>5</sup>Note different household in each enumeration area are interviewed in each quarter.

<sup>6</sup>The base year is 1985.

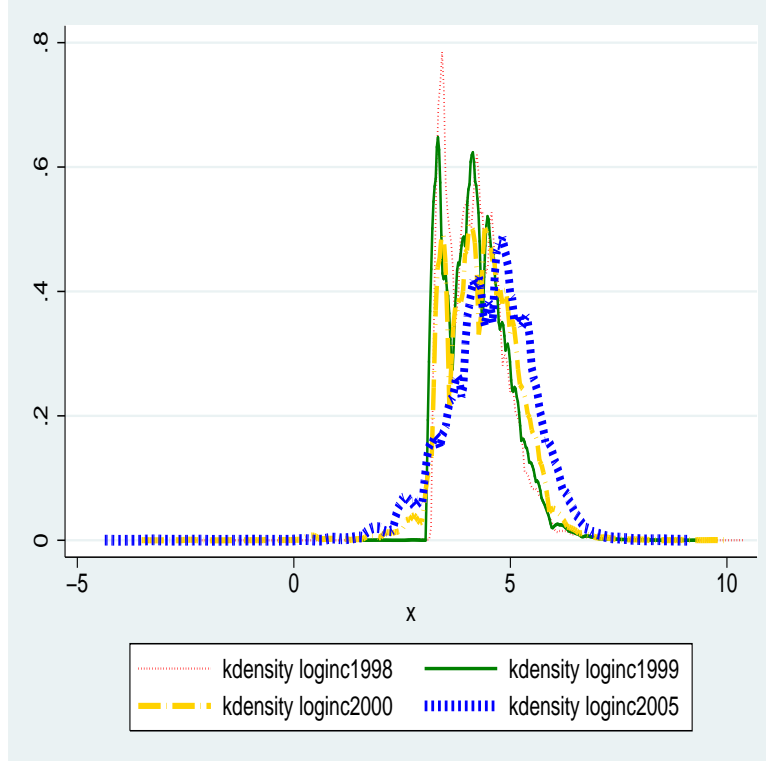
<sup>7</sup>For the first quarter of 1998/99 the data set was not available.

Table 1: Summary Statistics

	Pre Democracy ( $\sigma$ )	Post Democracy ( $\sigma$ )
Observations	237802	246800
Age	23.41 (18.12)	23.00 (18.38)
Sex (male=1)	0.52 (0.5)	0.51 (0.5)
Sector (urban=1)	0.24 (0.42)	0.22 (0.42)
Years sch	4.19 (5.13)	4.56 (5.38)
HH size	6.23 (3.48)	6.92 (4.26)
Income	93.14 (246.68)	123.52 (267.35)
Married	37.85%	35.91%

combine the two datasets pre democracy (1997/98 & 1998/99) and do the same for the datasets post democracy (2000 & 2005). It is important to present these averages for several reasons. Most importantly, we need the population surveyed before democracy to be no significantly different from the population surveyed post democracy. This is a necessary condition needed if changes over the two time periods are to be attributed to post-democratic reform. If not, changes could simply be as a result of changes in population structure or population sample. The pre and post estimates of the demographic variables in Table 1 confirm that the population structure did not change significantly. In addition, estimates of mean real income pre and post democracy provide microeconomic evidence of positive income change

Figure 1: Kernel Density of Log Income Pre and Post Democracy

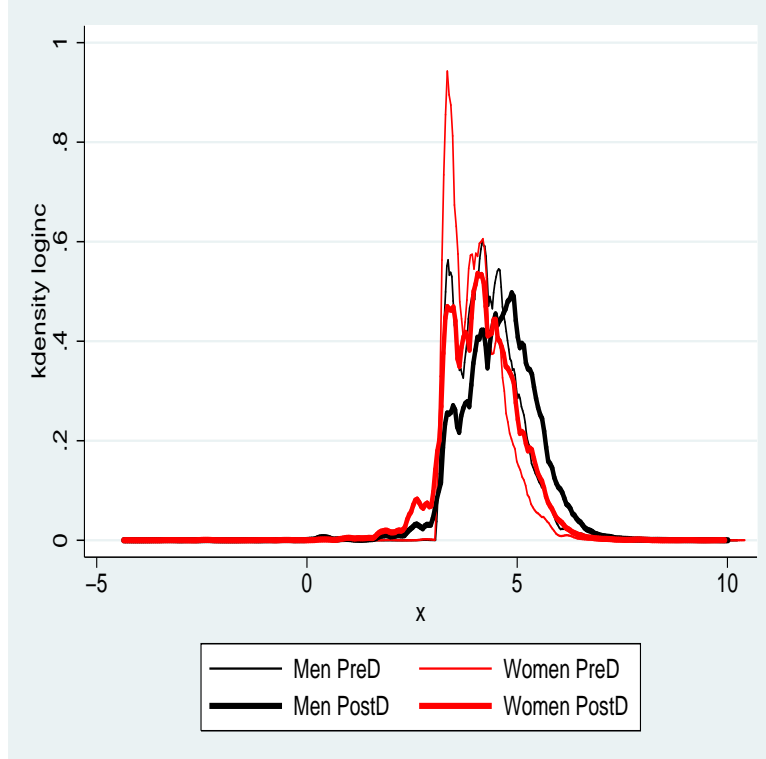


Note: 1998 and 1999 are pre democracy and 2000 and 2005 are post democracy.

post democracy. To be precise, there was about a 28% increase in real mean income post democracy. This is a substantial change but is not entirely unexpected given the rapid changes in post democratic Nigeria highlighted earlier. To capture the evolution of the change in income across the population over the four year period, I graph the distribution of income using a kernel density function for the four years of data used in the analysis (1998, 1999, 2000 and 2005).<sup>8</sup>

<sup>8</sup>Log income is used in the kernel density graphing.

Figure 2: Kernel Density of Log Income Pre and Post Democracy



Note: 1998 and 1999 are pre democracy and 2000 and 2005 are post democracy.

From Figure 1, the rightward shift in income distribution post democracy (2000 and 2005) is apparent. This result supports other findings pointing to general welfare improvement in Nigeria as a whole post democracy. However, we are concerned with if the impact was different across gender. Hence, a similar kernel distribution, across gender, pre and post democracy is presented. Figure 2 provides evidence that both men and women benefitted from a shift to democracy. The distribution of income of both groups shifted right post democracy. Nonetheless, it is difficult



to say from this kernel distributions precisely who benefitted more or less. Pre democracy the distribution of income for men was more to the right than women. This trend continued post democracy and simply shows that the income gap across gender continues to exist post democracy in Nigeria. However, one the questions of interest is if this income gap shrunk post democracy, remained the same or increased? The answer to this question cannot be told from the figure 2. This is one of the reasons why estimation of the means and returns to education for each group is necessary to answer the questions of interest.

### 3 Estimation Strategy

#### Hypothesis 1

To test the hypotheses that there are no disparities in the income and returns to education benefits, across gender, post democracy in Nigeria, I compute means and estimate the returns to education.

First, hypothesis one has two parts and each part of the hypothesis is tested. The first part pertains to the income gap and the second part the returns to education. First, I calculate mean income, across gender pre and post democracy in Nigeria. See equation (1). Second, using the difference in difference approach, I estimate the change in the change in mean income across gender. See equation (2).

$$\bar{x}_{jt} = \frac{1}{N_{jt}} \sum_i x_{ijt} \quad (1)$$

Here j=1 is men and j=2 is women. x is deflated income. t is the time period pre democracy or post democracy [t=1 pre democracy and t=2 post democracy]. N is the

total number of people in the subgroups considered. While  $\bar{x}_{jt}$  is the mean income of group  $j$  at time  $t$ .  $i$  is the individual considered.

$$\delta_x = [\Delta\bar{x}_{11} - \Delta\bar{x}_{12}] - [\Delta\bar{x}_{21} - \Delta\bar{x}_{22}] \quad (2)$$

Here  $\delta_x$  is the difference in difference in mean income.

For the second part of the hypothesis, I estimate the average returns to education by gender. the average returns to education (ARTE) are estimated using ordinary least squares (OLS) on a simple Mincer type earnings function (equation 3) for each time period and for men and women.

$$\log(y_{ijt}) = \alpha + \beta_{jt}S_{ijt} + \phi_{jt}X_{ijt} + \kappa_{jt}X_{ijt}^2 + \rho_{jt}D_{ijt} + \epsilon_{ijt} \quad (3)$$

Here  $X_{ijt}$  is age of individual  $i$  in group  $j$  at time  $t$ ,  $S_{ijt}$  is years of schooling of individual  $i$  in group  $j$  at time  $t$ ,  $D_{ijt}$  is a vector of all other possible exogenous/control variables including dummies for individual  $i$  in group  $j$  at time  $t$  and  $y_{ijt}$  is income of individual  $i$  in group  $j$  at time  $t$ . Recall as above  $j = 1$  or  $2$  and  $t = 1$  or  $2$ .

Similarly as with mean income, the difference in difference in returns to education is estimated. See equation (4).

$$\delta_\beta = [\Delta\beta_{11} - \Delta\beta_{12}] - [\Delta\beta_{21} - \Delta\beta_{22}] \quad (4)$$

The second null hypothesis is that there are no disparities within gender in the change in mean income and returns to education post democracy in Nigeria. The two parts of this hypothesis are also tested separately. First, inequality is calculated

for men and women pre and post democracy. Inequality can be measured in several ways. Some of the most commonly used measures include the Gini coefficient, Gini (1912), the decile ratio, the Atkinson index, Atkinson (1970); and Theil's entropy, Theil (1967). In this analysis, I calculate income inequality within subgroups of interest using the Gini coefficient. The Gini is calculated by taking difference between all pairs of incomes and then totalling the absolute differences. This total absolute difference is then normalized by dividing by population (squared) and average income (see equation 5). For this analysis, the bootstrapped estimate of the Gini coefficient is calculated.

$$G_{jt} = \frac{1}{2N_{jt}^2\mu} \sum_{i=1}^m \sum_{k=1}^m n_i n_k |y_{ijt} - y_{kjt}|. \quad (5)$$

$\mu = \bar{x}_{jt}$  is the mean income for group  $j$  at time  $t$ .  $G_{jt}$  is the Gini for group  $j$  at time  $t$ . Here  $y_{ijt}$  is the income of individual  $i$  in group  $j$  at time  $t$ .

First, the percentage change in the Gini pre and post democracy for men and women is calculated. I also calculate the difference in difference. See both equations 6 and 7.

$$\nabla G_j = \left[ \frac{G_{j2} - G_{j1}}{(G_{j1} + G_{j2})/2} \right] \times 100 \quad (6)$$

$$\delta_G = [\Delta G_{11} - \Delta G_{12}] - [\Delta G_{21} - \Delta G_{22}] \quad (7)$$

In the case of the  $\nabla G_j$ , if  $\nabla G_j > 0$  then inequality has increased for the group and if  $\nabla G_j < 0$  inequality has decreased for the group.  $\nabla G_j < 0$  is a positive outcome

that reflects a reduction in inequality post democracy. In contrast if  $\nabla G_j > 0$ , for both men and women, the smaller the  $\nabla G_j$ , the better the outcome with respect to changes in inequality.<sup>9</sup>

The Gini coefficient shows if inequality has increased or decreased but not from what part of the group this change might be coming from. To get at this also, I calculate the mean income at each education level for men and women separately. See equation 8.

$$x_{jth}^- = \frac{1}{N_{jth}} \sum_i x_{ijth} \quad (8)$$

As above, j=1 is men and j=2 is women and t is the time period pre democracy or post democracy [t=1 pre democracy and t=2 post democracy]. What is different in equation (8) is h. h is the level of education [h=1 no schooling, h=2 partial primary education, h=3 completed primary education, h=4 completed secondary education and h=5 Tertiary education]. N is the total number of people in subgroup j at time t at level h. While  $x_{jth}^-$  is the mean deflated income of group j at time t and education level h.

I do not use a difference in difference approach for this part of the analysis. Rather, I find only the difference pre and post democracy (see equation 9).

$$\delta_{jk} = [\Delta x_{j2h}^- - \Delta x_{j1h}^-] \quad (9)$$

Here  $\delta_{jh}$  is the simple change in mean deflated income post democracy in group j

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<sup>9</sup>Here I assume inequality is a “bad”, society wants less of inequality.

belonging to education level  $k$ .

For the last part of the second hypothesis, the returns to education are also estimated at each level of education using another form of the Mincer equation (see equation 10). With this functional form, the returns to an extra year of schooling for primary, secondary and tertiary education can be estimated.

$$\log(Y_{jt}) = \theta_{jt} + \gamma_{jt}X + \delta_{jt}X^2 + \varrho_{jt}yrpri + \varphi_{jt}yrsec + \varsigma_{jt}yruniv_{jt} + \lambda_{jt}Z + \varepsilon_{jt} \quad (10)$$

In this equation,  $Y$  is a vector of incomes for group  $j$  at time  $t$ ,  $X$  is a vector of age for group  $j$  at time  $t$ ,  $Z$  is the matrix of all relevant control variables and year dummies,  $yrpri$  is a vector of years of primary education for group  $j$  at time  $t$ ,  $yrsec$  is a vector of years of secondary education for group  $j$  at time  $t$  and  $yruniv$  is a vector of years of tertiary education for group  $j$  at time  $t$ . Similar to the analysis for mean income, the difference pre and post democracy is calculated at each level of education and tests for statistical significance are conducted (see equation 11-13).

$$\delta_{\varrho j} = [\varrho_{j2} - \varrho_{j1}] \quad (11)$$

$$\delta_{\varphi j} = [\varphi_{j2} - \varphi_{j1}] \quad (12)$$

$$\delta_{\varsigma j} = [\varsigma_{j2} - \varsigma_{j1}] \quad (13)$$

$\delta_{\varrho j}$  is the change in returns to primary education in group  $j$  while  $\delta_{\varphi j}$  is the change in returns to secondary education in group  $j$  and  $\delta_{\varsigma j}$  is the change in returns to tertiary education in group  $j$ .

It is important to mention at this point that the returns to schooling estimates  $(\beta, \varrho, \varphi, \varsigma)$  in equation 3, 9 and 10, derived using OLS, potentially suffer from endogeneity and omitted variable bias. Typically to deal with these problems, the return to schooling is re-estimated using instrumental variables in a two stage least squares framework. In Uwaifo (2006), the ARTE in Nigeria between 1997-1999 are estimated using the IV approach. She notes no significant difference in estimates using the IV and the OLS methods. The inference from this result is that OLS estimates, of ARTE, in the Nigerian case are consistent. Based on this finding, I assume that OLS estimates of ARTE for subgroups in Nigeria are likewise consistent. There is a slight possibility however that this assumption might be invalid. However, given that the interest in this analysis is comparison across groups with respect to change in economic indicators, inference can still be valid even if bias in OLS estimates exist. For inference to be valid in the mist of potential bias in OLS estimates, bias must not be significantly different for comparison groups. For example, the bias in the OLS estimate of ARTE for women should be equal to the bias in the OLS estimates for men.<sup>10</sup>

For the estimation of returns to education at the different levels of education,

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<sup>10</sup>The assumption of equal bias is not farfetched. If we believe that ability is the omitted variable in the regression analysis leading to potential bias in the OLS estimates, we do not expect the distribution of ability to differ across men and women.

Uwaifo (2006) does not show if OLS estimates of return to education at each level of education are biased or not.<sup>11</sup> The OLS estimates at the different levels of education may not be biased given the lack of bias in estimates of ARTE for Nigeria. However, the possibility of biased estimates cannot be ruled out given that ability affects level of education attainment and I am not controlling for ability in this analysis. Despite this constraint, given our interest is the comparison among education levels in changes in returns, the inferences are valid whether or not estimates are biased if bias is not time variant.<sup>12</sup>

## Results

### Testing the first Hypothesis

Table two reports the results from computing equation (1) and (2). First, there is a preexisting income gap between men and women pre democracy. However, the difference in difference results shows that this gap gets exacerbated post democracy. The table shows that an average man received 23 more real naira relative to women post democracy, per month.<sup>13</sup> This 23 naira is equivalent to over 2300 current naira which is substantial. The difference in difference is not only economically significant but statistically significant. Meaning the gender gap in income grew post democracy even though attempts were made to shrink it. Assuming change in income can be

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<sup>11</sup>She is not able to use the IV approach for the estimation across levels because she has only one instrument and would not be able to satisfy exclusion restriction given the existence of three potentially endogenous variables.

<sup>12</sup>There is no reason to believe that a bias in the estimate of the returns to a particular level of education, if it exists, will change over time.

<sup>13</sup>This is equivalent to an increase in the average income gender gap by \$23 dollars post democracy.

Table 2: Mean Income Pre and Post Democracy

Variable	Pre Democracy (S.D)	Post democracy (S.D)	<i>difference</i>
<b>Gender</b>			
Male	102.13 (242.69)	142.64 (283.63)	-40.51
Female	71.98 (254.59)	89.49 (231.75)	-17.51
Diff in Diff	-30.14	-53.14	-23.00*

\*Note mean income here is for those who are employed and earned income.

attributed to reforms post democracy, men experienced higher income benefits than women from post democratic reform in Nigeria.<sup>14</sup> An argument one could make is that the gender gap in income is only a reflection of the level of education of women in society and does not indicate any form of disadvantage or discrimination. In the second part of the results, this argument is debunked by providing evidence of an income gap at each level of education.

Table 3 reports the OLS estimates of returns to education and the difference in difference estimate. First, it is important to note that the OLS returns to education estimates for women are higher and statistically different from men, before and after democracy. Second, both men and women experience an increase in average return post democracy<sup>15</sup> but this change differs across gender. The returns to education gender gap increases post democracy as revealed by the difference in difference estimate. This difference is statistically significant though not substantial. It shows that

<sup>14</sup>In Uwaifo 2006b, arguments supporting the assumption that change in income post democracy can be attributed to democratic reform are provided.

<sup>15</sup>The estimates of returns to education pre and post democracy are significantly different.



post democracy, returns to education increased by about one percentage point more for women relative to men. The results are in contrast to the finding for mean income. Though women earn less pre and post democracy relative to men, women have higher returns to their education. Hence, education pays more for women than men and more so post democracy. Higher returns to education for women have been noted in several developing and developed countries and is one of the common argument given when making an economic case for women's education.

Combining the above results, the null hypothesis that there is no difference in change in income and returns to education post democracy in Nigeria, across gender, can be comfortably rejected. The difference in difference estimates are statistically significant in both cases.

**Table 3: Average Returns to Schooling Pre and Post Democracy**

Variable	Women			Men		
	Pre Dem (se)	Post dem (se)	$Diff_w$	Pre Dem (se)	Post dem (se)	$Diff_m$
Yrs of Schooling	0.030* (0.001)	0.053* (0.001)	-0.023	0.024* (0.001)	0.038* (0.001)	-0.014
Controls	Yes	Yes		Yes	Yes	
$R^2$	0.20	0.24		0.20	0.24	
No of Obs	20,332	24,346		47,869	44,936	
$diff_m - diff_w$						0.009*

\*NA-Not applicable.  
5% significance level

## Hypothesis 2- Within Gender Differences in Benefits

Table 4 reports Gini coefficients for women and men. The Gini coefficient is the first way that within gender disparities post democracy are tested. In the first part of table 4, the % change in inequality is reported while in the second part, the difference in difference estimate is presented.

Table 4: **Gini Coefficient Pre and Post Democracy**

Group	Pre Democracy	Post democracy	
<b>% Change in Gini Coefficient</b>			
Male	0.44	0.49	10.75%
Female	0.41	0.51	21.74 %
<b>Difference in difference Approach</b>			
Male	0.44	0.49	-0.05
Female	0.41	0.51	-0.10
$\delta_G$	0.03	-0.02	0.05

One of the surprising results from this table is the marked increase in inequality among men and among women post democracy. However, inequality increased at a slower rate among men in comparison to women. Prior to democracy, inequality in income among women was less than inequality in income among men. Things have changed post democracy, women now have greater inequality in income than men. Specifically, women experienced about a 10 percent more increase in inequality than men. The difference in difference estimate confirms the inference from the first part of the table. This is a surprising finding given that one expects that democracy should reduce inequality not increase inequality. However, there is evidence in the recent

literature of potential increase in inequality in presidential democracies (see Persson and Tabellini, 2000).

The Gini coefficient provides evidence of inequality increases post democracy, across gender. It however does not provide information on potential subgroups that could be the source of the rising inequality, especially among women.

Table 5: **Mean Income Pre and Post Democracy**

Variable	Women			Men		
	Pre Dem (S.D)	Post dem (S.D)	$\Delta$	Pre Dem (S.D)	Post dem (S.D)	$\Delta$ (S.E)
No Sch	58.81 (109.34)	64.66 (216.53)	5.85* (2.46)	85.26 (289.70)	109.02 (238.85)	23.77* (2.44)
1-5yrs	93.24 (925.5)	82.14 (251.04)	-11.11 (24.6)	109.00 (183.05)	125.04 (150.83)	16.03* (5.12)
F.Pri	71.71 (105.07)	85.06 (184.52)	13.35* (2.69)	108.96 (158.68)	142.04 (314.56)	33.08* (3.62)
F.Sec	88.81 (77.63)	108.22 (129.28)	19.40* (2.8)	129.31 (171.68)	177.16 (217.00)	47.86* (3.67)
Tertiary	131.38 (108.73)	190.29 (387.68)	58.91* (13.93)	179.11 (193.86)	241.01 (398.42)	61.9* (9.05)

\*change statistically significant.  
5% significance level.

Table 5 reports the mean income at different education levels of education across gender, pre and post democracy. I consider those who have no education. Some primary education, some secondary education, completed secondary education and Tertiary education. There are several findings worth nothing. First, men have higher mean income than women at every level of education. The gravity of this disadvantage is revealed when you consider that on average, women with tertiary education earn just as much as men with secondary education (means are not significantly different). Similarly women with secondary education have similar income as men with

no education. This trend continues post democracy which is surprising given government policy to reduce gender discrimination and women disadvantages. Second, I find differences in the change in mean income when comparing women or men at different levels of education. Uwaifo (2006b) provides evidence that income changes post democracy can be attributed to democratic reform. Given this finding, positive change in mean income when comparing groups pre and post democracy captures the income benefit from democratic reform. For example, table 5 shows that men with less than a completed secondary education had similar income benefits post democracy. Meaning the change in mean income post democracy for men at these education level groups are statistically the same. However, income benefit of democratic reform for men with secondary education or tertiary education are the same statistically but statistically different from men at lower levels of education. The results for women differ. Income benefits from democratic reform are statistically the same at all levels of education apart from tertiary education. The income benefit of democratic reform for women with tertiary education differs from all other women. Interestingly this change in mean income for women with tertiary education is not statistically different from the change for men with secondary or tertiary education. Hence, post democratic reform affected mean income of men and women with tertiary education similarly.

In table 6 the estimates of the returns to education at different levels of education are presented. As above, I am interested primarily in the within gender differences post democracy in Nigeria but will highlight other findings. First, returns to edu-

**Table 6: Average Returns to Schooling Pre and Post Democracy**

Variable	Women			Men		
	Pre Dem (S.e)	Post dem (S.E)	$\Delta$	Pre Dem (S.E)	Post dem (S.E)	$\Delta$
Primary	0.019* (0.001)	0.033* (0.001)	0.014*	0.018* (0.001)	0.029* (0.001)	0.011*
Secondary	0.038* (0.002)	0.053* (0.003)	0.015*	0.024* (0.002)	0.035* (0.002)	0.011*
Tertiary	0.075* (0.006)	0.15* (0.008)	0.075*	0.061* (0.004)	0.10* (0.004)	0.039*
$R^2$	0.21	0.26		0.21	0.25	
No of Obs	20,332	24,346		47,869	44,936	

\*5% significance level  
 NA-Not applicable.

cation increased post democracy at every education level. Second, the returns to primary and secondary education are much lower than the return to tertiary education, both before and after democracy. Third, prior to democracy, the return to primary education is statistically the same for men and women. Similar results are noted at the tertiary level before democracy but not at the secondary level. Post democracy, things are quite different. Returns to secondary and tertiary education are statistically different for men and women but still the same at the primary level. This result explains partly why education pays more for women than men. With respect to the main test for the hypothesis being considered, the results are similar to the results comparing the means at different levels of education. Among women, those with primary and secondary education benefitted similarly from democratic reform in terms of change in returns. However, women with tertiary education benefitted much more than women at the lower levels of education. In particular, women

with tertiary education's change in return is six percentage point higher than those with lower levels of education. The same trend is noted among men but the magnitude of the difference comparing men with tertiary education with those with less is much smaller (3 times as much for men versus 5 times as much for women). In addition, the results show that there is no difference in the return to education benefit of democratic reform, across gender, at the primary and secondary level. Besides, the change in return at the primary and secondary level are statistically the same, for men and women. Tertiary is the only level where gender differences in the change in return are noted. Women's returns to tertiary education increased by 3.6% points more than men.

Given the above results, the second null hypothesis is rejected. There are within gender differences in the benefits of education both in terms of income and returns to education.

Table 7: **Tabulating Winners Post Democracy**

Variable	Winner (across gender)	Winner (within females)	Winner (within males)
Mean Income	Male	Tertiary	Tertiary & Secondary
Gini Coefficient	Male	NA	NA
Average returns to Schooling	Female	NA	NA
Return to Primary Education	None	NA	NA
Return to Secondary Education	None	NA	NA
Return to Tertiary Education	Female	NA	NA
Returns Education	NA	Tertiary	Tertiary

NA-Not Applicable. None refers to both men and women having similar benefits. Hence there is no winner.

## 4 Conclusions and Implications

In this paper I address two related questions by posing two null hypotheses. Both hypotheses are related to the benefits of post democratic reform. Underlining these hypotheses is the assumption that changes post democracy can be attributed to post democratic reform. This assumption might seem controversial but Uwaifo (2006) provides evidence of the validity of this assumption. The benefits considered are changes in income and returns to education.

The results lead to rejection of the first null hypothesis. Meaning that there are gender differences in the income and returns to education benefits of democratic reform. These results imply a growing gap in mean income and returns to education across gender. Similarly the second hypothesis is rejected. Within gender disparities in the income and returns to education benefits of post democratic reform exist. Those with tertiary education enjoyed much greater benefits from democratic reform than those at the lower levels of education. These are the main results based on the original questions of interest. However, there are some other results worth highlighting. First, though the income gap on average between men and women has grown, this growth in the income gap is restricted to the lower levels of education. At the tertiary level, women and men benefitted similarly from post democratic reform. Second, education yields higher average returns for women than men and this differential has only widened post democracy. However, this difference in returns is primarily at the secondary and tertiary levels of education. An extra year of primary education yields similar returns across gender. The question of who are the big winners post

democratic reform depends on what labor market indicator one is considering and what group. Table 8 reports these big winners. A big winner is one who benefits more or has a higher positive change, post democracy, when comparing groups of interest. Looking across gender with respect to income, men on average appear to be the big winner with high income gains and lower growth in inequality. Within gender, women with tertiary education are the obvious winners with much higher increase in income and returns to their education than their counterparts. Among men the big winner are men with tertiary education but the magnitude of the difference in benefits in comparison to men with lower levels of education is less than differences among women. Looking carefully at the tables, it is obvious that women with tertiary education have benefitted the most from democratic reform, based on the indicators considered. Their income increased at a similar rate as their male counterparts but the returns to their education increased much more than their male counterparts.

What are the implications of these results. First, inequality in the benefits of democracy are real and could keep growing without government intervention in terms of transfers. Second, though women earn less than men in many developed country, the extent of the gap in the Nigerian case is worrisome. This is especially apt given the increase in this gap within a democratic government. Returns to education is higher for women than men but does not mean that women earn more than men. Similarly higher increase in returns to education for women than men does not translate to bigger increases in income for women. However, a continued increase in returns to education for women, above men, is one way to slowly close the income gap at higher



levels of education. For example, women with tertiary education had the highest increase in returns post democracy and are the only women group who have equal increase in income to a male comparison group post democracy. In addition, the rejection of the second hypothesis tells us that inequality is growing among men and women in Nigeria. The women's case is more disturbing given the over 20% increase in the Gini coefficient over the span of a few years. Recall inequality for women was lower than men before democracy but is now higher. This inequality growth among women is potentially driven by the biggest winners post democracy, women with tertiary education. Even though rising returns for women with tertiary education is good, low growth in returns at the lower levels of education might reduce demand for education among women who believe they cannot attain tertiary levels for several reasons including financial constraints.

Important questions that one can ask based on the above results are: first, can we explain the income gap between men and women pre and post democracy or is the gap largely unexplained and could be attributed to discrimination? A related question is if the changes in the income gap post democracy are a result of changes in explainable variables across gender or reflect an increase in discrimination as captured by an increase in the unexplained difference between the two groups? These questions are important because the above results do not say that discrimination against women has increased or decreased post democracy. The difference in benefits could be as a results of increased discrimination, increased disadvantage or occupation choice differences across gender. I am presently exploring these question using the Blinder-

Oaxaca decomposition technique (see Blinder, 1973 and Oaxaca, 1973). The answers to these questions would be very useful for Nigeria in terms of how to direct, target and focus policy and programs to deal with women's disadvantages in the labor market.

In terms of recommendation, the Nigerian democratic government needs to address issues of inequality across and within gender. The income gap across gender needs more attention. Hence, sponsored economic research exploring the reasons for these persisting and rising differences are necessary. Finally, women's education yields high dividend at the secondary and tertiary levels, and programs/policies need to be implemented aimed at boosting female enrollment and retention at these levels, especially in the rural areas. Apart from scholarships for women from low income households at these levels, laws restricting early marriage might aid retention rates for women.

### **Acknowledgement**

This research has received funding partly from the Center for African Studies University of California, Berkeley. This work has benefitted from helpful comments from participants in the 2007 SEA meetings in New Orleans. Adebayo Aromolaran and Nosa Anderson were instrumental in securing the datasets. Of course, all remaining errors are mine.

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