An Empirical Analysis of Labour Force Participation of Married Women in Adamawa State, Nigeria

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Abstract
An all inclusive human capital development has long been identified as the secret behind the huge success recorded by developed and some emerging economies of the world. It is on this ground this study, Labour force participation of married women in Adamawa State, examines the factors influencing the decision of married women within the working age bracket (18 – 60 years) to participate in labour force activities. Employing the linear probability and probit models on 120 observations, it is found that women’s education has a positive effect on labour force participation of married women and on the other hand, husband’s employment and household size have shown a negative effect. Women’s education, in an overall perspective, is found to be the major determinant of the labour force participation of married women. The present study will be of great value to individuals, non-governmental organisations, government and its agencies that are interested in gender related issues. Therefore, it is important for government to direct its policies towards proper female education as it is the key for enhancing female human capital development and productive employment.

Keywords: labour force participation; married women; education; probit model; Nigeria.

INTRODUCTION
The problem of married women participation in labour force is as old as human race and has generated a lot of controversies. The economic analysis of this has attracted considerable attention since the pioneer works of Mincer (1962) and Cain (1966). The female labour force participation rates increased considerably in the developed countries in recent years. In contrast, in many developing countries and in Nigeria specifically northern areas like Adamawa state show a declining trend.

Labour force participation of married women examines the implication of growing educational opportunities for women in Nigeria. Although bias has existed from the traditional Nigerian society against women, recent events especially in education reveal a conquering of this deep-rooted prejudice. Enrolment figures particularly in the last ten years shows a remarkable bridging of the gap between the genders. In other words, more and more women are acquiring tertiary education. However, it is the contention of this study that, in view of the needs of development, education acquired becomes meaningful when utilized in the labour and productive sector of the economy.

Against this realization, research argues that the number of women who have acquired education is misappropriating to the number involved in the labour sector. Thus, a significant number of women with tertiary education do not get involved in the labour process in Nigeria and hence under utilization of manpower and a negative returns to investment in human resources. There are a number of factors that are responsible for these marginal participation of married women in the formal labour force and also a number of constraints to the participation rate of married women in the labour force, these constraints are education, violence, exclusion from retirement and pension, lower income in relation to men, sexual harassment and productive roles which often entails working part-time of interrupting employment to raise Children (Anugwom, 2009).

Like many developing countries, in Nigeria particularly Adamawa State, housekeeping is considered as the main activity of married women. Sather (1993) explains that there exists a segregation of time allocation by sex that is men work for wages generally outside their homes while women and daughters have overlapping household chores. Educated women who realize their returns to education join the labour force and small ratio of women participates in economic activities, majority of them are involved in the informal sector. Professionally, educated women who are in fact a very small ratio share economic activities in their
respective professions. The marital status of females correlates with aspirations of work, some of the women work before marriage as they have less responsibility of household chores. A number of explanatory variables are considered as factors that lead to an increase the labour force participation rate of married women amongst which are women’s age, education, women as head of household, household asset, household poverty status, household size, husband’s education and many others.

Adamawa State was chosen as the area of investigation because the Northern Nigeria popularly known as Muslim North and at times erroneously as Hausa land tends to suffer more effect; using Adamawa State, one can have a general view in the country since northern areas have similar characteristics.

The rest of the paper is organized as follows: Section two contains the theoretical framework. Section three reviews the empirical literature. Section four discusses the methodological and data issues. Section five presents and discusses the empirical results. Section six concludes the paper.

THEORETICAL FRAMEWORK
The theoretical underpinning for this study is human capital theory, which explains that the economic prosperity and functionality of a nation depends on its physical (health status) and human stock (experience, education, skills, etc). It emphasizes how education increases productivity and efficiency of economically productive human capability which is a product of innate abilities and investment in human being (Mincer, 1962). By extension, labour force participation depends on physical (health status) and human stock (experience, education, skills, etc) of an individual. Thus, the labour force participation rates of wives depend on the head of family educational level and level of permanent income. Moreover the educational and occupational trends had not only contributed in bringing more young married women into the labour force but also contributed in changing the expectations regarding long-term participation in labour force. This in turn will stimulate women to invest further in education which would encourage them to participate in the labour market.

EMPIRICAL LITERATURE
Khan and Khan (2009) highlighted the factors that influence the decision of married women (in the age group of 16-60 years) to participate in labour force activities in Punjab (Pakistan). Employing the probit model on 3911 observations, the study found that women’s age, woman as head of the household, women’s education, household poverty, family size, number of girls (5-15 years), number of daughters over 15 years of age, husband’s unemployment and low income, and rural locality have a significant positive effect on labour force participation of married women. On the other hand, numbers of infants, number of sons over 15 years of age and husbands education have shown a negative effect. Poverty in an overall perspective was found to be the major determinant of the labour force participation of married women. The study also revealed that majority of married women work in the informal sector of the economy.

Porter and king (2009) estimated the causal impact of fertility on women’s labour supply. Using the occurrence of twins and the sex in first births as measures of exogenous shock to fertility since twins at first birth occur, relatively rarely in one country they used all available demographic and health’s survey. The study revealed that women in developing countries have more children if they had twins in their first birth and if the first two births were the same sex or if the first two births were girls. Women in sub-Saharan Africa, Latin America and the Caribbean and East Asia also have more children if they had one or two boys in their two births. However, women in south Asia and the Middle East and North Africa (MENA) have fewer children. Findings on labour force participation differ by age and geographical area. Women in sub Saharan Africa, Central America and the Caribbean are more likely to participate in the labour force when they have twins in the first birth. With the exception of Asia, women whose first one or two births are boys are less likely to participate in labour force. In Asia, the effects differ by age.

Herr and Wolfram (2008) examined the propensity of highly educated women to exit the labour force at motherhood, focuses on systematic differences across women with various graduate degrees to analyze whether these contribute to differences in the capacity to combine children with work over a variety of high education career paths. Working with a sample of Harvard alumnae observed 10 and 15 years after graduation it was discovered that, the labour force attachment of mothers at the 15th year is the highest among MDs (94 percent) and the lowest among MBAs (72 percent) and women with no advanced degree(69 percent). They then use a rich set of biographical information on the alums, combined with data on the 18 work places to try to disentangle whether the working patterns observed reflect selection on types of in the women pursing difference graduate degrees or variation in the difficulty of combining work with family along different career paths. Overall, the results of the study suggest that work environment contributes to women’s decision to exit the labour force motherhood.

Enuwals, et al. (2007) investigated the trend in female labour force participation in Netherland over successive generations of women and produced
an educated guess for future participation. To achieve this objective, they estimated a binary age-period-cohort model for the generations known between 1925 and 1986. Using data from the Dutch Labour Force Survey 1992-2004, the results indicated that the increasing level of education, the diminishing negative effect of children and unobserved cohort effects has stopped since the generation born in 1995. This result is in line with result of studies on social norms and attitude towards the combination of female employment and family responsibilities which show a similar pattern over the successive generation. They observe that future participation growth importantly depends on the involvement of attitude towards the combination of paid work and children.

Sackey (2005) in his study on female labour force participation in Ghana (effects of education) explained that to participate in the labour market or not to participate appears to be an issue of survival for women in the Ghanaian economy parallel to the rising trend in female participations rates there has been a tendency towards a decline in fertility. At the core of this pattern has been the schooling factor. This study used data from the Ghana living standards survey with demographically enriched information to estimate female labour force participation and matters in both urban and rural localities; significant positive impact on women’s labour market participation and have an opposite effect on fertility. He concluded that although the gender gap in education has become narrower over the years, it is important for government policies to ensure the sustainability of the female educational gains obtained. Arguably, this is key mechanism for enhancing female human capital and productive employment with favorable impacts on perceptions of ideal family size and fertility preferences.

Salazar (2002) examined women’s participation in the labour force and its implications for inter-household income inequality (reinforcing versus buffering effects) in Madrid women’s increasing participation in the labour market in all industrialized countries changed not only the composition of the labour force but also the processes at work within the households that might have influenced the patterns of inter-household income inequality. Increasing inequality in income has been reported for most countries in the last two decades and increasing dispersion in male wages has been traditionally considered as one of the main driving forces of this result.

**METHODOLOGICAL AND DATA ISSUES**

**Model Specification**

(a) Linear probability model

It is used to denote a regression model in which the dependent variable $Y$ is a dichotomous variable taking the value 1 or 0. The variable $Y$ is an indicator variable that denotes the occurrence or non occurrence of an event.

\[
MLFP = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10})
\]

\[
MLFP = \beta_0 + \beta_1 \text{WAGE} + \beta_2 \text{WEDU} + \beta_3 \text{POVTY} + \beta_4 \text{MHEAD} + \beta_5 \text{HEMP} + \beta_6 \text{HHIZ} + \beta_7 \text{LOC} + u_i
\]

(b) Probit model

Probit is a limited dependent variable regression model. This means that it applies in case when the dependent variable is limited in some way. Thus, for probit, the dependent variable is limited to binary values, zero or one. Probit model is the common solution to the deficiencies of linear probability model.

\[
MLFP^* = \beta_0 + \beta_1 \text{WAGE} + \beta_2 \text{WEDU} + \beta_3 \text{POVTY} + \beta_4 \text{MHEAD} + \beta_5 \text{HEMP} + \beta_6 \text{HHIZ} + \beta_7 \text{LOC} + u_i
\]

**A priori Expectations**

$\beta_1 < 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0$ and $\beta_7 < 0$

It is worthy of note that both models seem similar, but probit has edge over the LPM. The specification of both models is for comparison of estimates as well as to add to the robustness of our analysis.

**Table 1: Definition of Dependent and Explanatory Variables used in the Models**

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable</strong></td>
<td></td>
</tr>
<tr>
<td>MLFP (Married woman’s labour force participation)</td>
<td>If she works: 1, otherwise 0</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
</tr>
<tr>
<td>WAGE (Married woman’s age)</td>
<td>18-60 years:1, otherwise 0</td>
</tr>
<tr>
<td>WEDU (Married woman’s education)</td>
<td>Minimum of SSCE:1, otherwise 0</td>
</tr>
<tr>
<td>POVTY (Household’s poverty status)</td>
<td>If household spends less than N155 in a day:1, otherwise 0</td>
</tr>
<tr>
<td>MHEAD (Married woman as head of household)</td>
<td>If she is the head of household: 1, otherwise 0</td>
</tr>
<tr>
<td>HEMP (Husband’s employment)</td>
<td>If the husband is employed: 1, otherwise 0</td>
</tr>
<tr>
<td>HHIZ (Household / family size)</td>
<td>Number of household / family size. (1 if the family size is above 10 members, otherwise 0)</td>
</tr>
<tr>
<td>LOC (Locality of household)</td>
<td>If the household is lives in Urban: 1, otherwise 0.</td>
</tr>
</tbody>
</table>

**Source:** Authors’ formulation

Where:

- $\beta_0 =$ constant
- $U_i =$ Error/disturbance term
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and $\beta_7$ are the behavioural parameters that measure the rate of change in MLFP with respect to WAGE, WEDU, POVTY, MHEAD, HEMP, HHIZ and LOC.

**Data Related Issues**

The study areas for data collection are Jimeta-Yola (Yola-North Local government Area of the state capital) and Girei Local Government. Jimeta-Yola lies between latitude and longitude. Similarly, Girei Local Government lies between latitude and
The focus of result discussion is on estimates under 1.2 and 2.2 as contained in table 2 because they are improved versions over their counterparts after dropping non-performing variables from the models.

**Probit Model Results**

The results of probit regression show that three parameters or coefficients (constant exclusive) are statistically significant. Out of these, the variable, women education (WEDU) has a coefficient of 0.9351 with the corresponding marginal effect of 0.4378 and statistically significant at 1% as indicated by the p-value (0.0003). This means that an increment of 1 to the variable women’s education (1 additional year of schooling/education) increases the probability of married women labour force participation, on average, by 43.78%. However, the coefficient of poverty variable is not statistically different from zero. The variable of husband’s employment (HEMP) has a coefficient of -0.5601 and marginal effect of -0.2622, which is statistically significant at 10 percent as indicated by the p-value (0.0930). This implies that the husbands being employed decreases the probability of the married women labour force participation, on average, by 26.22%. Similarly, the coefficient of house size (HHIZ) has an estimate -0.4433 with the corresponding marginal effect of -0.2075, which is statistically significant at 10 percent. This also implies that 1 unit increase in the household size reduces the probability of the participation of married women in labour or work force by 20.75%.

R² of 0.1464 shows that 14.64% of the total variation in MLFP is explained by regression equation while the remaining 85.36% is captured by the error term. After adjusting for the degrees of freedom, R² dropped to 11.6731% as captured by adjusted R². Overall, this implies that at least 11.67% of the total variation in MLFP is explained. It should be noted that low R² is a peculiar feature of cross sectional data. The significance of the explanatory power of the model is captured by the F-statistics which is found to be statistically significant at 1%. We cannot rule out the problem of heteroscedasticity because of the robust standard errors.

R² of 0.1122 shows that 11.22% of the total variation in MLFP is explained by the probit regression while the remaining 88.78% is captured by the error term. After adjusting for degrees of freedom, R² dropped to 5.19% as captured by adjusted R² implying that at least 5.19% of total variation in MLFP is explained by probit model.
Furthermore, in both models (LPM and probit), women’s education (WEDU), husband’s employment (HEMP) and household size (HHIZ) are found to be positive, negative and negative respectively, signs which are in agreement with the *a priori* expectations (that is, $\beta_2 > 0$, $\beta_5 < 0$ and $\beta_6 < 0$). In other words, the parameters are rightly signed.

However, woman’s age (WAGE), household poverty status (POVTY), woman as head of household (MHEAD) and locality (LOC) are found to be statistically insignificant.

The results are in consonance with the study carried out by Khan and Khan (2009) on the labour force participation of married women in Punjab (Pakistan) and Enuwals, et al. (2007). The results also agree with the study by Anugwom (2009) on women, education and work in Nigeria. However, the results go contrary to the study on Ghana by Sackey (2005).

**CONCLUSION AND RECOMMENDATIONS**

The study empirically investigates labour force participation of married women in Adamawa State, Nigeria. Employing the linear probability and probit models on 120 observations, it is found that women’s education has a positive effect on labour force participation of married women and on the other hand, husband’s employment and household size have shown a negative effect.

The study further reveals that majority of married women work in the informal sector (self employment) with petty jobs and characterized with low level education of primary and secondary certificates and even none in some cases. The study recommends among other things:

- Provision of free education to a particular level to encourage participation of poor masses in the state.
- Provision of subsidized child-care facilities which will not only increase maternal labour force participation but girls’ school participation would also increase.
- Establishment of vocational training institutes for women in order to develop the potentials of mothers and wives so as to make them employable and productive.

Finally, to the best of our knowledge, no existing in-depth empirical study on Nigeria and in particular the northern part of the country. Thus, the current study is a contribution to the existing literature, which is largely dominated by the studies focused on developed countries. However, the study is not without its limitation. Thus, the major limitation is the small sample size used in the study. We, therefore, suggest that future researchers should conduct more indept survey for their studies.

**REFERENCES**


**APPENDIX**

**Table 3(a): Overparameterized Linear Probability Model Estimates**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>0.536132</td>
<td>0.23888</td>
<td>2.2444</td>
</tr>
<tr>
<td>WAGE</td>
<td>-0.0217582</td>
<td>0.189355</td>
<td>-0.1149</td>
</tr>
<tr>
<td>WEDU</td>
<td>0.343767</td>
<td>0.0917496</td>
<td>3.7468</td>
</tr>
<tr>
<td>POVTY</td>
<td>0.040941</td>
<td>0.0902946</td>
<td>0.5520</td>
</tr>
<tr>
<td>MHEAD</td>
<td>-0.0074378</td>
<td>0.20911</td>
<td>-0.0356</td>
</tr>
<tr>
<td>HEMP</td>
<td>-0.195475</td>
<td>0.15118</td>
<td>-1.2930</td>
</tr>
<tr>
<td>HHIZ</td>
<td>-0.158176</td>
<td>0.0902595</td>
<td>-1.7525</td>
</tr>
<tr>
<td>LOC</td>
<td>-0.00577117</td>
<td>0.0991135</td>
<td>-0.0582</td>
</tr>
</tbody>
</table>

- Mean dependent var = 0.466667, S.D. dependent var = 0.500979
- Sum squared resid = 25.48988, S.E. of regression = 0.477062
- R-squared = 0.146544, Adjusted R-squared = 0.093203
- F(7, 112) = 3.474961, P-value(F) = 0.002088
- Log-likelihood = -77.32002, Akaike criterion = 170.6400
- Schwarz criterion = 192.9400, Hannan-Quinn = 179.6961

**Source:** Computer Output

**Table 3(b): Persimonious Linear Probability Model Estimates**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>0.512215</td>
<td>0.127593</td>
<td>-4.0144</td>
</tr>
<tr>
<td>WEDU</td>
<td>0.340844</td>
<td>0.0882122</td>
<td>3.8639</td>
</tr>
<tr>
<td>POVTY</td>
<td>0.050402</td>
<td>0.0856102</td>
<td>0.5887</td>
</tr>
<tr>
<td>HEMP</td>
<td>-0.194248</td>
<td>0.110624</td>
<td>-1.7559</td>
</tr>
<tr>
<td>HHIZ</td>
<td>-0.159217</td>
<td>0.0895499</td>
<td>-1.7780</td>
</tr>
</tbody>
</table>

- Mean dependent var = 0.466667, S.D. dependent var = 0.500979
- Sum squared resid = 25.49357, S.E. of regression = 0.470833
- R-squared = 0.146420, Adjusted R-squared = 0.116731
- F(4, 115) = 6.140270, P-value(F) = 0.000163
- Log-likelihood = -77.32871, Akaike criterion = 164.6574
- Schwarz criterion = 178.5949, Hannan-Quinn = 170.3175

**Source:** Computer Output

**Table 4(a): Overparameterized Probit Model Estimates**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>z-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.141879</td>
<td>0.721104</td>
<td>0.196752</td>
<td>0.8440</td>
</tr>
<tr>
<td>WAGE</td>
<td>-0.050208</td>
<td>0.548669</td>
<td>-0.91509</td>
<td>0.3621</td>
</tr>
<tr>
<td>WEDU</td>
<td>0.944613</td>
<td>0.267951</td>
<td>3.525316</td>
<td>0.0004</td>
</tr>
<tr>
<td>POVTY</td>
<td>0.130001</td>
<td>0.249911</td>
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</tr>
<tr>
<td>MHEAD</td>
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<td>0.587107</td>
<td>-1.00271</td>
<td>0.3091</td>
</tr>
<tr>
<td>HEMP</td>
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<td>0.496476</td>
<td>-1.245965</td>
<td>0.2128</td>
</tr>
<tr>
<td>HHIZ</td>
<td>-0.442387</td>
<td>0.254992</td>
<td>-1.735694</td>
<td>0.0826</td>
</tr>
<tr>
<td>LOC</td>
<td>-0.021913</td>
<td>0.265201</td>
<td>-0.082634</td>
<td>0.9341</td>
</tr>
</tbody>
</table>

- Mean dependent var = 0.466667, S.D. dependent var = 0.500979
- S.E. of regression = 0.476930, Akaike criterion = 1.360006
- Sum squared resid = 25.47582, Schwarz criterion = 1.545838
- Log likelihood = -73.60034, Hannan-Quinn criterion = 1.435473
- Restr. log likelihood = -82.91080, Avg. log likelihood = -0.613336
- LR statistic (7 df) = 18.62092, McFadden R-squared = 0.112295

<table>
<thead>
<tr>
<th>Obs with Dep=0</th>
<th>Total obs</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs with Dep=1</td>
<td></td>
<td>56</td>
</tr>
</tbody>
</table>

**Source:** Computer Output
Table 4(b): Persimonious Probit Model Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>z-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.059902</td>
<td>0.368515</td>
<td>0.162548</td>
<td>0.8709</td>
</tr>
<tr>
<td>WEDU</td>
<td>0.935066</td>
<td>0.259021</td>
<td>3.609997</td>
<td>0.0003</td>
</tr>
<tr>
<td>POVTY</td>
<td>0.130827</td>
<td>0.247290</td>
<td>0.529042</td>
<td>0.5968</td>
</tr>
<tr>
<td>HEMP</td>
<td>-0.560137</td>
<td>0.333469</td>
<td>-1.679729</td>
<td>0.0930</td>
</tr>
<tr>
<td>HHIZ</td>
<td>-0.443282</td>
<td>0.251306</td>
<td>-1.763917</td>
<td>0.0777</td>
</tr>
</tbody>
</table>

Mean dependent var 0.466667 S.D. dependent var 0.500979
S.E. of regression 0.470702 Akaike info criterion 1.310184
Sum squared resid 25.47949 Schwarz criterion 1.426329
Log likelihood -73.61102 Hannan-Quinn criter. 1.357351
Rest. log likelihood -82.91080 Avg. log likelihood -0.613425
LR statistic (4 df) 18.59955 McFadden R-squared 0.112166
Probability(LR stat) 0.000942

Obs with Dep=0 64 Total obs 120
Obs with Dep=1 56

Source: Computer Output