
Logistic Regression of Factors Associated to Household Labour Participation: Maigatari L.G.A Jigawa State Nigeria, 2016.

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Abstract

This study examines the influence of household structure on labor participation in Maigatari local government area in of Jigawa state. It is carried out with the aim of assessing the number of persons in each age category and the associated parameters, such as labour participation, health status, migration, marital status, literacy rate, and per capita income and so on. Data was collected by a pilot Survey conducted this year. Sample size estimation using $n = \frac{Z^2}{d^2} pq$, were 386 questionnaires was administered to various wards and sampling technique used was convenient sampling. The study employed using logistic regression, all parameters are tested to be significant at p -value < 0.05 , the results suggested that marital status, literacy rate, poverty rate and per capita income were significant determinant among the household labour participation, and the study recommends that, discriminate policies be encouraged when designing measures to improve labour participation.

Key Words: labour participation, household structure, logistic regression, Maigatari.

1. INTRODUCTION

In Nigeria, there has been a noticeable decrease in the labour participation in economic market than it has ever been before. Until the early 1970s, studies of the labor force have concentrated on the developed countries. Also, most of these studies emphasized the determinants of the size of the labor force and the patterns of labor force participation placing emphasis on the personal, gender, household and labor market characteristics, and some relevant demographic factors such as fertility, urbanization and migration. While the studies of the labor force carried out in the developing countries varied considerably in terms of their explanatory and labor force variables as well as in the statistical techniques adopted, they provide a rational framework for further analytical works on the labor force.

In the developed industrialized countries, increasing female labour force participation has been linked to the structure of the population. Lawanson (2008) argues that women constitute more or less half of any country's population. However, he opined that in most countries, women contribute much less than men towards the value of recorded production both quantitatively in labour force participation and qualitatively in educational achievement and skilled manpower.

The Nigerian situation shows that between 1971 and 2004, the rate of increase of female participation rose from 12% to 70% of the work force due to women's participation in further and higher education (Women and Work Commission, 2005).

The National Bureau of Statistics publications (2010) showed that despite the great improvement over the years very few women relative to men secure jobs. Out of these few, a sizeable number of them are temporarily employed. The female Labour participation rate (% of female population ages 15 and above) in Nigeria was 38.90 in 2008, 39.20 in 2009, (World Bank, 2010). These figures show that, though there has been great improvement yet much

still needs to be done. The Federal Civil Service in Nigeria is regarded as the government employed staff in Nigeria and this is being used as a proxy to depict the employment situation in the country. The analysis also indicates that the number of males employed far outweighs the number of females during the period under investigation. Several policies have been formulated to further increase female participation in the labour market with the most predominant being the Millennium Development Goals, Hence the need for empirically informed policy formulation. Oladejo et al (2011) also noted that several factors, both economic and non-economic are responsible for low female participation. Traditionally, women are regarded as homemakers, who oversee and coordinate the affairs and activities at home. (Oladejo et al 2011) explained that previously in Africa, women worked at home while their husbands and sons went out to the farm to work. This is generally induced by the cultural, religious and traditional beliefs of most developing countries. This is evident in Chaudhry & Nosheen (2009) who conclude that women empowerment is considerably influenced by the socio-cultural norms of the community, job of women and household participation rate.

2. THEORETICAL AND EMPIRICAL WORKS ON HOUSEHOLD LABOUR FORCE PARTICIPATION

The theoretical outlook on labor force participation reflects how an individual makes choice among alternative uses of his/her time. On theoretical grounds, an increase in the individual's wage rate could lead to the income effect, which is negative, i.e., the increase in income leads to a demand for more leisure and consequent reduction in time allocated to work. In utilizing this models in the explication of labor force participation in a developing economy like that of Nigeria, there are issues calling for attention. First of all, there is a tenuous link between the labor force concepts and the labor force variables often used in empirical studies.

To view socio-economic behavior like that of labor force participation as an individual decision making process is one approach. For example, in a household, the school enrolment of children will directly affect employment of mother and vice-versa. If the mother is employed and contributes to household income, it is likely that the household can afford to send the children to school. Conversely, if the children attend school, it is more likely that the mother works because school enrolment will reduce child employment and increase the household income needs (Peek, 1978).

Attempts have been made to find measurable variables to reflect the determinants of labor force participation by looking at a combination of personal characteristics such as, age, marital status, education, presence of children, household size, wage/income, migration status, health etc., and household characteristics such as relationship to head, husband's occupation, husband's income, husband's employment status-for married women; and the labor market macro-variables such as, the level of unemployment, level of urbanization, type of employment, agricultural employment, proportion of children enrolled in school (Standing and Sheehan eds., 1978; Magidu 2010).

The methodology of study relies on the use of logistic regression model towards the estimation of the labor supply functions on household labor force participation. The estimation results show that own as well as husband's education at all levels positively influences labor participation in different degrees in wage-, self-, and total employment in Maigatari.

In the present study, an attempt is made to explore the relative importance of the household structure in the determination of labor force participation in Nigeria.

3. THE CONCEPTUAL FRAMEWORK / MODEL FOR THE STUDY

The general conceptual framework adopted in this study is that the labor force status of each

member of the household is a part of a large set of decisions where the individual's decision either to work or seek work is influenced by a combination of individual attributes, some of which, like educational attainment, literacy, health etc., are acquired with household resources; labor market variables like the region of residence or region of origin which reflect the relative abundance of formal employment opportunities, and their household structure. The import of the household structure like household size, relationship of each member of the household to the Head of the household, and whether the individual belongs to either a male or female-headed household is how the individual's disposition to work or seek work could be depressed or enhanced by other important influences coming from his or her primary family unit. It is hypothesized that the individual's disposition to work or seek work could be depressed or enhanced by a host of factors in the household or family unit such as pressure to meet a lot of financial obligations to other members of the household or to combine work in the market place with household work or to cover the financial obligations created by ill-health or the temporary loss of gainful employment by other "bread-winners" in the household.

ANALYTICAL FRAMEWORK

This study uses the logic function in its analytical tool and was based on a binary random variable. For instance, let's say Y has a Bernoulli distribution and could be related as stated below;

$$Y \sim B(1, \pi(x))$$

That is, the variable Y takes either the value 1 or the value 0 with probabilities $\pi(x)$ or $1 - \pi(x)$ respectively. $X \in \mathbb{R}^p$ is a vector of p exogenous variables and $\pi: \mathbb{R}^p \rightarrow [0,1]$ a real-valued function. In fact, $\pi(x)$ represents the conditional probability $P(Y = 1/x)$ of $Y=1$, given x .

Let $r = Y - \pi(x)$, which allows us to rewrite our model as

$$Y = \pi(x) + r$$

where r has an expectation of

$$E(r) = E(Y - \pi(x)) = E(Y) - \pi(x) = \pi(x) - \pi(x) = 0$$

and a variance of

$$var(r) = var(Y) = \pi(x)(1 - \pi(x))$$

For the forthcoming analysis we are going to define the so-called logistic transformation designated as;

$$l(z) = \frac{\exp(z)}{1 + \exp(z)} = \frac{1}{1 + \exp(z) - z}$$

which allows us to specify the probability function π as

$$\pi(x) = L(x^T \beta)$$

with a vector $\beta \in \mathbb{R}$ of unknown parameters. This specification yields the logistic regression model with parameter β .

If we denote the inverse function of L , referred to as the logit transformation, by

$$logit\pi = \ln\left(\frac{1}{1 - \pi}\right)$$

The model is therefore further specified below;

4. MODEL SPECIFICATION

Since a household is either participating in the different labour force or not, labour force participation is a yes or no decision. Hence the response variable, can take only two values; 1, if the household is in the labour force and 0 if he/she is not (Guajati, 2009).

Following Afaredi et al (2011) the study will employ the logit model in this study.

The log it model equation takes the following form:

$$FLF = X_i \beta + u_i, \forall_i = 1 \dots n,$$

Where FLF represents the female household force participation, X is a vector of explanatory variables given as follows: ageyrs1 for age of respondent above 18 years old, marstat for marital status, religion, hhsz for Household size, pov for Poverty rate, lit for Literacy rate, pcexp for Per capital expenditure, and lowage for Lowest wage willing to start up work with, while β is a vector of parameters or coefficients to be estimated and μ is the error term.

Model 1: Logistic regression to ascertain house hold participation in Maigatari

$$\text{Logit}(y_t) = \ln \frac{\lambda}{1 - \lambda} = \beta_0 + \beta_1 \text{ageyrs1} + \beta_2 \text{marstat} + \beta_3 \text{religion} + \beta_4 \text{hhsz} + \beta_5 \text{pov} + \beta_6 \text{lit} + \beta_7 \text{pcexp} + \beta_8 \text{lowage} + \varepsilon$$

The data for the analysis was the household survey of age/sex structure and labour participation maigatari 2016. The data contains 389 observations from jigawa states, enumeration was only done on selected wards.

5. RESULT AND INTERPRETATION

The log it regression result that is aimed at examining the determinants of household labour participation in the rural sector is presented below;

Logistic regression Number of obs = 389

LR $\chi^2(9) = 45.53$ Prob > $\chi^2 = 0.0000$

Log likelihood = -35.044563 Pseudo $R^2 = 0.3938$

Table 1: logic regression for households participation

House hold participant	Coef.	Std. Err.	Z	P> z
Age>18	-.0127553	0.215002	-0.59	0.553
Marital status	.5660326	.1872876	3.02*	0.003
Gender	29.47918	8.06343	3.01	0.001
Religion	-3.020461	1.190427	-2.54*	0.011
House hold size	-.6809934	.687956	0.99	0.322
Poverty rate	2.177998	1.00529	2.17*	0.030
Literacy rate	-1.036897	1.145607	-0.91	0.364
Per-capita exp.	-3.482486	1.145607	-3.04*	0.002
Lower wage willing to start up	.0155558	0.2045547	0.88	0.939
Cons	30.47918	10.06343	3.03	0.002

*Coefficients with * denote significance at 95% confidence interval.*

Prob > χ^2 gives the probability that the null hypothesis is true and as we can see, Prob > $\chi^2 = 0.0000$ shows that we should reject the null hypothesis as there is no statistical probability that the null hypothesis occurred. Hence the model is statistically significant.

From the coefficients we see that age coefficient is negative with the value -.0127553. This means that for a one-unit increase in age, we expect a 0.0127553 decrease in the log-odds of the house hold participation in urban areas holding all other independent variables constant. In other words, the exponential of 0.0127553 ($e^{0.0127553} = 1.012836996$) gives us the odds ratio of house hold labour participation with respect to age, that is a unit increase in age decreases the odds or probability that a house hold would participate by about 1.013. This suggests that the older a head household who lives in the urban area is, the less likely is he/she to participate in the labour force and the households labour force is likely to increase with the younger generation. We note however that the age coefficient is not significant with

a z-value of -0.59. Also gender is significant with p-value of 0.001. This could be attributed to the fact that household could work at whatever age in rural areas and therefore would not play a significant role in determining whether women work, rather other factors could be able to determine this such as marital status. Marital status has a strong positive effect in determining whether women in rural areas decision to take up paid jobs. Marital status a coefficient of 0.5660326 that suggest that a unit increase in every woman that gets married increases the probability that she takes up paid jobs by about 1.76 ($e^{0.5660326}$). This is very surprising as we expect that due to the cultural beliefs in Africa which is stronger in the villages, marriage should prevent women from taking up paid jobs as the case maybe.

However we understood equally that these rural sectors are characterized by relatively poor families that the men may not have a choice than to let their spouses take up paid jobs in order to increase the total household income to meet the challenges of this new age.

Religion also appears to be one of the significant determinants of household labour participation as portrayed by our findings, though it suggests a negative relationship. The results show that a unit increase in house hold becoming Muslims or traditionalists reduces the probability that a house hold would take up paid jobs by 20.5 ($e^{3.020461} = 20.50074035$). This also implies that regions with more Muslims and traditionalists would have a lower probability for house hold to participate in the labour force which is expected as these religious groups give priority to men than women in most aspects of life.

Equally surprising is the fact that household size is not significant given the p-value of 0.322 which is higher than 0.05 considering a two-tailed test at 5% level of significance. Therefore a unit increase in household size reduces rural house hold labour participation with the log-odds ratio of -0.6809934, or the odds or probability of 1.976 ($= e^{-0.6809934}$). The negative relationship between household size and household labour participation is however expected, given that the higher the household.

Nevertheless, the household size coefficient is insignificant and could be attributed to the fact that rural areas tend to practice child labour such that even very young children participate in paid jobs and thereby reducing the number of people dependent on the head of household assistance.

The poverty rate has a significant positive impact on household labour participation. The higher the poverty rate the higher the probability that a man/woman would take up paid jobs. In fact our results suggest that for a unit increase in poverty level the probability that a rural household would participate in active labour force increases by about 8.829 ($e^{2.177998}$). This is expected a priori based on the fact that the poorer one is, the more he is compelled to take up paid jobs, and in fact it becomes more a matter of obligation than choice. However what is most surprising is that literacy rate has an insignificant impact on household labour participation. Our results show that a unit increase in literacy rate decreases the probability that a household would participate in labour force by about 2.82. This could only be explained by the fact that most people may not really work according to their educational qualifications due to the scarcity of available jobs, and on the other hand some of the jobs do not even necessary need educational qualifications, so at the end of the day it is no longer a question of being educated or not but other factors could contribute to female labour participation as we have discussed. Per-capita expenditure was seen as a very strong determined of household labour participation in rural areas with a z-value of $|-3.04| > 2$ and a low p-value of 0.002. However what was surprising about this is that it had a negative relationship with household labour participation. The results show that a unit increase in per-capita expenditure would reduce the probability that a household participates by the probability of 32.5 ($e^{-3.482486}$). While the lowest wage they were willing to start up paid jobs with, was not significant according to the findings. A unit increase in the amount of wage willing to start up paid jobs with increases the probability that a household would

participate by 1.0157 (e.0155558).

So wage willing to start up paid jobs and household labour participation have a positive direction though it's not a significant determine in Maigatari.

The expected value of the log-odds of household participation in Maigatari when all of the predictor variables equal zero is 30.47918, with a very strong significant level. On a general note we therefore state that the significant determinants of household labour participation in rural areas at 5% level of significance are; marital status, religion, poverty rate and per capita income, as has been discussed above.

6. SUMMARY AND CONCLUDING REMARKS

The relevance of this study cannot be overemphasized. Marital status is significant in Maigatari and has a direct relationship with household labour participation. This maybe associated to the fact that Maigatari families have awoken to the reality of combining efforts to cover household expenditure and children upkeep, which is therefore encouraging and means that sensitization could also be improved on the unmarried females to take up paid jobs and not only wait for marriage to start work. However the residents in Maigatari should keep up improving on their educational and professional qualifications as they grow old. This can be done through setting up institutions that could offer such qualifications that may adapt to their household-duty schedule, so as to induce them to improve on their qualifications even as they grow old.

Religion appears to have a negative significant effect on household labour participation which suggests that some religious cultures seriously restrict some women into participating in gainful employment. This is very important when we consider the government's objective to improve household participation in labour force. Policy instrumentalists should therefore find a way of sorting out these religions that negatively influence participation, to sensitize them and expose them to the benefits of women participating in gainful employment amongst their negative ones. On the other hand the fact that religion is not significant only shows that these residents have been able to look at the relevance of a household participating in household labour beyond the religion which further strengthens our recommendation on the exposure and sensitization of rural residents to participate. However based on the dummy regressor for religion, the significance was from the Muslim religion which is not very surprising following their underlying principles for a female Muslim faithful.

On the other hand per-capita expenditure is significant in as most people are not rich and not motivated to work not only for the income, but for other factors like health, growth and development. In rural and urban areas the lowest wage an individual is willing to work is not significant, which suggest that there are many other factors that determine if a household would participate in the labour force but her choice of "starting income" is not a determinant factor.

In conclusion, we noted that the finding of this study are very enriching and contributes to knowledge significantly. The Nigerian government has as major objective to improve on participation nationally and primarily this impact must be felt in the labour market. The Nigerian government has done a lot over the years to improve household labour participation but a lot more need to be done. The determinants of household labour participation in the rural sector is mainly marital status, religion, poverty rate and per capita income are significant determinants in the rural sector.

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