DETERMINANTS OF PARTICIPATION AND EARNINGS IN WAGE EMPLOYMENT IN NIGERIA[1]

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Abstract

The study investigates the determinants of participation and earnings in wage employment in Nigeria. To achieve the objective of the study, three models are estimated for male and female employees across the four wage employment segments considered in the study. These models are probit model, multinomial logit model and Mincerian human capital model. The results of the estimated probit model show that the key determinants of participation of an employable household member (male or female) in wage employment are levels of education attained. Other factors are possession of assets like own-homes, living in free accommodation and residing in urban areas. The estimated multinomial logit models reveal that the factors that influence the probability of participation of males and females in the various segments of wage employment vary overtime perhaps due to the changing government labour policy and the dynamics that characterise the economic environment. It is interesting to note that the levels of education attained by labour suppliers stand out as key determinants of participation across the various segments of wage employment in recent times. The main determinants of hourly wage are the levels of education attained, experience and the location of residence of the employees. The returns to education and experience differ for males and females and they equally vary across the four segments of wage employment adopted for the study. The study also finds some traces of gender wage gap across wage employment segments.

1. Introduction

Nigeria's labour market has been described as a composite one, which contains a multitude of labour markets. This characteristic feature of the nation's labour market is said to reflect the "institutional market" model wherein the policies of unions, employers and government are substituted for the traditional action of the market forces as the significant factors in wage movements (see Okoroafor, 1990:59). The nation's labour market has equally been characterised as being market-specific (by region), highly immobile and political, and these features have been argued to make the market suffer some disequilibrium.[2] Labour market in Nigeria like in any other developing country is dualistic in nature as it is composed of formal and informal sectors. The formal sector is made up of wage employment in the public and private sectors while the informal sector is composed of rural and urban informal and intermediate sector.

It is on record that Nigeria's labour market has been undergoing some significant developments since the commencement of economic reform programme in the late 1980s. Prominent among these developments are the large scale retrenchment of public sector workers and the growing importance of private sector as an alternative employment choice for the retrenched workers. Private labour market is composed of different segments such as wage and self-employment segments. All these

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[2] See Okigbo (1991).

segments together with public sector wage employment have been argued to differ with regard to the factors determining participation/entry and earnings.[3]

While there have been numerous studies on the determinants of participation/entry and earnings in wage employment choice in the private and public sectors in the developing countries especially in Africa,[4] there appear to be few studies focusing on the determinants of entry/earnings with respect to wage employment in Nigeria. The only published studies on Nigeria are those of Bennel (1983), Okuwa (2004), Aromolaran (2004, 2006), and Aminu (2007a).[5] All these studies except Bennel (1983) employ human capital model to achieve their various objectives. Bennel (1983) specifically focuses on earnings differentials between public and private sectors in Ghana, Kenya and Nigeria. The approach used by Bennel, which is comparison of average earnings/wages between sectors, has, however, been faulted by van der Gaag, Stelcner and Vijverberg (1989) for not being rooted in human capital theory/model, which in the last three decades, remains the basic approach for addressing issues of determinants of earnings and earnings differential in the public and private sectors.

Okuwa (2004) examines private returns to higher education along gender and sector of employment (public and private) lines in Nigeria. The study never considers the issue of labour force participation while it employs the Mincerian human capital model to achieve its objectives. It finds that private rate of returns was lower for graduates of colleges of education while it was higher for polytechnic graduates and higher still for university graduates.[6] The studies undertaken by Aromolaran (2006, 2004) for Nigeria find that wage returns associated with an additional year of post-secondary education were higher than those attached to an additional year of either primary or secondary education.[7]

Aminu (2007a) investigates whether the public sector workers were still underpaid after they had enjoyed two upward reviews in their pay during the period that stretched from September 1998 to May 2000. It was only a sample of urban male employees that was used in the study. The study also touches on labour force participation, which it explains with respect to five employment options. The employment options considered are public sector wage employment, formal private sector wage employment, self-employment, producer cooperative, and employer of labour.[8] The study

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[3] See Glick and Sahn (1997:793) among others.

[4] See Okurut, SSwanyana and Adebua (2006), Kabubo-Mariara (2003) and Glick and Sahn (1997) among others.

[5] The other related study is that of Aminu (2007b), which was a final report submitted to the African Economic Research Consortium (AERC). The study investigates public-private wage differential before and after public sector wage review in September 1998. It also explains labour force participation along employment options considered in Aminu (2007a). The study finds that public sector workers were better remunerated than their private sector counterparts after the wage review.

[6] The study obtains returns to an additional year of secondary education that ranged from 0.5 percent (for males) to 3.5 percent (for females). On the other hand, it finds that the returns to schooling at the university level were 16.3 percent for males and 10.7 percent for females. At sector of employment level, the study finds that returns to university education were 16.8 percent in the private sector while the returns were 12.6 percent in the public sector.

[7] The study finds returns to post-secondary education that ranged from 10.4 to 12.2 percent for wage employment while the returns (to post-secondary education) hovered between 13.7 and 15.4 percent for self-employment.

[8] The employment options considered in the study are thus for household members that supply labour and demand for labour services.

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finds that public sector workers were no longer underpaid and it in fact finds that the workers were enjoying a pay advantage of 68.4 percent. While Okuwa (2004) uses a data set that emanated from Nigeria's Labour Force Survey conducted in 1995, Aromolaran (2006, 2004) utilize household survey data that were collected during the period from 1996/97 to 1998/99. Aminu (2007a) uses Child Labour Survey data that were collected in December 2000.

All these studies on wage employment in Nigeria are now stale in the light of recent developments especially with respect to the retrenchment in the public sector and the growing importance of private sector as provider of jobs for the retrenched public sector workers. There is thus a lack of recent studies to shed light on what implications the determinants of labour force participation and earnings in the nation's labour market segments have for the public sector downsizing programme and this may affect the realisation of the goals, which the programme is to achieve.

Existing studies on the determinants of participation/entry and earnings in wage employment in Nigeria have consistently aggregated wage employment activities into two sectors, namely: public and private sector wage employment. When one considers the fact that each of the two wage employment sectors contains segments that are not homogenous and employment segments have been argued in the literature to differ with regard to determinants of participation/entry and earnings, it then follows that existing studies have only produced results that may not be regarded as in-depth explanations of the workings of the segments of each of the aggregate wage employment sectors in Nigeria. Hence, existing studies have only given a sort of incomplete picture of the workings of the nation's wage employment.

The fact that some tracer studies[9] of retrenched public sector workers suggest that the alternative employment opportunity for the rank and file is found mainly in the informal sector means that any consideration of determinants of labour force participation in the private sector will not be complete if no attempt is made to analyse the determinants for each segment of the private sector labour market. If one cannot dismiss, with a wave of the hand, the possibility that some of the already retrenched and yet to be retrenched public sector workers (in Nigeria) may seek wage employment (which can be formal or informal) in the private sector,[10] it then becomes imperative for one to know what can constitute obstacles by way of determinants of labour force participation in the various segments of the private sector wage employment. To the best of my knowledge, there appears to be no study that has met this vital need for Nigeria.

It is against this background of recent developments in the nation's labour market[11] and the need to present a complete picture of the workings of wage employment especially with respect to the determinants of participation and of earnings in the various segments of wage employment that this study is undertaken. The basic objectives of the study are three. The first is the investigation of the determinants of participation in wage employment. The second is to provide explanation for the

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[9] See Rama and MacIsaac (1999) and Alderman, Canagarajah and Younger (1996) among others.

[10] This may derive from the fact that the workers might have got used to wage employment overtime while in the public sector and would like to be continuously engaged as wage workers in the private sector.

[11] The recent developments in Nigeria's labour market are the public sector retrenchment and the growing importance of private sector labour market as a provider of jobs for the retrenched public sector workers.

participation in the various segments of wage employment. The third is the investigation of the determinants of earnings in wage employment in Nigeria. Wage employment in Nigeria is more often than not split into public and private sector wage employment. However, each of these components of wage employment is made up of several segments. Based on the General Household Survey of Nigeria, wage employment in the private sector can be in incorporated entities (companies and related organisations like non-governmental organisations) and informal sector organisations while wage employment in the public sector can be in government companies, parastatals and ministries. It, therefore, follows that an employable household member seeking to supply labour may be employed in any of these segments of wage employment. Given the freedom of choice, he/she may as well choose not to participate in any of the segments.

The rest of the study is structured as follows. Section 2 reviews the Nigerian labour market. Also reviewed in Section 2 is one of the major developments in recent times in the labour market and this has to do with the public sector downsizing programme. A critical review of some related studies is carried out in Section 3. An attempt is also made to point out the gaps in existing studies that relate to Nigeria in Section 3 and this exercise provides in part the background and some justification for the study. The methodology together with the data is explained in Section 4. Results of estimated models are contained in Section 5. The last Section summarises the findings and also concludes.

2. A Review of the Nigerian Labour Market

The nation's labour market has been described by various authors in a number of different ways but the description that seems arguably the most encompassing is the one provided by Okoroafor (1990:59). According to Okoroafor, the nation's labour market is a composite one as it is a multitude of labour markets, which to all intents and purposes, reflects the "institutional market" model wherein the policies of unions, employers and government are substituted for the traditional action of the market forces as the significant factor in wage movements. The nation's labour market has equally been characterised as being market-specific (by region), highly immobile and political, and these features have made the market to suffer some sort of artificial perpetual disequilibrium (Okigbo, 1991).

While Okoroafor (1990:62) observes that Nigerian women participation in wage employment has been low just as their participation in employment in general, it is interesting to know that the nation's educational policy never discriminates on the basis of gender or region/state and neither does it discriminate on ethnic ground or any other criterion for that matter. In the late 1990s, employed labour (in Nigeria) was made up of 62 percent male and 38 percent female (Aminu, 2007b).

One particular feature of the Nigerian labour market is the small percentage of its labour force that is wage labour.[12] This may be blamed on the fact that wage employment in the country is a little over a century. The majority of the labour force is found in self-employed segment of the labour market. The self-employed segment is made up of people employed in the service industry,

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[12] Wage labour hovered around 10 percent during the period 1998/99. This percentage was calculated from the General Household Survey conducted by the National Bureau of Statistics from April 1998 to March 1999 (see Aminu, 2007b).

distribution and primary industry like farming. To obtain an accurate size of the nation's labour force has not been easy owing to factors that border on conceptual and definitional problems and difficulties in data collection (Fapounda, 1979; and Okoroafor, 1990).

The nation's labour market also has a dualistic characteristic, which makes the labour market to be recognized as being composed of formal and informal sectors. In the formal sector (made up of wage employment in both the private and public sector), the subsisting wage levels are influenced by the administrative decisions of Federal Government Wage Commissions, and Prices and Incomes Policy. The informal sector made up of rural and urban informal and intermediate sector has its wages dictated to a very large extent by the phenomena of market forces and to a limited extent by wage structures in the government and formal private sector organisations.

The influence of Wage Commissions on formal sector wages is through the instrumentality of their recommendations. The history of Wage Commissions in Nigeria dates back to 1941 when Bridges Committee of Inquiry was set up. As at 2008, thirteen of such Commissions have been set-up with varying terms of reference and recommendations, which in most cases have sought increases in workers' take-home pay.[13]

Since the onset of the economic problems in the early 1980s, the nation's labour market has had to grapple with the problems of unemployment, public sector retrenchment, low employment generation capacity of the nation's industrial sector, government contradictory policies, rural-urban migration and a sort of mismatch between manpower requirement and supply. A litany of macro and sectoral policies has been implemented to contain especially the problem of unemployment. Prominent among these policies are Foreign Technical Aid Scheme, Back to Land Programme, Small and Medium Enterprises' (SME) Loan Scheme, National Directorate of Employment (NDE), and National Poverty Eradication Programme (NAPEP).

One fundamental development in the nation's labour market in recent times has been the public sector downsizing programme. The Federal Government of Nigeria started contemplating a sort of drastic reduction of its workforce in 2001 to make public sector leaner and more effective in service delivery. The reduction in the public sector workforce at the federal level has not been easy to implement either due to its fiscal implications or the socio-political problems that such a program can wreak on the country. In order to drum up support for the policy, a number of frightening projections were made to underline the need to reduce the federal workforce. A case in point was the projection that constituted the fulcrum of the alarm raised by a team of Federal Government technocrats in January 2003. The alarm bordered, in the main, on the urgent need to prune government personnel costs, with a stern warning that a failure to do so may result in government spending 95 percent of her earnings on personnel by 2007.[14]

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[13] A listing of these Commissions/Committees together with their recommendations is contained in Aminu (2007a, 2007b).

[14] The alarm was credited to a team of federal technocrats headed by the then Finance Ministry's Permanent Secretary (see the front page of *The Guardian,* January 17, 2003). It is, however, interesting to note that the frightening projection/prophecy did not come to pass due mainly to the enormous revenue realised by the government from the unforeseen increases in oil export prices. About 82.4 percent of government revenue in Nigeria was accounted for by oil-related revenue (over a 5-year period) in the most recent times (see Central Bank (2006:96)).

The campaign for the reduction in federal workforce has been conducted under a newly christened policy of public sector downsizing and this policy has been effectively implemented in a few Federal Ministries and parastatals, which are being used as a testing ground. These Ministries and parastatals are Ministries of Finance and Federal Capital Territory and National Planning Commission's parastatals.[15] The loss of job occasioned by this policy in the chosen Ministries and parastatals has been enormous and the story of its aftermath is better told by those who are yet to recover from the shock of loss of job and the fear of getting another job in an era of scarce vacancies in the formal labour market.

The policy of public sector downsizing requires that before the end of 2005, about 3,170 were to be retrenched from the Federal Civil Service.[16] They were part of the 30,056 federal employees initially slated for retrenchment. To effectively implement the downsizing policy, at least ₦60 billion was needed and 2006 fiscal year was chosen as the second year for the implementation of the policy.[17] In recent times, the Minister of Finance revealed that about ₦50 billion would be needed to clear the outstanding severance benefits for 96,318 workers among whom were 45,312 workers from the core ministries and 38,000 workers from 193 parastatals and agencies.[18] From the foregoing, it is obvious that the amount required to finance the downsizing programme is as enormous as the pains inflicted on disengaged workers that are yet to receive their severance benefits. While a large number of federal employees together with some State Government employees[19] have been shown the way out of the civil service, many more are to follow in the next few years as the public sector reform is an on-going project of the two tiers of government in Nigeria.

Given the criteria for the mass retrenchment in the nation's public sector, there is no doubt that the exercise must have affected and will still affect, to a large extent, employees at the lower rungs of the ladder and those with little or no requisite education to enter any other segment of the formal labour market in some meaningful way.[20] The public sector downsizing policy is part of an over-all

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[15] In these Ministries, and National Planning Commission's parastatals, a large number of employees have lost their job and a number of units have been rationalized and merged. In the case of National Planning Commission, at least three of its parastatals (National Data Bank, National Manpower Board and National Centre for Economic Management and Administration) have been scrapped/merged with existing ones with similar/complementary mandates.

[16] This category was made up of those with medical problems, those with unsatisfactory character and those who had opted out of the public service voluntarily (See *The Guardian,* September 4, 2005. pp.1-4.)

[17] The money was to be used to pay terminal benefits, pension, 10 percent of one year's pension and repatriation allowance- to enable the disengaged officer to transport himself and his family to his hometown. Again, 5 percent of the money was to finance pre-exit training. See *The Guardian,* September 4, 2005. pp.1-4.

[18] See *The Nation* (daily newspaper) issue of December 14, 2007 page 52, wherein the Minister of Finance made the revelation while testifying at a meeting convened by the Senate Committee on Federal Character and Inter-Governmental Affairs and Relevant Government Organs.

[19] Among the States that retrenched workers in the last 6 to 7 years are Lagos, Edo, Kwara and Oshun States. There are 36 States in Nigeria. The Federal Capital Territory in Abuja (which functions, to a large extent, like a State Government) has also had to retrench a large number of its workers in the recent past. Other States are contemplating similar retrenchment programme as an integral aspect of their economic blueprint called State Economic Empowerment and Development Strategy (SEEDS), which is the State's version of the Federal Government's NEEDS.

[20] The employees to be affected by the retrenchment are: (1)those whose functions have been monetized, out-sourced, abolished (2) those without entry qualifications for the positions they occupy (3) those who have failed promotion

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socio-economic reform programme called *National Economic Empowerment and Development Strategy* (NEEDS) implemented across levels of government but has now been incorporated into the recently launched Seven-Point Agenda of the Federal Government. NEEDS assigns some sort of pivotal role to the private sector as the engine of economic growth and, by extension, the chief provider of employment for millions of Nigerians.

3. A Review of Related Studies

A review of the literature reveals that a large number of studies have been conducted on the public and private wage employment choices in developing countries while African countries cannot be said to have had enough when placed side by side with other countries.[21] Among the studies that have been conducted for African countries are Okuwa (2004), Aromolaran (2004, 2006), and Aminu (2007a, 2007b) for Nigeria, Kabubo-Mariara (2003) for Kenya, Okurut, SSwanyana and Adebua (2006) for Uganda, Glick and Sahn (1997) for Guinea, Al-Samarrai and Reilly (2005) for Tanzania, Skyt-Neeilsen and Rosholm (2001) for Zambia, Glewwe (1990) for Ghana, Appleton, Collier and Horsnell (1990) for Cote d'Ivoire, and van der Gaag, Stelcner and Vijverberg (1989) for Cote d'Ivoire and Peru. One key aspect of these studies has been the focus on wage employment in the public and private sectors of the labour market. The focus has been pursued by treating the various segments that make up, say, wage employment in the private sector, as homogenous. It has been argued in the literature that the factors influencing labour force participation and earnings in the various labour market segments (be they in private or public sector) are at variance.[22]

Since wage employment studies on African countries have failed to take the differences in the various segments of each aggregate labour market sector into consideration in explaining the central factors in labour force participation and earnings in wage employment, such studies must have provided an incomplete picture about the workings of the labour market they purport to explain in the first instance.[23] Existing studies may thus not be relied upon for policy guidance on account of this deficiency. There is, therefore, a gap in wage employment studies in Africa.

Most wage employment studies have relied on just one cross section data set while others have employed more than one cross section data set to explain determinants of participation and earnings in the public and private sectors. Given the fact labour market in any country is never stagnant but is ever changing in response to changes that take place in the economy, it therefore follows that existing wage employment studies that are based on stale data sets may not be relied upon for policy guidance as labour market undergoes changes with the overall economy. One can then conclude that existing wage employment studies on African countries (including Nigeria) are deficient (on policy

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examinations three times (4) those with disciplinary cases (5) redundancies. See *The Guardian,* September 4, 2005 pp.1-4.

[21] See Aminu (2007a, 2007b) for a listing of some of the studies on developing countries (including African countries).
[22] See Glick and Sahn (1997).
[23] The studies undertaken by Bales and Rama (2001) and Filmer and Lindauer (2001) allude to the need to consider the fact that private sector wage employment is made up of different segments. They stress the danger inherent in ignoring this when analyzing pay differential between public and private sector. Their studies make a case for appropriate comparison (public and private wage profile/employment opportunities) and the need to take the subsisting labour market conditions in individual countries into consideration when analyzing public-private wage differential.

relevance) to the extent of how stale their data sets are. The fact that virtually all the latest wage employment studies on Nigeria employ data sets that were collected as far back 1998/99 survey period, makes the studies to fall short of being relied upon to offer any policy guidance on recent developments in the nation's labour market.

It is these identified gaps in the literature that this study is addressing by considering, in the first instance, the factors determining participation and earnings in the various segments that constitute wage employment in both the private and public sectors of Nigeria's labour market. In the second instance, the study is employing, among others, the latest data sets on Nigerian households. The latest data sets were collected in 2007/08 household survey year besides the ones for 1998/1999 household survey exercise. The use of the latest data sets will ensure that the expected results portray the workings of the nation's labour market and such results can be relied on for policy guidance. An interesting comparative analysis of the results from the latest survey data with those from the earlier survey can be undertaken, and this can go a long way in revealing the impact of the public sector downsizing programme on the nation's labour market. This sort of exercise is lacking in previous studies on Nigeria.

4. Methodology
4.1 Models
To achieve the three basic objectives of the study, three models are estimated. The first of these models is probit model, which is meant in this study to test whether the selection of employable household members into wage employment is random or not. In short, the model is specified and then estimated to explain the factors determining whether or not employable household members participate in wage employment arm of the labour market. It is the genre of model used in situations in which the regressand/response variable is a binary or dichotonomous variable. In economics literature, labour force participation decision is expressed as a function of unemployment rate, education, family income/asset, average wage rate and other relevant factors that can influence a household member to participate or not to participate in the labour market (Gujarati, 2006:581).

Probit model has been employed by a large number of studies to explain labour force participation decisions of employable household members. Examples of these studies are Oishi (2002), Sackey (2005) and Watts (2008). Drawing from similar studies, we can specify the relevant probit model for this study as follows.

$$\mathrm{Pr}ob(wage\_employment:1=yes)=\frac{1}{\sqrt{2\pi}}e^{-X_w\beta_w^2/2} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)[24]$$

In this study, X_w is a vector of household-related variables, individual household member variables (demographic) and education variables. β on the other hand represents a set of unknown parameters

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[24] This specification has been employed before in several similar studies (see Kilkenny and Huffman, 2003:920)

to be estimated. The variance of the error term in the model is normalised to 1 while its cut-off point is normalised to zero. The household variables are old female household members, children of various age groups, rural-urban residential status, household assets (own home) and unearned income, which is proxied in this study by free accommodation enjoyed by the entire household members.[25] All these are typical variables used in similar models except the case of old female household members. The basic reason for introducing this variable is that it is a common practice in Nigeria, that whenever a baby is born in a household it is usually the responsibility of the elderly female relative of the couple that comes around to take care of the new-born and this practice helps to relieve the mother of the child care responsibility and she can thus take up any paid employment. The presence of an old female household member enters the model as a dummy and it is expected to positively influence wage employment of female household members in particular.

The possession of household assets and living in free accommodation[26] may negatively affect the decision to enter into wage labour market as either of the two states implies some material acquisition, which can sort of discourage wage employment to earn income to facilitate material acquisition. On the other hand, being resident in an urban area may positively influence participation in wage employment as most wage employment activities are concentrated in urban areas while being resident in rural areas may discourage wage employment given the paucity of such employment or the low remunerations that may characterise the ones that are available.

The presence of children below age 5 is assumed to negatively affect the decision to participate in wage employment as such children require a lot of care, which may only be given effectively by the mother or close relative or house-helps, who most probably must be far older than the children to be able to function as expected. Children older than 4 years of age are assumed to positively influence participation in wage employment as such a cohort of children requires less care than those that are less than 5 years of age. The basic demographic variables considered in the model are household headship, marital status, household size, age and sex of the household member. The first three demographic variables are often deployed in this sort of model to capture responsibility associated with having to cater for a family. Each of the variables is thus assumed to positively influence household members to participate in wage employment.

Being young is likely to positively influence participation in wage employment as the activities involved may require people that possess the requisite agility and unbounded ability to learn and assimilate, the qualities that are in short supply as one approaches the old age. Participation in wage employment is equally expected to become attractive as a household member acquires additional education since its possession facilitates easy entry and smooth progression (with associated increased returns) in wage employment.

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[25] We employ this variable as a proxy due to lack of information on household members' unearned income in the household survey data (General Household Survey of Nigeria) used for the study. We develop a dummy to capture households that are benefiting from free accommodation.

[26] There is a need to strss that in some instances, the possibility of securing free accommodate may in fact facilitate the decision to participate in wage employment that does not yield enough income to enable the labour suppliers pay for an accommodation. These instances are common in the urban areas with shortage or costly accommodation, which may discourage labour suppliers to take up wage employment with small remuneration without any housing subsidy or free accommodation..

The second model is a multinomial logit model, which belongs to the class of discrete choice models.[27] In this study, the model is meant to address labour force participation decisions of employable household members (male and female separately) across the various segments of wage employment relative to non-participation in those segments. In the model, four wage employment segments are identified and these are wage employment in private sector incorporated entities/organisations, wage employment in informal private sector entities/organisations, wage employment in government ministries, and wage employment in government-owned enterprises/parastatals. The base category in the model is made up of those that are not selected into these wage employment choices/segments. The basic reason for proposing this model is that it is suitable for describing more than two choices of employment open to a labour supplier. The multinomial logit model is the one in which the regressors do not vary over alternatives and it has been employed in similar studies like Comola and de Mello (2009) and others.[28]

The specification of a multinomial logit model is based on a random utility model in which an individual i is faced with a number of choices represented by J. Individual i's utility of choice j is expressed as:[29]

$$U_{ij} = x'_{ij}\beta + \varepsilon_{ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

In case the individual makes the choice j, it is then assumed that U_{ij} is the maximum among the J alternatives. The statistical model is then anchored on the probability that the jth choice is considered as implied in equation (3) below.

$$P(U_{ij} > U_{ih}) \text{ for h} \neq \text{j} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

McFadden (1973) shows that if and only if the J disturbances are independent and identically distributed with a Weibull distribution of the following form:

$$F(\varepsilon_{ij}) = \exp(-e^{-\varepsilon}) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

It then follows that

$$P_{ij} = \Pr(Y_i = j \mid J, X) = \frac{\exp(x'_{ij}\beta)}{\sum_{h \in J} \exp(x'_{ih}\beta)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

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[27] A discrete choice model is the one that specifies the probability that a person chooses a particular alternative while expressing the probability as a function of observed variables that relate to the alternatives and the individual concerned (see http://en.wikipedia.org/wiki/Discrete_choice)

[28] Other studies that have utilised the approach include among others, Aminu (2007a, 2007b), Kabubo-Mariara (2003), and Okurut, SSwanyana and Adebua (2006).

[29] The exposition here draws on Dolton (2009).

Equation (5) is referred to as conditional logit model in which the regressors vary over the alternatives for each individual. The numerator on the right hand side of the equation is greater than zero and the probabilities all lie between 0 and 1 and sum over j to one. In case the regressors do not vary over alternatives, the underlying model is called the multinomial logit model.

$$P_{ij} = \frac{\exp(x_i'\beta_j)}{\sum_{h \in J} \exp(x_i'\beta_h)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

As $\sum_{j=1}^{m} P_{ij} = 1$, the restriction that is normally imposed to ensure model identification is that $\beta_1 = 0$. In interpreting the coefficients of estimated multinomial logit model in the case of, say, alternative j, one has to interpret it to mean the relative risk of choosing alternative j rather than alternative 1 whose parameters/coefficients are already normalised to zero. The alternative whose parameters are normalised to zero is called the base category in the multinomial logit model.

In the multinomial logit models, the formal private wage employment[30] choice is assigned 1 for its response variable. The other wage employment choice in the private sector, that is wage employment in informal organisations, assumes the value of 2 for each individual engaged there. Government-owned enterprises/parastatals' wage employment choice is assigned 3. We decide to merge wage employment in government-owned enterprises and in parastatals together due to the fact that their conditions of service are somehow similar at least in the area of remuneration, which, on average, is better than what obtains in government ministries. Government ministries' wage employment choice is assigned 4.

The household and demographic variables are made up of household assets, free accommodation, children age groups (below 2 years, from 2 to 4 years and from 5 to 17 years), age (and age-squared),[31] marital status, household size, household asset holdings (own homes) and rural/urban residency status of the household. Every employable household member is identified with the highest level of education attained. These are typical explanatory variables that feature in similar studies.[32] The model will reveal the relative strength of the explanatory variables in explaining the selection of household members into the four segments of wage employment in relation to non-participation.

The third model is a Mincerian human capital model in which the logarithm of hourly wage/earnings is expressed as a function of only human capital variables (education and

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[30] In Nigeria's General Household Survey's questionnaires, formal private wage employment is provided by organisations that are referred to as private companies or incorporated private organisations.
[31] Age-squared variable is meant to capture the non-linear impact of age on employment choice.
[32] See among others Aminu (2007a, 2007b), Kabubo-Mariara (2003), and Okurut, SSwanyana and Adebua (2006).

experience).[33] The model is based on Mincer (1958, 1974).[34] The education variable is the highest educational attainment of the household member (whose age ranges from 18 to 60 excluding students).[35] The experience variable is taken to be general experience and is calculated as age minus six (pre-school years) minus years of schooling to achieve the highest educational level.[36] Another variable that can be used instead of experience is age, which can feature both at its level and squared form in the model.

In this study, the approach used to address the problem of selectivity bias (sector of employment bias), which sometimes affects the coefficients[37] of the Mincerian earnings equation, is the one that involves the computation of selectivity correction terms from the estimated probabilities of employment for each employee in a wage employment segment. The probabilities are derived from the multinomial logit model. The selectivity correction terms are then included in the earnings equation for each category (male/female) of workers across the labour market segments.[38] The selectivity problem normally occurs when unmeasured characteristics of an employable household member influence both wage and the wage employment segment selection process. This derives from the fact that the determination of participation in a given wage employment segment is not likely to be random. These terms are called the inverse Mill's ratios. To properly identify these terms, we exclude some of the variables that feature in the multinomial logit model (or in the probit model) from the wage equations. The third model, which requires the estimation of a number of Mincerian wage/earnings equations, is meant to address the third objective of the study especially in the area of explaining the determinants of earnings and establishing the sort of returns that characterise education and experience in the various segments of the nation's wage employment.

The empirical Mincerian human capital model for this study is expressed as follows:

$$\log HW = h + \sum_{e} \alpha_e E_e + \delta EX + \varphi EX^2 + \psi UR + \phi \lambda + \xi \text{ ....(7)}$$

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[33] The General Household Survey, which constitutes the data base for the study collects information on income/earnings of labour market participants for the month before the month of Survey. There is information on hours worked per week and on remuneration received monthly and this provides the needed data for the computation of hourly wage (using hours worked last month and the monthly remuneration as Nigerians in both public and private sector organisations are paid monthly).

[34] To the best of my knowledge, this model remains the most suitable model for addressing the third objective of the study.

[35] In Nigeria, the retiring age for a labour supplier in most public and private sector organisations is 60 while any household member that supplies labour at any age below 18 is engaging in child labour activity (see FOS/ILO/SIMPOC, 2001)

[36] The educational attainments in this study are categorized into no education, primary education, secondary education and post-secondary education. The years of schooling assumed for these educational attainments are 0, 6, 12 and 16, respectively.

[37] The coefficients are not consistent when affected by selection problem.

[38] To derive the selectivity correction terms, we follow the Lee's (1983) two-step procedure. The formula for selectivity correction terms is: $\lambda_{ij} = \varphi \ (\Theta^{-1}[P_{ij}])/P_{ij}$. Where φ (.) refers to the standard normal density function while Θ(.) relates to the cumulative distribution function. P_{ij} is the predicted probability of observing individual i in sector j as obtained in the multinomial logit model (which in this study is the estimated multinomial logit model before we obtain the relative risk ratios [exponentiated coefficients of multinomial logit model]).

Where *logHW* is natural logarithm of hourly wage/earnings of the household member while *E* refers to a vector of education variables and they are the various levels of education. The levels of education considered are primary, secondary and post secondary and each of the coefficients attached to these variables is interpreted in relation to the excluded educational level, which is no education. *EX* represents the individual employee's experience and EX^2 is the square of experience. *UR* is urban/rural variable, which describes the location of the employee-household member. λ represents the selectivity correction term (inverse Mill's ratio). The last symbol on the right hand side is error term. The explanatory variables here are usually the ones considered in similar studies (see Glick and Sahn (1997), Bales and Rama (2001), Kabubo-Mariara (2003), Okurut, SSwanyana and Adebua (2006). After estimating the model, efforts will be made to decompose any wage differential that may exist between any pair of wage employment segments. This sort of analysis has featured in a number of similar studies and is often meant to decompose any observed differential in pay into employee's human capital characteristics and returns to those characteristics (see Glick and Sahn (1997), Kabubo-Mariara (2003) and Okurut, SSwanyana and Adebua (2006)).[39]

All these models (probit, multinomial and Mincerian models) are estimated for male and female employable household members whose ages range from 18 to 60 years excluding students for the most recent period (2007/08) and the period before the commencement of public sector downsizing programme in Nigeria. The latter period refers to the period before 2005. It is expected that the study should show the dynamics that might have characterized the factors determining labour force participation and earnings in the various wage employment segments as a result of the downsizing programme while taking account of other developments in the economy that might have also impacted the nation's labour market.

To test whether the four-sector/segment analysis of wage employment with regard to determinants of entry (into the different segments) is justified, Wald tests are conducted on the estimated slope coefficients of the multinomial logit models. These tests involve evaluating the null hypothesis that the estimated coefficients are equal for any pair of wage employment sectors/segments considered in this study.[40]

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[39] The task of decomposing any observed differential in pay is to be accomplished in the final report of this study.

[40] In this study, the Wald tests of equality of estimated coefficients across wage employment segments may be considered as a sort of indirect tests of whether the multinomial logit model adopted is indeed the appropriate model in the light of the assumption of independence of irrelevant alternatives (IIA) that forms the basis of multinomial logit modelling. The IIA means that a person's choice between two alternative outcomes is not affected by what other choices are available. The most common and perhaps the most accessible approach to testing for the violation of IIA assumption that involves the estimation of a restricted choice set has been found to be unsatisfactory (see Cheng and Long, 2007:598). In fact, McFacdden (1973) has earlier advised that both multinomial and conditional logit models should only be deployed in situations where the outcome categories can be assumed to be distinct and weighed independently by the decision maker. In the same vein, Amemiya (1981:1517) equally suggests that multinomial logit framework should be adopted whenever the alternatives faced by the decision maker are dissimilar. Chief among the alternative modelling frameworks that have been suggested in the literature are nested logit, mixed (kernel) logit, paired combinatorial logit and multinomial probit. All these alternative frameworks have been adjudged to be numerically tasking when it comes to estimation (see Schmidheiny, 2007). There is no doubt that the various wage employment

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4.2 The Data

The basic data sets used for the study are derived from the General Household Surveys[41] (GHS) conducted by the National Bureau of Statistics (NBS) in 1998/99 and 2007/08 periods. The survey's design is a two-stage cluster sampling with a total of 120 enumeration areas selected in each state while 60 were selected in the Federal Capital Territory of Abuja. The data set contains employment information on each member of the household and it equally contains information on each household in the areas of residency status, location, and other information that relate to the entire household members as a unit. The GHS 1998/99 data set relates to 8594 households whose members were 37932. The GHS for 2007/08 contains information on 18826 households while the entire household members were 83700. The household membership includes children, adults (employable household members) and the old (non-working). It is only those that are within the working age bracket (18 to 60 years, excluding students) that constitute the focus of the three models estimated in this study.

5. Empirical Analysis[42]

5.1 Descriptive Statistics of Variables used in the Models

We present below the descriptive statistics of variables used in the various models estimated in the study. The statistics and subsequent analyses are based on the Nigeria's GHS surveys of 1998/99 and 2007/08 periods. First, we present the descriptive statistics in respect of the variables that relate to the entire labour force.

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segments assumed in the present study are indeed distinct and above all, dissimilar and so the multinomial logit approach appears to be suitable.

[41] The GHS is a comprehensive survey of Nigerian households. Parts A and B of the GHS contain the relevant information/data for the present study.

[42] *Stata 8* was the econometric package used for all the empirical analyses in this study.

Table 1. Descriptive Statistics of Variables in Respect of the Labour Force

Period:	1998/99		2007/08	
Number Household Members:	**15888**		**33295**	
	Mean	**Std.Dev.**	**Mean**	**Std.Dev.**
Old female member	0.0105	0.0786	0.1256	0.3314
Own Child less than 2 years	0.0137	0.0831	0.2537	0.4351
Other Child less than 2 years	0.0142	0.0827	0.0166	0.1278
Own Child from 2 to 4 years	0.0946	0.2171	0.6436	0.4789
Other Child from 2 to 4 years	0.0921	0.2042	0.0578	0.2335
Child from 5 to 17 years	0.5835	0.3964	0.8808	0.3239
Own Home	0.7363	0.4406	0.3928	0.4883
Free Accommodation	0.0794	0.2703	0.1024	0.3032
Urban_Rural (Urban =1)	0.2406	0.4275	0.2102	0.4075
Age	36.0650	11.1873	36.4138	11.5343
Age Square/100	14.2583	8.5593	14.5900	8.9291
Sex/Gender (Male =1)	0.4675	0.4989	0.4602	0.4984
Marital Status (Married =1)	0.7864	0.4099	0.7901	0.4072
Household Head	0.4364	0.4959	0.4247	0.4943
Household Size	1.9890	1.4868	2.0632	1.5885
Hourly Wage/Pay (1985 prices) in Naira	0.2849	0.9299	0.9538	1.3359
Wage Employment (Wage Employment=1)	0.1132	0.3168	0.0874	0.2825
No Education	0.5828	0.4931	0.5143	0.1587
Primary Education	0.2002	0.4002	0.1971	0.3978
Secondary Education	0.1801	0.3843	0.2139	0.4100
Post Secondary Education	0.0368	0.1883	0.0747	0.2629
Years of Schooling	3.9513	5.1917	4.9438	5.7068

Source: Computations by the author from the General Household Surveys (GHS) of Nigeria for the 1998/99 and 2007/08
periods. GHS is conducted on a regular basis by National Bureau of Statistics, Abuja, Nigeria.

Table 1 shows that in the recent past, at least 51 percent of Nigeria's labour force do not have even the minimum education (primary). This finding is corroborated by the low average years of schooling (which hover between 3.9513 and 4.9438 years) of the labour force. The low average years of schooling are lower than the years of the schooling at the primary education level. Only a few of the labour force (7.47 percent) possessed post secondary education while the majority of those that can be described as educated possessed only secondary education. It is, however, encouraging to note that the percentage of employable Nigerians that possess post secondary education registered some appreciable increase during the 10-year period. The average age of the labour force revolves around 36 years while a larger percentage of them are females. The hourly wage/pay in 1985 prices increased from ₦0.28 in 1998/99 period to ₦0.95 during the 2007/08 period. The standard deviation associated with the latter period's hourly wage/pay is however higher (1.3359) than the one estimated during the former period (0.9299) thereby suggesting a higher degree of income inequality among labour in Nigeria.

The household size is around two. The percentage of the nation's labour force in wage employment was 8.74 percent in the recent past (2007/08 period) after having attained a level of 11.32 percent in the 1998/99 period. This finding sort of suggests that there might have been a palpable decline in

wage employment, which is perhaps due to the public sector downsizing programme. The low percentage of wage employment obtained in this study is close to the estimate (of around 10 percent) found in an earlier study on Nigerian employment data (see Aminu, 2007b).

While it is only 1.05 percent of employable Nigerians that enjoyed the company of old female members (above 60 years of age) in the 1998/99 period, the percentage is as high as 12.56 percent by 2007/08 period. This upward trend in the statistics may be due to the retrenchment in the public service, which in part affected a large number of people who would now be accommodated or taken care of by working household members to whom the retrenched are somehow related. The rest of household variables (except 'other child from 2 to 4 years,' 'household assets' and 'urban_rural') in the Table record some appreciable increases from 1998/99 to 2007/08 period. Of particular interest among household variables that underwent some declines is the urban_rural variable, whose statistics in 2007/08 suggests (when to compared to what obtained during 1997/98) that there might have been some urban-to-rural migration, which perhaps could have been triggered to some extent by the loss of urban wage/formal sector employment provided in the main by the government and the shrinking industrial complexes across the country.

The next Table contains descriptive statistics of variables in respect of employable male and female members of household in the periods before and after the public sector downsizing programme in Nigeria.[43]

Table 2. Descriptive Statistics of Variables used in the Models

	1998/99				2007/08			
	Male		**Female**		**Male**		**Female**	
No. of Employable Household Members:	**7427**		**8461**		**15324**		**17971**	
	Mean	**Std. Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**
Old female member	0.0106	0.0799	0.0104	0.0775	0.1234	0.3289	0.1275	0.3335
Own Child less than 2 years	0.0136	0.0843	0.0139	0.0821	0.2527	0.4346	0.2545	0.4356
Other Child less than 2 years	0.0139	0.0826	0.0144	0.0828	0.0141	0.1179	0.0188	0.1357
Own Child from 2 to 4 years	0.0925	0.2188	0.0964	0.2156	0.6428	0.4792	0.6444	0.4787
Other Child from 2 to 4 years	0.0890	0.2033	0.0949	0.2050	0.0546	0.2272	0.0607	0.2387
Child from 5 to 17 years	0.5583	0.4116	0.6056	0.3812	0.8657	0.3410	0.8938	0.3081
Own Home	0.7230	0.4475	0.7480	0.4342	0.3860	0.4868	0.3986	0.4896
Free Accommodation	0.0781	0.2683	0.0804	0.2721	0.1017	0.3023	0.1031	0.3041
Urban_Rural (Urban =1)	0.2519	0.4341	0.2307	0.4213	0.2161	0.4116	0.2053	0.4039
Age	37.939	11.5171	34.420	10.621	38.202	11.769	34.889	11.106
Age-Squared/100	15.720	8.9699	12.975	7.9643	15.979	9.2775	13.406	8.4427
Marital Status (Married =1)	0.7282	0.4449	0.8375	0.3689	0.7409	0.4382	0.8320	0.3739
Household Head	0.8137	0.3894	0.1052	0.3068	0.8112	0.3913	0.0953	0.2936
Household Size	1.6059	1.5953	2.3253	1.2944	1.5482	1.4025	2.5024	1.6059
Hourly Wage/Pay (1985 prices) in Naira	0.4622	1.2872	0.1293	0.3430	1.4275	1.5670	0.5499	0.9263
No Education	0.5075	0.5000	0.6490	0.4773	0.4328	0.4955	0.5839	0.4929
Primary Education	0.2065	0.4049	0.1947	0.3960	0.2016	0.4012	0.1933	0.3949
Secondary Education	0.2310	0.4215	0.1353	0.3421	0.2616	0.4395	0.1732	0.3784
Post Secondary Education	0.0549	0.2279	0.0209	0.1431	0.1040	0.3052	0.0497	0.2173
Years of Schooling	4.8908	5.5546	3.1266	4.6986	6.0125	5.9495	4.0326	5.3248
Experience	27.049	13.745	25.294	12.230	26.195	14.075	24.863	12.854
Experience-Squared/100	9.2056	7.7891	7.8935	6.8445	8.8426	7.9100	7.8335	7.1405

Source: Computations by the author from the General Household Surveys (GHS) of Nigeria for the 1998/99 and 2007/08
     periods. GHS is conducted on a regular basis by National Bureau of Statistics, Abuja.

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[43] The period before public sector downsizing is assumed to be 1998/99 while the period after is taken to be 2008/09 since the downsizing in recent times had been implemented from 2005 to 2007.

Looking at the sample sizes across the two periods, one discovers that those for the 2007/08 period are almost twice the ones for the 1998/99 period. In spite of this problem of unequal sample sizes across the two periods, a good number of the statistics in the Table reveal some interesting facts about the Nigerian labour market. First, the percentage of males and females (within the working age bracket) living with old female household members ranges from 1.04 percent during 1998/99 period to 12.75 percent in the 2007/08. The sharp increase in the percentage during the period of almost ten years may in part be due to the retrenchment in the nation's public sector and the fast ageing workforce in both the public and private sectors.

It can also be seen in the Table that the percentage of females living with children (from zero to seventeen years of age) is higher than that of males living with the same cohort of household members in the two periods. This should be expected since it is the females that traditionally assume the role of child care and they should, as a matter of course, be the ones that should be found living more with the children. The higher mean values associated with children variables in the 2007/08 period may be accounted for by the corresponding sample sizes.

The Table also shows that the larger percentage (as high as 79.47%) of male and female household members reside in the rural areas (see the mean values for 'urban_rural' variable). While males are older than females by at least three years, it is the latter genre of workers that has the higher percentage of married individuals. On rewards for efforts, it is the males that receive the higher hourly pay in the two periods. If we assume that the two cohorts of workers possess, on average, the same education and experience/age, it thus follows that the statistics sort of suggests a prevalence of gender wage gap in the Nigerian wage employment market. One other interesting finding in the Table is the fact that hourly wage increased dramatically for both males and females during the ten-year period.

Males are more educated than females as depicted by the higher percentage of the former that possess secondary and post secondary education. It is also shown that males have higher years of schooling, which equally buttresses the fact that males are more educated than females. Males also have higher years of general experience than females perhaps due to the fact that males are shown (in the Table) to be older than females in the labour market. The Table also shows that the percentage of females without education is higher than that of males. It is, however, interesting to note that the percentage of either males or females without education registers some decline during the ten-year period. A higher percentage of decline is associated with males and this can be understood when one considers the higher percentage of increase that characterises the years of schooling for males.

5.2 Estimated Probit Model of Labour Force Participation

The next Table contains the results of estimated probit model of labour force participation of male and female household members in wage employment in Nigeria. The estimated probit model is the one described in equation (2). Some of the explanatory variables contained in the model have statistically significant effects on the probability of participation in wage employment.

Table 3. Estimated Probit Model of Labour Force Participation of Male and Female Members of Household in Wage Employment in Nigeria

	1998/99		2007/08	
	Male	**Female**	**Male**	**Female**
Intercept	-2.9087	-3.4214***	-2.9734	-3.8239***
	(-10.50)	(-10.39)	(-13.43)	(-14.44)
Old Female Member	0.0169	0.1002	0.0236	-0.1402
	(0.07)	(0.37)	(0.54)	(-0.284)
Own Child less than 2 years	-0.0877	-0.5586	0.0816**	-0.0717
	(-0.40)	(-1.41)	(2.36)	(-1.37)
Other Child less than 2 years	-0.5517**	-0.0318	0.0682	0.2175*
	(-2.14)	(-0.10)	(0.53)	(1.66)
Own Child from 2 to 4 years	-0.3785***	-0.0643	-0.0290	-0.1749***
	(-3.58)	(-0.46)	(-0.86)	(-3.86)
Other Child from 2 to 4 years	-0.1317	-0.2250	-0.0253	-0.0937
	(-1.27)	(-1.56)	(-0.37)	(-0.99)
Child from 5 to 17 years	-0.1748***	-0.0967	-.0457	-0.0216
	(-3.15)	(-1.32)	(-1.05)	(-0.35)
Own Home	-0.4330***	-0.2064***	-0.0621**	0.0463
	(-8.51)	(-3.17)	(-1.94)	(1.02)
Free Accommodation	-0.0896	-0.2358**	0.0142	0.1598***
	(-1.28)	(-2.50)	(0.30)	(2.48)
Urban_Rural	0.3035***	-0.0868	0.3286***	0.1875***
	(6.70)	(-1.44)	(10.07)	(4.23)
Age	0.0751***	0.0811***	0.0463***	0.0713***
	(5.13)	(4.53)	(4.19)	(4.96)
$Age^2/100$	-0.0799***	-0.0889***	-0.0437***	-0.0847***
	(-4.52)	(-3.83)	(-3.33)	(-4.56)
Household Head	0.1054	0.2009**	0.3098***	0.4437***
	(1.07)	(2.12)	(3.78)	(5.82)
Household Size	0.0297	0.0189	0.0907***	-0.0214
	(1.50)	(0.87)	(-3.78)	(-1.21)
Marital Status	0.0656	-0.1290	-0.0662	0.1204**
	(1.03)	(-1.64)	(-1.42)	(1.90)
Primary Education	0.4791***	0.6737***	0.3869***	0.2861***
	(9.05)	(10.88)	(8.83)	(4.35)
Secondary Education	0.8293***	0.9867***	0.8097***	0.9914***
	(15.75)	(13.96)	(20.10)	(17.50)
Post Secondary Education	1.8743***	2.4397***	1.8969***	2.2769***
	(23.88)	(21.25)	(41.84)	(36.21)
Number of Observations	**7427**	**8461**	**15324**	**17971**
LRChi2	1521.78	874.17	2963.86	2320.85
Prob>chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.2232	0.2234	0.2431	0.3460
Log likehood	-2647.7256	-1519.8097	-4613.1649	-2193.3397

Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level
Source: Estimations based on Nigeria's General Household Surveys for 1998/99 and 2007/08.

The Table shows that the presence of old female household members increases the probability of participation of employable household members in wage employment. The finding is in line with our a priori expectation but it is not statistically significant. While the presence of children of less than five years of age reduces the probability of females' participation in wage employment, it is only in the cases of other child less than two years and own child from two to four years of age that

have a statistically significant influence during the 2007/08 period. Children whose ages range from five to seventeen years have negative (which is against a priori expectation) but not statistically significant influence on females' participation in wage employment. The same variable exerts a statistically significant negative effect on males' participation in wage employment in the 1998/99 period.

Having a household asset (own home) reduces the probability of participation of both males and females (except in the case of females in the 2007/08 period) in wage employment thereby conforming to our theoretical expectation. The impact of the variable is found to be statistically significant at reasonable levels. Such an asset in this case sort of raises the reservation wage of the household members in considering whether to enter wage employment or not. Living in free accommodation, which is meant to measure the influence of unearned income (which also raises reservation wage), exerts a negative influence in the 1998/99 period while it exerts a positive effect on participation in the 2007/08 period.[44] It is, however, statistically significant only for females in the two periods. The Table also shows that living in urban areas positively and significantly influences the participation in wage employment perhaps due to the attraction provided by the greater concentration of wage employment opportunities in the urban areas than in the rural areas.

Being young increases the probability of participation (in a statistically significant way) in wage employment for both males and females in the two periods. The positive effect however declines with age. These findings are in line with our theoretical expectations. Expectedly, education has a positive and above all, a statistically significant influence on the participation of males and females in wage employment and the influence is found to increase with the level of education attained by both males and females. This finding is in line with the ones obtained in similar studies on African countries.[45] It can be seen further that the influence of education is of higher magnitude in the case of females. This thus implies that females are more willing/motivated than males to participate in wage employment when they have higher levels of education (especially secondary and post secondary). It therefore follows that females in Nigeria can be encouraged or motivated to increase their participation in wage employment by ensuring that they acquire higher levels of education.

5.3 Estimated Multinomial Logit Models of Labour Force Participation
The next set of Tables contains the results of the estimated multinomial logit models of labour force participation of employable males and females in Nigeria in the 1998/99 and 2007/08 periods. The results are in respect of males and females that supply labour across the four wage employment segments adopted for the study. The explanatory variables in the Table are the same with ones under the probit models.

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[44] The positive influence of free accommodation on labour force participation in wage employment may in fact be interpreted to mean that some individuals are motivated to take up some paid employment whose returns may be low but will enjoy free accommodation (either from relatives, associates or employers), which can enable them consider the employment to be worthwhile at the end of the day.

[45] See Glick and Sahn (1997) for Guinea, Vijverberg (1993) for Cote d'Ivoire and Glewwe (1990) for Ghana.

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The results of the Wald tests conducted on the estimated parameters of each pair of sector choices[46] show that the null hypothesis can be rejected at 0.001 level of significance for males and females. The implication of the tests is that Nigeria's wage employment is indeed not homogenous as the determinants of entry into the four wage employment segments (in this study) are not the same. There is thus a firm justification for the segmentation (of the wage employment) that constitutes the fulcrum of each of the multinomial logit models in this study.

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[46] Since there are four employment choices for which results are generated in the multinomial logit model, we then have six pairs of employment choices on which we conduct the Wald tests for males and then for females. We use the concept of combination in Statistics to arrive at the six pairs. The formula for combination is n!/(r!(n-r)!), where n is the number of objects (segments) and r is the number of objects taken at a time for analysis without considering their order of arrangement (see Spiegel and Stephens, 1998:132). ! is factorial. In this case, we have 4!/(2!(4-2)!)= (4x3x2)/(2x2)=24/4=6.

Table 4: Estimated Multinomial Logit Model of Labour Force Participation of Male and Female Household Members in Wage Employment in Nigeria for 1998/99 Period

	MALE				FEMALE			
	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys.	Ministries	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys.	Ministries
Intercept	-4.2607***	-7.1346***	-5.4853***	-10.0251***	-7.4850***	-8.6075***	-8.1583***	-10.4604***
	(-10.50)	(-8.26)	(-5.21)	(-10.51)	(-5.93)	(-7.37)	(-4.94)	(-6.40)
Old Female Household Members	-0.1777	-0.4376	0.1867	0.4738	-0.9060	-0.3320	0.6166	1.1005
	(-0.18)	(-0.56)	(0.25)	(0.71)	(-0.68)	(-0.33)	(0.69)	(1.22)
Own Child less than 2 years	-0.1821	-0.3362	-0.6000	0.3074	-5.0100	-1.2025	0.5319	-1.9996
	(-0.25)	(-0.48)	(-0.70)	(0.58)	(-1.20)	(-0.82)	(0.52)	(-0.88)
Other Child less than 2 years	-0.8294	-1.8505**	-1.2113	-0.7075	-8.1013	1.3273*	-487.69	0.3683
	(-0.92)	(-1.75)	(-1.18)	(-1.00)	(-1.29)	(1.77)	(-0.00)	(0.26)
Own Child from 2 to 4 years	-0.9347**	-1.1519***	-0.4404	-0.2053	0.3466	0.2542	-3.2993***	0.1904
	(-2.41)	(-3.00)	(-1.23)	(-0.71)	(0.69)	(0.57)	(-2.52)	(0.34)
Other Child from 2 to 4 years	-0.5344	-0.0892	-0.3984	-0.0038	-1.1218	-0.0543	-1.4725*	0.0311
	(-1.41)	(-0.30)	(-1.06)	(-0.01)	(-1.62)	(-0.12)	(-1.80)	(0.06)
Child from 5 to 17 years	-0.0791	-0.5349***	-0.3829**	-0.0979	-0.0552	-0.3685	-0.1389	-0.0441
	(-0.42)	(-3.33)	(-1.94)	(-0.60)	(-0.22)	(-1.54)	(-0.49)	(-0.15)
Own Home	-0.7340***	-1.1198***	-0.4354**	-0.6523***	-0.2087	-0.2601	-0.5033*	-0.8184***
	(-4.31)	(-7.62)	(-2.36)	(-4.78)	(-0.88)	(-1.25)	(-1.85)	(-3.29)
Free Accommodation	-0.2237	-0.2762	0.0693	0.0053	-0.5638	-0.4603	-0.4581	-0.3690
	(-0.98)	(-1.49)	(0.29)	(0.03)	(-1.51)	(-1.45)	(-1.22)	(-1.13)
Urban_Rural	0.1640	0.7345***	0.4637***	0.6070***	-0.3991*	-0.1239	0.2508	-0.4464**
	(1.05)	(5.66)	(2.87)	(5.00)	(-1.76)	(-0.64)	(1.02)	(-1.99)
Age	0.0434	0.1669***	0.1178***	0.2499***	0.1414**	0.1840***	0.2329***	0.2578***
	(0.84)	(3.66)	(2.13)	(5.12)	(2.18)	(2.83)	(2.71)	(2.87)
$Age^2/100$	-0.0366	-0.1595***	-0.1524**	-0.2795***	-0.1231	-0.2177***	-0.2858***	-0.3252***
	(-0.60)	(-2.89)	(-2.22)	(-4.74)	(-1.52)	(-2.53)	(-2.58)	(-2.71)
Household Head	0.1444	-0.1163	-0.1255	0.6877**	0.0591	0.3660	0.1327	0.7123**
	(0.27)	(-0.42)	(-0.34)	(2.08)	(0.17)	(1.25)	(0.31)	(2.11)
Household Size	-0.2644	0.1312***	-0.0398	0.1221**	-0.0093	0.1345***	-0.1807	0.0287
	(-1.42)	(2.63)	(-0.44)	(1.95)	(-0.10)	(2.49)	(-1.05)	(0.26)
Marital Status	0.3720*	-0.2002	0.1569	0.0900	-0.3841	-0.2375	-0.4599	0.0359
	(1.65)	(-1.13)	(0.70)	(0.50)	(-1.34)	(-0.95)	(-1.37)	(0.12)
Primary Education	0.7650***	1.2224***	0.4806**	1.3740***	1.4563***	1.7682***	1.1283***	1.3696***
	(4.36)	(6.05)	(2.31)	(6.84)	(6.88)	(6.92)	(4.10)	(3.20)
Secondary Education	1.0776***	1.8078***	0.9950***	2.3159***	1.5321***	2.4512***	1.4602***	3.0979***
	(5.88)	(9.25)	(5.00)	(12.29)	(5.63)	(9.28)	(4.71)	(8.29)
Post Secondary Education	1.8454***	3.6015***	2.4738***	4.2688***	2.9922***	4.9666***	2.1745***	6.1060***
	(6.69)	(16.21)	(9.98)	(20.38)	(7.15)	(15.77)	(4.06)	(15.27)

Sample :   Male = 7427   Female = 8461)
LR Chi2(68):   Male = 1773.55   Female = 1081.39
Prob>chi2 :   Male = 0.0000   Female = 0.0000
Pseudo R2 :   Male =0.1729   Female = 0.2027
Log Likelihood: Male = -4241.4704   Female = -2127.1387

Note: Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level. Where: **Incorp.Priv.Org. = Incorporated Private Organisations, Inf.Priv.Org. = Informal Private Organisations, Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries**
Source: Estimations are based on Nigeria's General Household Surveys of 1998/99 and 2007/08 periods.

Table 5: Estimated Multinomial Logit Model of Labour Force Participation of Male and Female Household Members in Wage Employment in Nigeria for 2007/08 Period

	Male				Female			
	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys.	Ministries	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys.	Ministries
Intercept	-3.3298***	-1.8598***	-8.3070***	-9.0701***	-3.6047***	-2.6090***	-7.9013***	-11.2953***
	(-7.46)	(-6.84)	(-9.19)	(-12.08)	(-9.03)	(-12.90)	(-6.74)	(-12.15)
Old Female Household Members	0.5035***	0.3273***	0.3309**	0.2230*	0.6122***	0.5330***	0.1739	0.2375
	(4.99)	(4.57)	(1.98)	(1.72)	(6.50)	(9.20)	(0.71)	(1.48)
Own Child less than 2 years	-0.3976***	-0.2572***	0.0288	-0.2853***	-0.4011***	-0.1636***	-0.2293	-0.3921***
	(-4.87)	(-4.94)	(0.23)	(-2.76)	(-4.41)	(-3.91)	(-1.11)	(-2.58)
Other Child less than 2 years	0.3045	0.2937	0.5380	0.6127*	0.3867*	0.1233	0.3184	0.6123**
	(1.03)	(1.44)	(1.23)	(1.59)	(1.66)	(0.91)	(0.58)	(1.63)
Own Child from 2 to 4 years	-0.4385***	-0.2630***	-0.0496	-0.2900***	-0.7191***	-0.4652***	-0.2625	-0.4989***
	(-5.70)	(-4.95)	(-0.37)	(-2.95)	(-9.57)	(-11.51)	(-1.42)	(-3.92)
Other Child from 2 to 4 years	0.2138	0.2446**	0.3750	-0.3618	-0.2554	-0.0011	0.2223	0.1088
	(1.39)	(2.38)	(1.52)	(-1.49)	(-1.59)	(-0.01)	(0.65)	(0.40)
Child from 5 to 17 years	-0.6048***	-0.2024***	-0.2210	-0.1543	-0.5696***	-0.1881***	0.4711	-0.1444
	(-6.09)	(-2.69)	(-1.25)	(-1.18)	(-5.95)	(-3.05)	(1.48)	(-0.82)
Own Home	0.0519	0.2317***	0.1592	0.0444	-0.0175	0.2679***	-0.0124	0.2608**
	(0.72)	(4.86)	(1.27)	(0.47)	(-0.24)	(7.14)	(-0.06)	(2.02)
Free Accommodation	0.1119	0.3001***	0.4101**	0.1291	0.0014	0.5457***	0.5519**	0.3556*
	(0.96)	(3.69)	(2.24)	(0.87)	(0.01)	(9.04)	(2.20)	(1.80)
Urban_Rural	0.1349*	-0.1895***	0.2802**	0.0837	-0.1693**	-0.0374	1.0521***	0.0712
	(1.67)	(-3.32)	(2.25)	(0.89)	(-2.00)	(-0.81)	(5.77)	(0.58)
Age	0.0975***	0.1103***	0.1636***	0.2228***	0.0861***	0.0836***	0.1083*	0.2254***
	(4.20)	(7.45)	(3.60)	(6.22)	(4.00)	(7.42)	(1.83)	(4.80)
Age^2/100	-0.1143***	-0.1306***	-0.1704***	-0.2277***	-0.0787***	-0.0637***	-0.0996	-0.2207***
	(-4.09)	(-7.25)	(-3.18)	(-5.42)	(-2.83)	(-4.31)	(-1.32)	(-3.71)
Household Head	1.3147***	1.5502***	1.9051***	1.6695***	1.8089***	1.8383***	1.8284***	2.0960***
	(7.99)	(16.23)	(5.76)	(6.26)	(11.58)	(17.75)	(5.20)	(9.03)
Household Size	-0.0594	-0.0103	-0.0206	-0.2155***	-0.2018***	-0.0836***	-0.3581***	-0.2200***
	(-1.35)	(-0.50)	(-0.25)	(-2.45)	(-5.48)	(-6.56)	(-2.62)	(-2.81)
Marital Status	0.4179***	-0.0403	-0.0730	-0.0828	0.2296**	0.2413***	0.2163	0.8384***
	(3.68)	(-0.53)	(-0.39)	(-0.59)	(2.00)	(3.71)	(0.79)	(4.40)
Primary Education	0.7692***	0.5274***	1.1979***	1.6545***	1.6511***	1.3497***	1.8402***	1.9639***
	(8.30)	(0.0658)	(5.92)	(8.54)	(19.58)	(28.63)	(7.21)	(5.25)
Secondary Education	0.4129***	0.0730	1.5334***	2.4939***	1.4804***	1.0968***	1.9256***	4.1889***
	(4.70)	(1.26)	(8.59)	(14.90)	(15.79)	(21.26)	(7.48)	(14.39)
Post Secondary Education	0.0665	-0.7369***	2.5201***	3.9617***	1.0290***	0.2632***	2.9451***	6.1249***
	(0.53)	(-8.36)	(13.98)	(23.46)	(6.33)	(2.56)	(11.01)	(21.13)

Sample :   Male = 15324   Female = 17971
LR Chi2(68) :   Male = 4642.45   Female = 6142.08
Prob>chi2 :   Male = 0.0000   Female = 0.0000
Pseudo R2 :   Male = 0.1373   Female = 0.1696
Log Likelihood :   Male = -14581.033   Female = --15039.981

Note: Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level Where: **Incorp.Priv.Org. = Incorporated Private Organisations, Inf.Priv.Org. = Informal Private Organisations, Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries**
Source: Estimations are based on Nigeria's General Household Surveys of 1998/99 and 2007/08 periods.

In the 1998/99 period, the presence of old females in the household affects males and females' participation in private sector wage employment negatively while it positively influences their participation in public sector wage employment. This effect/influence, however, lacks any statistical significance. With respect to the 2007/08 period, the presence of old females in the household increases the probability of participation of males and females across wage employment segments. This finding is in line with our a priori expectation. The presence of old females is, however, not exerting a statistically significant influence on the participation of females in the public sector wage employment segments (public companies/parastatals and ministries).

While own child of less than two years exerts negative effects that are not statistically significant on both males and females' participation across most wage employment segments in the 1998/99 period, the same variable exerts a statistically significant negative influence on males and females' participation across the wage employment segments except in the case of public companies/parastatals in the 2007/08 period. This finding conforms to our a priori expectation especially with regard to females. On the other hand, the presence of other child of less than two years only reduces, in a statistically significant sort of way, the probability of participation of males in informal private organisations during the 1998/99 period. Interestingly, the presence of the same genre of children in the household increases the probability of participation of both males and females in the 2007/08 period. In addition, the variable is significant at conventional levels for females' participation in incorporated private organisations and government ministries. This thus implies that the presence of other children of less than two years does not affect labour force participation in wage employment during the 2007/08 period.

The presence of own children whose ages range from two to four reduce significantly the probability of females' participation in public corporations/parastatals' wage employment in the 1998/99 period and this result conforms to our theoretical expectation. The negatively-signed coefficients (and their statistical significance) of the same variable (during the 1998/99 period) with regard to males' participation in private sector wage employment segments run contrary to theoretical expectation. With respect to the 2007/08 period, the presence of the same category of children in the household reduces the probability of participation of both males and females in the various wage employment segments except in the case of public corporations/parastatals. There is a need to stress that the higher coefficients with regard to females suggest that the care for this cohort of children exerts a greater negative impact on the concerned labour suppliers.

The presence of other children whose ages range from two to four years in the household only reduces, in a statistically significant sense, the probability of participation of females in wage employment provided by public corporations/parastatals during the 1998/99 period. On the hand, the presence of the same group of children does not affect the probability of participation of males and females in the various wage employment segments and it in fact bolsters the probability of males' participation in informal private sector wage employment during the 2007/08 period. This should be expected as the individuals sheltering other people's children within that age bracket will have work to provide for such children while others may be burdened with child care responsibility.

The presence of children whose ages range from five to seventeen significantly reduces the probability of males' participation in wage employment in informal private sector organisations and public sector corporations/parastatals in the 1998/99 period while the presence of the same set of children negatively and significantly reduces the probability of participation of both males and females in the two segments of private sector wage employment in the 2007/08 period.

Owning a home reduces, in a statistically significant way, the probability of participation of both males and females in the various segments of wage employment in the 1998/99 period. It is in the private sector informal wage employment that the variable (own home) exerts the highest negative impact on the probability of participation with regard to males during the aforementioned period. The less likelihood of home owners to participate in wage employment sort of reflects a higher reservation wage, which results from both rent income (on the property in case some part of the home is rented out) and unearned income (by not paying for accommodation when one stays in one's home). On the whole, the finding is in line with the theoretical expectation. Owning a home in the 2007/08 period significantly increases the likelihood of participation of both males and females in informal sector wage employment and it also exerts a statistically significant positive effect on females' decision to participate as wage earners in government ministries.

Living in a free accommodation does not significantly affect the probability of participation of males and females in the various segments of wage employment in the 1998/99 period. The same variable increases the likelihood of participation of males and females in wage employment in informal organisations and public corporations/parastatals in the 2007/08 period. It is also interesting to note that living in free accommodation increases the probability of females' participation in government ministries as wage earners. While this finding contradicts our a priori expectation, it nevertheless mirrors what prevails in some urban areas where workers that are earning low income might not have taken up the appointment in the first instance if they would not enjoy free or subsidised accommodation.

Being resident in urban areas significantly increases the probability of males' participation in the various segments of wage employment except in the case of wage employment in incorporated private sector organisations during the 1998/99 period. This finding conforms to what one should expect as wage employment is more of urban than rural form of employment. However, being resident in urban areas significantly reduces the probability of participation in wage employment provided by incorporated private sector organisations and government ministries during the same period. On the other hand, being resident in urban areas increases the probability of participation of both males and females in public corporations/parastatals as labour suppliers during the 2007/08 period. It is, however, the opposite effect (which is statistically significant) that such a residency status has on the probability of participation of males in the informal private sector organisations and on the probability of participation of females in incorporated private sector organisations during the same period. This may have to do with lack of job security that characterises wage employment in these private sector organisations.

Being young is found to increase the probability of participation in the various segments of wage employment during the two periods. The impact on the probability of participation is statistically significant. As labour suppliers grow older, the probability of participation in any of the wage employment segments reduces significantly during the two periods. These findings are in line with the theoretical expectations. Being a household head increases the probability of participation in wage employment during the two periods and this finding conforms to our a priori expectation. Household size bolsters significantly the probability of participation of both males and females in informal private sector wage employment and it equally increases significantly the probability of participation of males in government ministries during the 1998/99 period. Large households are most likely to be within the low income bracket who perhaps may not have the connections to secure wage employment for their members in the formal sector of the labour market and it thus follows that such members of households will most likely seek wage employment in the informal sector where connections may not be needed to

secure employment.[47] In the 2007/08 period, a large household size significantly reduces the probability of participation of females in the various segments of wage employment and it also reduces significantly the probability of participation of males in only government ministries' wage employment. This finding suggests that females within small households will most likely seek wage employment.

It can be seen in the two Tables that wherever marriage exerts a positive influence on the decision of both males and females to seek wage employment, such influence is found to be statistical significant at a conventional level. This conforms to the theoretical expectation, which in this case suggests that wage employment is sought so as to earn income to address marital financial responsibility.

While the probability of participation of both males and females in the various wage employment segments increases with the level of education during the 1998/99 period, the probability of participation of both sexes in the 2007/08 period has a different pattern. It can be seen that in the latter period, the participation of both sexes in wage employment in the private sector decreases with higher levels of education while it increases with higher levels of education with regard to the public sector wage employment. This finding is in line with those of Terrell (1993), Tansel (2005) and Long (2006).[48] In the present study, the finding suggests that public sector wage employment must have become more attractive (to males and females with higher levels of education) than private sector wage employment. It is equally interesting to note that the probability of participation of females in private sector wage employment declines much more drastically than what prevails in the case of the probability of males' participation in the same wage employment. This means that females with higher levels of education have a greater propensity than men to seek wage employment in the public sector. It can be concluded that those (males and females) with higher levels of education are more likely to be in the public than in the private sector wage employment. There is a need to stress that the findings obtained in respect of the impact of education levels on participation in wage employment in the 2007/08 period are in conformity with at least one previous study on an African country (see Glewwe, 1990).

5.4 Estimated Wage Equations
The results presented in the subsequent Tables relate to the estimation of the model expressed in equation (7). As described earlier, the model is a Mincerian human capital model in which the logarithm of hourly wage/earnings (in 1985 prices) is expressed as a function of an employee's highest education level attained (which may be primary, secondary or post-secondary), experience, experience-squared, location of residence (urban or rural) and sector selection correction term (lambda (λ)). First, we consider the results in Table 6, which relate to estimated wage equations for males and females supplying labour across the four segments of wage employment in the 1998/99 period. Most of the coefficients attached to the explanatory variables in the equations have the right signs while a greater number of the coefficients in the male wage equations are statistically significant. Some of the R-squareds for the equations are on the low side and they in fact provide some explanation for the poor results obtained in the equations concerned. A perverse set of signs characterises the estimated equation for females supplying labour in incorporated private sector organisations. This may have to do with the relatively small sample size or model specification problem (perhaps the model should not linear).

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[47] Formal sector of the labour market in this study embraces incorporated private sector organisations, public corporations/parastatals and government ministries.
[48] Terrell (1993), Tansel (2005) and Long (2006) are studies conducted for Haiti, Turkey and Vietnam respectively.

The highest statistically significant returns to experience are associated with males supplying labour in public corporations/parastatals while the second highest statistically significant returns to experience are reaped by females in government ministries. No other returns to experience are statistically significant for females in wage employment. While experience-squared's coefficient has the right negative sign across the four wage employment segments but is only statistically significant for males in incorporated private organisations and public corporations/parastatals.

It can be seen that the returns to education (wherever there is some measure of statistical significance) increase with the level of education attained by labour suppliers and this is a common finding in studies of this genre.[49] The highest returns to secondary and post secondary education are obtained for males in the incorporated private organisations while the lowest returns are found in respect of males in the public sector wage employment segments. This finding appears to be in line with what one should expect with regard to returns to education in the public sector during the 1998/99 period[50] as it was a time in which the public sector wage had stagnated at a point for too long in spite of the rapid increases in the consumer price index (see Aminu, 2005). Table 6 shows further that living in urban areas has a statistically significant positive effect on hourly wage of especially males and females in informal private sector organisations and it also exerts the same effect on hourly wage obtainable by females in government ministries.

Table 7 contains the results of estimated wage equations in respect of males and females in the various segments of wage employment during the 2007/08 period. Most of the variables' coefficients have the theoretically expected signs and they are equally statistically significant to a certain extent. The only abnormal result is the negative sign of the coefficient of primary education variable in the case of males in public corporations/parastatals and also with regard to females in government ministries. Similar studies on African countries have encountered such an abnormal sign for education variable's coefficient (see Aminu, 2007b and Glick and Sahn, 1997). This finding cannot, however, be said to be peculiar to Africa as Long (2006) also obtains negative coefficients for some education variables in the case of Vietnam.

In the Table, it can be seen that virtually all the variables in the wage equations determine the employee's hourly wage. Returns to experience are highest for males in informal private organisations followed by the ones earned by females in public corporations/parastatals. Males in government ministries are the least disadvantaged in terms of returns to experience among males in wage employment. In line with a priori expectations, the returns to education/schooling increase as the level of education increases in every segment of wage employment. This finding is the same with the one obtained by Comola and de Mello (2009) for Indonesia. The highest returns to primary education are reaped by females in incorporated private organisations while the least returns are found among males in informal private organisations.

The first and the second highest returns to secondary education are reaped by females supplying labour services in incorporated private organisations and public corporations/parastatals. The least returns to secondary education are found in informal private organisations when males supply labour. Females with post secondary education earn the highest returns when employed in incorporated private

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[49] See Aminu (2007b) and Glick and Sahn (2007) among others.
[50] The data for the 1998/99 analysis were collected in the second quarter of the survey year/circle. The second quarter was made up of the months of June, July and August 1998. The public sector wage was increased in September 1998 after having been frozen since 1993.

organisations. It can be seen further that females with post secondary education earn higher returns than males with the same education while working in the same segment of wage employment. The returns to the various levels of education are however, lower than the ones obtained by Comola and de Mello (2009). This perhaps suggest that the returns in wage employment are, on average, lower in the Nigerian economy than those prevailing in a sister oil-producing but well-diversified economy of Indonesia. Living in urban areas has a positive impact on hourly wage received by male labour suppliers in such wage employment segments as incorporated private organisations and informal private organisations.

When we correct for sector/segment selection bias in the wage models earlier estimated for the 1998/99 and 2007/08 periods, we obtain another sets of results presented in Tables 8 and 9. With respect to the 1998/99 period, the only wage equations affected by selectivity bias are the ones related to public corporations/parastatals (see Table 8). It can be seen that the returns to experience for males are now higher than before while the returns to the various levels of educated are more than two times the ones estimated previously in Table 6. Another interesting set of results relates to the high statistical significance of coefficients attached to variables in the wage equation estimated for females in public corporations/parastatals. One can compare these with the estimation results without the selectivity term which are not significant at any of the conventional levels in respect of females in public corporations/parastatals (see Table 6).

The statistically significant, positive coefficient of the selectivity term in wage equations for males and females in public corporations/parastatals suggests that there is positive selection into these public sector organisations. In Nigeria, the conditions of service of these public organisations are far better than those obtained in at least government ministries in both the worst and best of times and so it is most likely that when the public sector pay was frozen in the period from 1993 to September 1998, job seekers and those already employed in ministries would still prefer or be willing to work in such public organisations.

With regard to the selectivity-corrected wage equations for the 2007/08 period, the selectivity term is statistically significant in private sector wage equations for both males and females and in government ministries' wage equation for males. The negative sign of the term suggests that there is negative selection into those organisations. This may have to do with the difficult economic environment in which private businesses were operating during the period. The most debilitating problem in the Nigerian business environment has been infrastructure failure, which has made many private businesses to fold up. It thus follows that job seekers will no longer consider such organisations as reliable providers of wage employment again.

The impact of the correction for selectivity bias on the estimated wage equations for the 2007/08 period is that it moderates the returns to experience and education downward. The only exception is the case of returns to education for males in the informal private organisations in which the returns increase to some extent. The returns to experience and education still differ for males and females across segments/sectors of wage employment and this suggests that the wage employment segments are not homogenous. On the whole, the sizes of the coefficients for experience and education variables in the present study are within the ranges found in studies on Vietnam (Long, 2006) and Turkey (Tansel, 2005)[51] and they are at the same time within the ranges earlier obtained by Aminu (2007a, 2007b) for Nigeria.

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[51] There is a need to stress that Tansel's (2005) estimates of returns to post secondary education are higher than those obtained for either Nigeria or Vietnam. This may be attributed to the higher income level (in per capita income term) in Turkey.

Table 10 relates to the analysis of pay differential along gender line. It can be seen that there are traces of gender wage differential whose size differs from one wage employment segment to the other. Gender wage differential is highest in public corporations (38.26%) during the 1998/99 period while it is highest in informal private sector organisations (31.97%) in the 2007/08 period. It is, however, interesting to know that the gender wage differential declined between the two periods across the wage employment segments except in the case of informal private sector wage employment. In the two periods, it can be seen that the differential is lowest in government ministries. The massive retrenchment in the public sector between the periods might have played some role in terms of ensuring optimal allocation of employees across segments of wage employment. The decline might also be due to the increase in the educational attainment of employees, which has registered some appreciable increase during the period (see the Tables and explanations on the descriptive statistics of variables used in the study). It needs be stressed that an analysis of pay differential is not complete without decomposing the differential into the one traceable to employees' characteristics and the one that can be due to returns to those characteristics. This outstanding aspect is the subject of another study by the author.

Table 6: Estimated Log of Hourly Wage Equations for Male and Female Household Members across Wage Employment Segments in Nigeria for 1998/99 Period

	Male				Female			
	Incorp.Priv.Org.	**Inf.Priv.Org.**	**Pub.Coys**	**Ministries**	**Incorp.Priv.Org.**	**Inf.Priv.Org.**	**Pub.Coys**	**Ministries**
Intercept	-1.3286***	-1.4747***	-1.2492***	-1.1297***	-0.7250**	-1.3087***	-0.9489**	-1.3041***
	(-5.48)	(-9.06)	(-5.39)	(-6.70)	(-2.10)	(-4.95)	(-2.19)	(-4.18)
Experience	0.0273*	0.0209**	0.0339**	0.0134	0.0110	0.0025	0.0303	0.0319*
	(1.80)	(1.99)	(2.12)	(1.26)	(0.52)	(0.14)	(1.13)	(1.82)
$(Experience)^2/100$	-0.0424*	-0.0155	-0.0545*	-0.0133	-0.0278	-0.0053	-0.0726	-0.0351
	(-1.63)	(-0.74)	(-1.82)	(-0.63)	(-0.77)	(-0.14)	(-1.44)	(-0.87)
Primary Education	0.2061	0.0795	0.2410	0.2419*	-0.0752	0.1332	0.0984	-0.0847
	(1.58)	(0.61)	(1.59)	(1.90)	(-0.42)	(0.68)	(0.47)	(-0.30)
Secondary Education	0.4229***	0.1997	0.4225***	0.1440	-0.1985	0.1995	0.1370	0.0290
	(2.83)	(1.51)	(2.75)	(1.13)	(-0.79)	(0.94)	(0.48)	(0.11)
Post Secondary Education	0.8989***	0.7018***	0.6753***	0.5462***	-0.1928	0.4641**	0.4762	0.1997
	(4.46)	(5.08)	(3.78)	(4.17)	(-0.54)	(2.04)	(1.13)	(0.76)
Urban_Rural	-0.0068	0.2512***	-0.0099	-0.0097	-0.1789	0.3314**	-0.2462	0.2128*
	(-0.07)	(3.63)	(-0.09)	(-0.16)	(-1.11)	(2.37)	(-1.51)	(1.87)
No. of Observations	251	364	218	444	134	165	90	132
F_Statistics	5.04	12.89	3.50	6.93	0.69	4.26	1.31	2.17
Prob > F	0.0001	0.0000	0.0024	0.0000	0.6571	0.0005	0.261	0.0507
R-Squared	0.1102	0.1780	0.0911	0.0868	0.0316	0.1392	0.0866	0.0941
Adjusted R-Squared	0.0883	0.1642	0.0653	0.0743	-0.0141	0.1065	0.0206	0.0507

Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level.

The figures in brackets are t-statistics of the corresponding coefficients.

Source: Estimations are based on Nigeria's General Household Survey of 1998/1999 period.

Where: Incorp. Priv. Org. = Incorporated Private Organisations, Inf. Priv. Org. = Informal Private Organisations,

Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries

Table 7: Estimated Log of Hourly Wage Equations for Male and Female Household Members across Wage Employment Segments in Nigeria for 2007/08 Period

	Male				Female			
	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys	Ministries	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys	Ministries
Intercept	-0.0654	-0.0089	0.4174***	0.2904***	-0.2290***	-0.1430***	-0.2054	0.0902
	(-1.16)	(-0.039)	(4.17)	(3.74)	(-3.52)	(-5.66)	(-1.41)	(0.72
Experience	0.0194***	0.0247***	0.0042	0.0192***	0.0110***	0.0150***	0.0226**	0.0220***
	(5.40)	(16.87)	(0.64)	(4.23)	(2.58)	(9.07)	(2.45)	(3.24)
$(Experience)^2/100$	-0.0173***	-0.0281***	0.0010	-0.0257***	-0.0050	-0.0175***	-0.0304*	-0.0280*
	(-2.86)	(-11.74)	(0.09)	(-2.70)	(-0.69)	(-6.41)	(-1.73)	(-1.69)
Primary Education	0.1919***	0.0215*	-0.0081	0.0241	0.3130***	0.0881***	0.1681*	-0.0211
	(6.12)	(1.81)	(-0.11)	(0.34)	(9.26)	(7.04)	(1.74)	(-0.15)
Secondary Education	0.2793***	0.1481***	0.2402***	0.1631**	0.4896***	0.1801***	0.3495***	0.2129*
	(7.86)	(10.72)	(3.26)	(2.35)	(11.19)	(10.93)	(3.34)	(1.78)
Post Secondary Education	0.5174***	0.3077***	0.3957***	0.2852***	0.7746***	0.3898***	0.7159***	0.4587***
	(10.51)	(13.13)	(5.56)	(4.21)	(11.45)	(12.18)	(6.69)	(3.91)
Urban_Rural	0.0622**	0.0302***	-0.0285	0.0058	0.0436	0.0175	-0.0166	-0.0664*
	(2.21)	(2.51)	(-0.69)	(0.22)	(1.31)	(1.41)	(-0.25)	(-1.75)
No. of Observations	1442	9451	376	896	1081	7090	149	432
F_Statistics	29.49	103.69	8.92	11.57	36.96	44.01	9.74	13.61
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-Squared	0.1098	0.0618	0.1266	0.0724	0.1711	0.0359	0.2916	0.1612
Adjusted R-Squared	0.1061	0.0612	0.1124	0.0662	0.1665	0.0351	0.2617	0.1494

Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level

     The figures in brackets are t-statistics of the corresponding coefficients.

Source: Estimations are based on Nigeria's General Household Survey of 2007/08 period.

Where: Incorp. Priv. Org. = Incorporated Private Organisations, Inf. Priv. Org. = Informal Private Organisations,

     Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries

Table 8: Selectivity-Corrected Log of Hourly Wage Equations for Male and Female Household Members across Wage Employment Segments in Nigeria for 1998/99 Period

	Male				Female			
	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys	Ministries	Incorp.Priv.Org.	Inf.Priv.Org.	Pub.Coys	Ministries
Intercept	-2.3453***	-2.1240***	-4.5819***	-1.3433*	1.8274	-0.7098	-4.0875***	-2.1269**
	(-2.50)	(-4.57)	(-3.84)	(-1.94)	(0.91)	(-0.54)	(-2.93)	(-1.96
Experience	0.0335**	0.0247**	0.0366**	0.0162	-0.0082	0.0002	0.0564**	0.0373**
	(2.08)	(2.29)	(2.32)	(1.18)	(-0.32)	(0.01)	(1.98)	(1.98)
(Experience)^2/100	-0.0478*	-0.0203	-0.0652**	-0.0176	-0.0173	-0.0031	-0.1032**	-0.0454
	(-1.81)	(-0.96)	(-2.19)	(-0.70)	(-0.47)	(-0.08)	(-2.03)	(-1.07)
Primary Education	0.3354*	0.1809	0.5244***	0.2744*	-0.5222	0.0190	0.4950*	0.0435
	(1.93)	(1.23)	(2.92)	(1.68)	(-1.35)	(0.06)	(1.86)	(0.13)
Secondary Education	0.6081***	0.3624**	0.9086***	0.2051	-0.7712	0.0224	0.7980**	0.3060
	(2.71)	(2.11)	(3.98)	(0.89)	(-1.52)	(0.05)	(2.03)	(0.69)
Post Secondary Education	1.0554***	0.9641***	1.4676***	0.6516*	-1.0198	0.1439	1.1683**	0.7506
	(4.31)	(4.31)	(4.46)	(1.83)	(-1.40)	(0.20)	(2.32)	(1.01)
Urban_Rural	0.0141	0.3303***	0.1442	0.0063	-0.0759	0.3265**	-0.1030	0.1826
	(0.14)	(3.79)	(1.23)	(0.08)	(-0.42)	(2.32)	(-0.61)	(1.52)
Lambda (λ)	0.3665	0.2287	1.3352***	0.0680	-0.7740	-0.1924	0.9470**	0.2443
	(1.12)	(1.49)	(2.85)	(0.32)	(-1.30)	(-0.47)	(2.36)	(0.79)
No. of Observations	251	364	218	444	134	165	90	132
F_Statistics	4.50	11.40	4.28	5.94	0.84	3.66	1.98	1.94
Prob > F	0.0001	0.0000	0.0002	0.0000	0.5596	0.0011	0.0676	0.0688
R-Squared	0.1148	0.1831	0.1249	0.0871	0.0444	0.1404	0.1446	0.0987
Adjusted R-Squared	0.0893	0.1671	0.0957	0.0724	-0.0087	0.1021	0.0716	0.0478

Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level

The figures in brackets are t-statistics of the corresponding coefficients.

Source: Estimations are based on Nigeria's General Household Survey of 1998/1999 period.

Where: Incorp. Priv. Org. = Incorporated Private Organisations, Inf. Priv. Org. = Informal Private Organisations,

Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries

Table 9: Selectivity-Corrected Log of Hourly Wage Equations for Male and Female Household Members across Wage Employment Segments in Nigeria for 2007/08 Period

	Male				Female			
	Incorp.Priv.Org.	**Inf.Priv.Org.**	**Pub.Coys**	**Ministries**	**Incorp.Priv.Org.**	**Inf.Priv.Org.**	**Pub.Coys**	**Ministries**
Intercept	0.3012*	0.3867***	0.1135	1.3086***	0.3948**	-0.0086	-0.3441	0.7043
	(1.63)	(10.72)	(0.22)	(3.73)	(2.38)	(-018)	(-0.47)	(1.48)
Experience	0.0175***	0.0161***	0.0056	0.0086	0.0101**	0.0141***	0.0231**	0.0147*
	(4.75)	(10.23)	(0.80)	(1.50)	(2.38)	(8.44)	(2.40)	(1.69)
(Experience)^2/100	-0.0152**	-0.0176***	-0.0002	-0.0122	-0.0076	-0.0189***	-0.0308*	-0.0173
	(-2.48)	(-7.08)	(-0.00)	(-1.16)	(-1.05)	(-6.84)	(-1.74)	(-0.94)
Primary Education	0.1609***	-0.0116	0.0266	-0.1094	0.1990***	0.0413**	0.1851	-0.0700
	(4.64)	(-0.96)	(0.28)	(-1.32)	(4.56)	(2.20)	(1.41)	(-0.47)
Secondary Education	0.2468***	0.1541***	0.3023**	-0.1205	0.3548***	0.1326***	0.3695**	0.0171
	(6.37)	(11.27)	(2.40)	(-1.02)	(6.49)	(6.11)	(2.50)	(0.09)
Post Secondary Education	0.5156***	0.5824***	0.5033***	-0.2714	0.6891***	0.3862***	0.7548***	0.0902
	(10.48)	(19.24)	(2.64)	(-1.37)	(9.79)	(12.07)	(3.30)	(0.30)
Urban_Rural	0.0395	0.0792***	-0.0147	-0.0139	0.0561*	0.0184	0.0007	-0.0728*
	(1.31)	(6.38)	(-0.31)	(-0.51)	(1.68)	(1.49)	(0.01)	(-1.90)
Lambda (λ)	-0.1791**	-0.4831***	0.0965	-0.3052***	-0.2716***	-0.0870***	0.0408	-0.1570
	(-2.08)	(-14.12)	(0.61)	(-2.98)	(-4.08)	(-3.36)	(0.19)	(-1.34)
No. of Observations	1442	9451	376	896	1081	7090	149	432
F_Statistics	25.96	119.24	7.68	11.27	34.51	39.40	8.30	11.95
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-Squared	0.1125	0.0812	0.1275	0.0816	0.1838	0.0375	0.2918	0.1647
Adjusted R-Squared	0.1081	0.0805	0.1109	0.0743	0.1784	0.0365	0.2566	0.1509

Note: * = 10% significance level, ** = 5% significance level, *** = 1% significance level

        The figures in brackets are t-statistics of the corresponding coefficients.

Source: Estimations are based on Nigeria's General Household Survey of 2007/08 period.

Where: Incorp. Priv. Org. = Incorporated Private Organisations, Inf. Priv. Org. = Informal Private Organisations,

        Pub.Coys. = Public Corporations and Parastatals, Ministries = Government Ministries

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Table 10: Analysis of Pay Differential

Wage Employment Segments	Mean log-hourly Pay for Male	Mean log-hourly Pay for Female	Differential in Mean log-hourly Pay	Exponential of Differential
			1998/1999 Period	
Incorporated Private Organisations	-0.7482	-1.0435	0.2953	**1.343529**
Informal Private Organisations	-0.6891	-0.9209	0.2318	**1.260868**
Public Corporations and Parastatals	-0.6316	-0.9556	0.324	**1.382647**
Government Ministries	-0.6497	-0.7519	0.1022	**1.107605**
			2007/2008 Period	
Incorporated Private Organisations	0.572	0.3824	0.1896	**1.208766**
Informal Private Organisations	0.5475	0.2701	0.2774	**1.319694**
Public Corporations and Parastatals	0.799	0.545	0.254	**1.289172**
Government Ministries	0.8536	0.8107	0.0429	**1.043834**

6. Summary of Findings and Conclusion

This study has investigated the determinants of participation and earnings in wage employment in Nigeria. Three models are estimated for male and female employees across the four wage employment segments adopted for the study. The four segments of wage employment used in the study are wage employment in incorporated private organisations, informal private organisations, public corporations and wage employment in government ministries. We estimate probit model, multinomial logit model and Mincerian human capital model. The results of the estimated probit model reveal that the levels of education attained by males and females play some role in their decision about whether to engage in wage employment or not. Other central variables influencing wage employment decision are the possession of assets like own-homes, living in free accommodation and residing in urban areas.

The factors influencing the participation of males and females in the various segments of wage employment vary overtime perhaps due to the changing government labour policy and the dynamics that characterise the economic environment. Prominent among the factors that affect the probability of participation of males and females in the wage employment segments are the levels of education attained. Of special significance is the finding that suggests that the higher the educational level, the higher the probability of participation in public sector wage employment and this may be due in the main to the assured job security in that sector of wage employment. In recent times, the presence of old female household members increases the probability of participation of especially

females in wage employment.[52] The study also finds that employees' hourly wage is determined by the levels of education attained, experience and the location of residence of the employees. It is also found that the returns to education and experience differ for males and females and they equally vary across the four segments of wage employment thereby suggesting that those segments are not homogenous and should therefore not be treated as such. The analysis of wage differential suggests a prevalence of gender wage gap in wage employment segments considered in the study. It is interesting to know that the differential has declined over the period. The differential is highest in informal private sector organisations and public corporations while it is lowest in government ministries. The state of gender wage differential in government ministries might perhaps due to government employment policy which must have sought to remunerate employees of the same experience and education equally.

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[52] In Nigeria, it is a common practice for old females to assist in child care for couples that have children of less than two years of age. In most cases, such old females are related to the couples.

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