


# Gender wage differences in Nigerian self and paid employment: Do marriage and children matter?

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## Abstract

This article investigates gender differences in Nigeria, in the impact of marriage and children on location in the self or waged employment sector, and on income from work. Findings show that the pay structure varies across employment sectors – waged and self-employed – and that the determinants of employment sector vary by gender and family roles. Differences in human capital investment and geopolitical zones also need to be considered. The estimates in the study reveal that there is a marriage premium for both males and females in the waged labour market, but partially support Becker's (1991) gender-based household specialisation model in terms of the relative incidence of self-employment. There is a wage penalty for married women with children in the paid-employment labour market, but motherhood is also negatively associated with income levels for self-employed women. We also find a fatherhood penalty for paid-employed men. Nevertheless, overall, the gender difference is higher in relatively less regulated self-employment compared to the more regulated paid employment labour market. Findings therefore offer some policy inputs but also suggest the need for further research into the causes of the gender pay gap in self- and paid employment, and thus into the overall wage gap in Nigeria that inhibits women's labour market participation and welfare.

**JEL Codes:** J310, J710, D130

## Keywords

Family, gender, marriage, Nigeria, paid employment, self-employment, wage differential

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## Introduction

How do marriage and parenthood affect labour market location and the gender pay gap? In Nigeria, as in other parts of Africa and Asia, this question is complicated by the divide between the formal labour market and self-employment (SE). This divide is linked to the differential effects of education on the gender wage gap, and also to gendered wage differences between geopolitical zones within the country. This study applies a multinomial logit model to a cross-section drawn from household panel data, in order to test the relevance in Nigeria of Becker's (1991) thesis of a 'marriage premium' – the claim that married men have higher wages than unmarried men, and that the lower incidence of this premium for married women results in household specialisation. The study adds the existence of a large and growing informal sector to the analysis. It examines whether the marriage premium and the household specialisation model are found to apply in SE. It explores the impact of parenthood for both men and women, in both the waged and self-employed sectors, in order to ascertain whether the pay gap is attributable to gender paid employment (PE).

SE seems to be increasing in developing countries, and this has been attributed to neoliberalism (Moghadam, 1999; Pisani, 2006). For instance, Moghadam (1999) argues that the shifts of development policies from internal oriented to external oriented growth strategies resulted in growing informalisation (Nwaka et al., 2015). Gindling and Newhouse (2014) found that about 53% of workers in developing regions are self-employed as compared to around 10% in developed regions. For 74 developing countries, they found that discrimination is greater in relatively less regulated SE, that salaried employees enjoyed better job quality than the own-account workers, and that SE offers reduced employment opportunities, and increased job insecurity and income uncertainty, with low and unsustainable earnings.

On the other hand, Lechmann and Schnabel (2012) argue that SE, compared with PE, offers greater independence and flexibility in contributing to household production, which must be seen as including child care (Moore, 1983). Millán et al. (2012) have found considerable variation in the experiences of self-employed men and women, in terms of earnings, type and status of employment and preference reasons. Within gendered patterns of labour supply decisions, marriage and children may present either a wage premium or penalty to women attracted to SE in the quest for flexibility of working hours. For men, SE may be a more voluntary choice, offering rewards based on a culture of entrepreneurship (Blanchflower and Oswald, 1998; Budig, 2006; Hundley, 2000; Marshall and Flaig, 2014).

In Nigeria, SE appears to have increased steeply over the past two decades. The National Manpower Board (NMB) in 1998 estimated that SE accounted for 55% of employment while salaried workers in both private and public sectors accounted for about 39%. More recently, General Household Survey (GHS) sample data for 2010–2012 estimated that SE commanded about 80% of the labour market (National Bureau of Statistics (NBS), 2013). There is a large overall wage differential between the sectors.

Considering the high share of SE and the gendered hourly wage differences between the sectors, this study raises the following questions: (1) are there any significant gender differences regarding the determinants of participation across the PE and the SE? (2)

What factors account for the possible gender wage differences within and across sectors? (3) Does the raw and unexplained gender wage gap differ substantially between SE and PE? To answer these questions, this study aims at investigating the determinants of employment sector selection and wages in SE and PE, with a special focus on marriage and the presence of children besides other individual and regional characteristics.

A range of studies indicate the important effects of marriage and children on the gender wage gap in different employment types (Marshall and Flaig, 2014; Millán et al., 2012; Simon and Way, 2016). Hundley's (2000) findings show that family attributes such as marriage and children limit the earnings of the self-employed and organisationally employed women compared to men. Unfortunately, the range of studies for developing countries is limited (Glick and Sahn, 1997; Vijverberg, 1993). To our best knowledge, there is no study for Nigeria investigating this relationship. The available papers on wage differences in different types of employment in Nigeria tend not to have a gender focus (Aderemi, 2015; Aromolaran, 2006; Ogwumike et al., 2006; Temesgen, 2008). The only article on the gender wage gap is that of Aminu (2010) who studied the effects of government wage review policy on public and private sector wage differentials for urban male and female employees. Most studies on wage differences in Nigeria have not considered the full range of employment alternatives such as SE and PE categories, nor the impacts on wages of family attributes such as marriage and family size.

This study contributes to the research focusing on the broad overlap between gender, family and self/paid employment. The theoretical model of the study is based on the assumption that household members make choices about their consumption of home goods, market goods and leisure. It uses an extended form of Becker's (1991) basic labour supply model, including assumptions that marital status, family size, and availability of financial capital are determinants of participation decision and employment mode choices. Before controlling for marital status and the presence and number of children, it demonstrates the links between education level and wages across the employment categories. It also shows the importance of regional socio-economic differences. In contrast to the studies on developed countries – where marriage is associated with a male earnings premium and a female earnings penalty, the study shows that the case is slightly different for Nigeria.

The rest of the article is organised as follows. The section 'Theoretical framework: Self- and paid employment – Marriage and household size effects' uses a brief literature review to indicate the derivation of the theoretical framework, exploring the debate on the growth of SE. 'Context: The nature of self- and paid employment in Nigeria' summarises the nature of the labour market in Nigeria. Data definitions and methodology are set out in section 'Data and methodology'. Finally, the sections 'Empirical results' and 'Concluding remarks' outline and discuss the empirical findings and set out the conclusions drawn.

## **Theoretical framework: Self- and paid employment – Marriage and household size effects**

Opinions differ on the causes of growth in SE over recent years. Some see SE as a necessary labour market strategy conditioned by economic reforms and policies – the 'push'

argument, while others consider it as a voluntary option – the ‘pull’ argument (Bennett and Estrin, 2007; Hughes, 2003; Lin et al., 2000). According to Hughes (2003), authors aligned with the ‘push’ argument conceive that SE emanated from neoliberal policies including the government’s job rationalisation and downsizing in the PE sector. These push effects force affected workers into involuntary SE as an alternative means of survival. Supporters of the alternative ‘pull’ effects argument see workers in the PE sector as voluntarily motivated to seek SE to gain independence, job satisfaction and prospects for higher earnings: the ‘motivated self-entrepreneur’ argument (Bennett and Estrin, 2007; Dawson et al., 2009; Hughes, 2003).

Labour market researchers have a range of explanations for gender differences in earnings, and type and status of employment. Explanations include gender gaps in human capital, caring responsibilities and economic characteristics such as access to financial capital (Altonji and Blank, 1999; Lechmann and Schnabel, 2012; Oaxaca, 1973). After these differences are accounted for, the unexplained part of the gender wage differential is generally attributed to discrimination. Lechmann and Schnabel (2012) posit that being self-employed translates to being independent, and thereby avoiding sources of discrimination in PE (see also Moore, 1983). Hence, considering the ‘pull’ approach, even if employers in the PE sector contribute more to unexplained earning differences, by this reasoning we could predict that gender differences should be lower for SE workers. Yet puzzlingly, empirical evidence suggests the exact opposite case, where the raw and unexplained gender wage gap appears to be higher among the self-employed, than for paid employees (Eastough and Miller, 2004). This may be an indication that the increasing SE share is due more to the ‘push’ effect – it may be an involuntary outcome for individuals, conditioned by economic reforms and policies. This important question will be explored indirectly through the research design.

The relationship between marriage and household size on the one hand, and employment modes and wages on the other, is often explained in the gender context using Becker’s (1991) household specialisation model. This model, based on individual choice, downplays institutional factors. It presents married couples as tending to maximise their joint utility function by specialising in the production of goods in which they offer a comparative advantage (see Schafgans and Stelcner, 2006; Simon and Way, 2016). Therefore, since men are more inclined to earn more through supplying more labour hours, women may then specialise in household production, resulting in lower labour market participation and working hours – a possible ‘mother-hood earning penalty’ effect (Budig, 2006; Budig and England, 2001; Hundley, 2000; Marshall and Flaig, 2014; Molina and Montuenga, 2009).

However, the impacts of marriage and household production vary across PE and SE. Budig (2006) identifies several reasons used to explain the gender earning differences between SE and PE. Females may benefit from SE in any of the following ways. First, SE choice may not be subject to discrimination which implies that women earn an equal amount to men with similar attributes and characteristics. Second, when compared to paid employees, self-employees enjoy a great deal of flexibility and control of labour work hours, of especial benefit for married women. Hundley (2000) argues that PE places more constraints than SE on time allocation between non-labour and labour market production.

On the other hand, such flexibility may be introduced institutionally into PE, through the more effective enforcement of labour law in PE, compared to SE. Therefore, gender differences in non-labour participation and labour market production could even be expected to have a more significant countervailing impact on the gender wage difference in SE than in PE. Given the flexibility options available, SE women may devote more time to non-labour market production and less time to labour market production – a strategy which is the opposite of that for SE men. In this case, most of the gender wage difference will be attributable to the relative gender roles in household specialisation (Groesbeck and Israelsen, 1994; Reynolds and Johnson, 2012). In this framework, given the more limited opportunities offered by SE compared to PE, higher family sizes would affect earnings negatively due to the substitution effects of balancing work time. Other reasons documented for a possible prevalence of earning disadvantage of self-employed women compared to men are as follows. First is a case of labour market gender discrimination from consumers and other creditors that restrains women from obtaining loans for capital intensive industries. Second, SE females might concentrate more on certain activities compared to men thus leading to a crowding out effect.

## **Context: The nature of self- and paid employment in Nigeria**

The structure of the Nigerian labour market reflects the case of a developing country where SE dominates employment outcomes. Hence, the Nigerian labour market has its own share of large scale heterogeneity (Aminu, 2010). These heterogeneous characteristics are based on differences in employment participation, wages and geopolitical attributes. The following sections use the 2012 cross-sectional GHS-panel data of Nigeria to describe the Nigerian labour market.

Table 1 presents the employment of workers by region, geopolitical zones and gender for 2012. While 69% of the workers in PE reside in urban areas and 31% are found in rural areas, the case is different for SE workers of whom 47% reside in rural areas. Also, there appear to be further differences in employment creation across the geopolitical zones. We observe that 46% and 17% of self-employees were located in the South-West and South-East geopolitical zones, respectively. In the PE sector, about 24% of workers are in the South-South zones. Overall, while the PE workforce is divided 64%–36% between males and females, the SE workforce is female dominated by 57% versus 43% for men. Given the asymmetric structure across the two employment modes, occupational differences provide further insight in the degree of difference in labour market composition.

Table 2 presents a summary of the distribution of men and women across nine broad occupational groups in 2012. Except for clerical, agricultural and elementary occupations in which males and females were equally represented, the others were either heavily male or female dominated.<sup>1</sup> Two occupational categories – associate professionals and service workers – had more female representation of 70% and 76%, respectively. The remaining four had a higher concentration of males. Female occupational choices thus seem to be limited, compared with those of males.

**Table 1.** Employment by gender, region and geopolitical zones, Nigeria, 2012.

	Total		Paid-employed		Self-employed	
	Million	%	Million	%	Million	%
Urban	15,224	58.4	5841	69.2	9093	53.1
Rural	10,857	41.6	2603	30.8	8018	46.9
Total	26,081	100.0	8445	100.0	17,111	100.0
Geopolitical zones						
North-Central	1916	7.4	1125	13.3	741	4.3
North-East	1283	4.9	593	7.0	643	3.8
North-West	2708	10.4	842	10.0	1819	10.6
South-East	4167	16.0	1129	13.4	2974	17.4
South-South	5353	20.5	2029	24.0	3128	18.3
South-West	10,651	40.8	2727	32.3	7806	45.6
Total	26,078	100.0	8445	100.0	17,111	100.0
Gender						
Male	13,076	50.1	5377	63.7	7410	43.3
Female	13,005	49.9	3067	36.3	9701	56.7
Total	26,081	100.0	8444	100.0	17,111	100.0

Source: Computed from cross-sectional General Household Survey (GHS)-panel data (National Bureau of Statistics (NBS), 2013).

**Table 2.** Employment by occupational groups and gender, Nigeria, 2012.

	Total		Female		Male		Dominance*
	Thousand	%	Thousand	%	Thousand	%	
Managers	466,875	1.8	105,051	22.5	361,824	77.5	Male
Professionals	2,899,041	11.2	125,945	43.4	1,639,591	56.6	Male
Associate professionals	6,963,867	26.9	4,895,739	70.3	2,068,128	29.7	Female
Clerks	708,809	2.7	36,931	52.1	339,499	47.9	Mixed
Service workers	3,069,429	11.9	2,331,183	75.9	738,246	24.1	Female
Agricultural workers	3,736,981	14.5	1,660,438	44.4	2,076,544	55.6	Mixed
Crafts	4,337,694	16.8	1,386,456	32.0	2,951,149	68.0	Male
Machine operators	1,874,487	7.3	216,732	11.6	1,657,755	88.4	Male
Elementary occupations	1,789,976	6.9	721,974	40.3	1,068,002	59.7	Mixed
Total	25,847,159	100	11,317,573	49.9	12,900,738	50.1	Mixed

Source: Computed from cross-sectional General Household Survey (GHS)-panel data (National Bureau of Statistics (NBS), 2013).

Occupations categorised as female-dominated occupations represent those occupations in which the share of women in an occupation is 15% more than the share of women in the total employment. The share of women in total employment is 49.9% (Hakim, 1993).

### Median hourly wage ratios

The median monthly wage was 30,000 Naira (equivalent to USD300)<sup>2</sup> in the PE sector and 8000 Naira in the SE sector in 2012 – an overall inter-sectoral wage differential of

**Table 3.** Median monthly remuneration by employment, gender and family characteristics, Nigeria (in Naira), 2012.

	Overall	Paid-employed	Self-employed
Overall median	12,000	30,000	8000
Female	8000	25,500	5000
Male	21,000	35,000	15,000
Female/male ratio (%)	38	73	33
Female			
Married with $\leq 3$ children (M3)	8000	27,750	6000
Married with $> 3$ children (M4)	5000	21,500	4500
M4/M3 ratio	63	77	75
Males			
Married with $\leq 3$ children (M3)	20,000	32,000	15,000
Married with $> 3$ children (M4)	23,000	37,000	15,000
M4/M3 ratio	115	116	100

Source: Computed from cross-sectional General Household Survey (GHS)-panel data (National Bureau of Statistics (NBS), 2013); all values are the current median monthly earnings reported in Naira.

27% (Table 3). Wages in Nigeria appeared quite divergent across gender and employment types. As illustrated in Table 3, in the overall median hourly earnings of females (8000 Naira/month was only 38% of the male median (21,000 Naira/month). In terms of the national minimum rate of 18,000 Naira, women earned almost 10,000 Naira less.

In the PE sector, median remuneration for females was approximately 25,500 Naira per month against 35,000 Naira per month for men, a gender wage gap in which women earned 73% of the male rate. SE women, however, earned about 5000 Naira per month compared with 15,000 Naira per month – just 33% of the male rate. The gender-based hourly wage gap also varied across age cohorts, wage distributions and employment modes. Overall, the wage differential between males and females aged 15 and over was 35 Naira/hour. However, within the ages 36–55 years, there was a female earning advantage. Along the higher wage distribution, the gap was larger, suggesting a possible ‘glass ceiling’ hypothesis resulting from women’s underrepresentation in higher-level employment positions. Similarly, there was a gender wage disadvantage in the wage employment mode compared to SE (see Supplementary Table A1 online at <http://elr.sagepub.com/content/by/supplemental-data>).

The lower part of Table 3 also includes information regarding earnings comparisons of married men and women with children in different employment types. While married males with more than three children earned more than those with fewer children in PE, the situation appeared to worsen for females in both employment types. A further comparison of median wage differences by sectors, geopolitical zones and gender is reflected in Figure 1. As illustrated, while industrial male workers in the South-South and North-Central geopolitical zones earned the highest, females in the South Eastern agricultural sector earn the lowest. This evidence indicates clear disparities by geopolitical zones, sectors and gender in Nigeria. However, we further analyse the nature of such differences when individual observed characteristics are counted for. This will be the focus of the following sections.

## Data and methodology

### *The data*

The study uses the data set obtained from the most recent GHS of 2012 which reports a panel data of 5000 households. For this study, our sample<sup>3</sup> was drawn from a cross-section of 4369 males and 4205 females aged 15–64 years.<sup>4</sup> The variable definitions and summary statistics are presented in Table A2 (see online Supplementary Material at <http://elr.sagepub.com/content/by/supplemental-data>). This table presents various determinants of sectoral employment and wages for men and women. Specifically, information on experience, education, age, marital status and others are included either in the multinomial logit model or the wage equation. Our definition of wages<sup>5</sup> is the hourly income received by an individual in his or her main employment. Also, by definition, non-labour market participants do not receive wages and so are excluded from the wage equation.

### *Demographic characteristics*

The age variable is used to capture participation across age categories and to control for cultural, religious and regional economic opportunities. Geopolitical zones are included as categorical variables. The urban variable, representing the urban–rurality dimension, reflects diverse opportunities and differences within regions as shown in Tables 1 and A2.

### *Human and financial capital characteristics*

We use education and experience (experience squared) to control for human capital endowments (Table A2). The education variable is a categorical one, based on individual self-reporting, rather than years of education, to take care of any potential measurement error (Pham and Reilly, 2007). Following Marshall and Flaig (2014), home ownership is used as a proxy for access to financial capital through the financial market. Home owners are expected to earn more than non-home owners across the employment modes.

### *Family characteristics*

In the literature modelling, the impact of family on employment modes (PE and SE), the sign of the coefficients for marriage and children is mixed (Anderson, 2010; Lin et al., 2000). Nevertheless, household size is generally found to be negatively related to labour market participation rate and earnings (Groesbeck and Israelsen, 1994). Hence, while we expect a negative coefficient for females in both employment modes, that of males is expected to be positive.

### *Other characteristics/economic structure*

We group occupations within the agriculture and service sectors in line with International Standard Classification of Occupations (ISCO)-88 definitions to capture



labour productivity differences between sectors and the various occupations within them. We expect that the shares of agriculture and service sectors within SE and PE will have a significant impact on wages. However, the signs of the coefficients may also vary across gender partly due to disparities in sectoral opportunities.

### Methodology: The sectoral choice model

The first part of our study is the estimation of labour market participation and employment mode choices using the multinomial logit model (McFadden, 1983). Estimates obtained from this model are then included into the wage equation which tests for any possible selectivity bias (Lee, 1983). Considering family responsibilities as a source of flexibility, male and female workers are, however, assumed to choose among PE, SE or non-participation. The assumption made here is that men's and women's labour market participation decisions are independent.<sup>6</sup> Wages in each mode are determined thus

$$\ln W_{si} = X_{si}\beta_s + \mu_{si}, \quad S = 1, 2, 3 \quad (1)$$

where  $S=1$  for PE, 2 for SE and 3 for non-participation.  $\ln W$  is the natural logarithm of the market wage for individual  $i$  (*male or female*) in employment mode  $S$ .  $X$  is a vector of variables that describes the broad categorisation<sup>7</sup> of individual characteristics such as demographic, human/financial capital, family and others;  $\beta$  is a vector of parameters to be estimated while  $\mu$  is the random disturbance term with a zero mean. Based on Gindling (1991), we assume an individual  $i$  is allocated to employment mode,  $S$  (such as SE, PE or non-participant) given a larger propensity to and utility derived from being in such a sector. Then

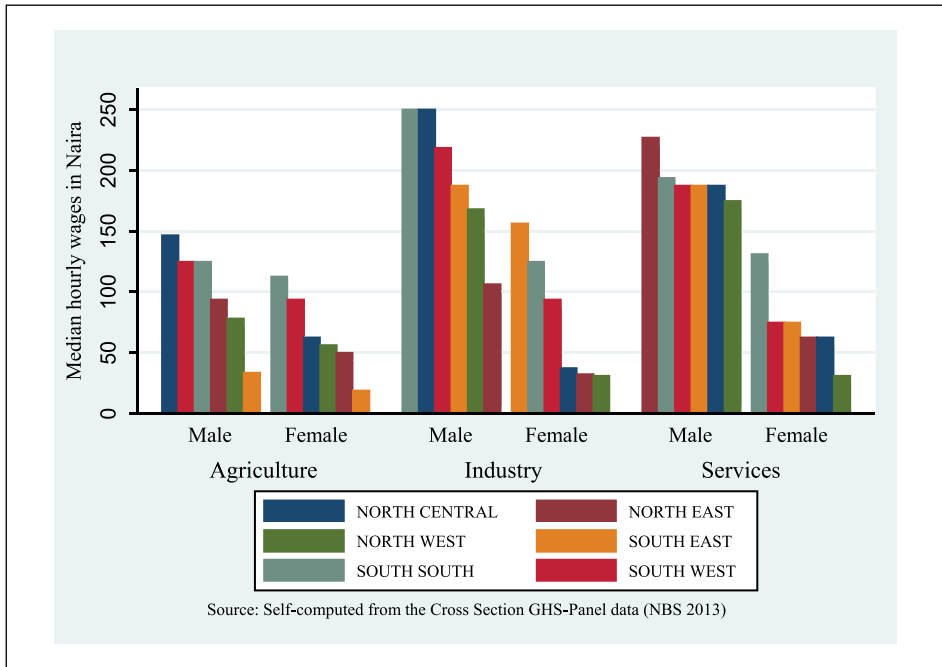
$$C_i = \text{Max} U_{si} \quad (2)$$

where  $U$  is the individual's indirect utility derived from an employment mode and  $C$  represents values and benefits for individual from  $S$ . So, equation (2) implies that sectoral values depend on the maximum utility derived from participating in it. The utility obtained from participating in a sector further derives from wage rates, job benefits, social security and others. If we express the indirect utility as a linear function of an individual's observed characteristics and unobserved heterogeneity among workers, we will have

$$U_{si} = V_i\gamma_s - \varepsilon_{si} \quad (3)$$

where  $\gamma$  are the parameters in vector form,  $V$  are the variables affecting individual's sectoral preferences as mentioned above and  $\varepsilon$  is the random disturbance term having a zero mean. The logit model is represented thus

$$P(U_i = S) = \frac{\exp(V_i\gamma_s)}{\sum_{s=1}^3 \exp(V_i\gamma_s)} \quad (4)$$



**Figure 1.** Median hourly wages by sector, gender and geopolitical zones. (See colour version of this figure online at <http://elr.sagepub.com/>).

The selectivity adjusted wage equation is given by

$$\ln W_{si} = X_{si} \beta_s + \lambda_{si} \theta_s + \eta_{si} \tag{5}$$

where  $\lambda_{si} = \phi \left( \frac{\Theta^{-1}[P_{ij}]}{P_{ij}} \right)$ , is the selectivity term—otherwise called the inverse Mills ratio.  $\phi(\cdot)$  and  $\Theta(\cdot)$  are the standard normal density and cumulative density functions,  $P_{ij}$  are the predicted probabilities from the multinomial logit model,  $\eta_{si}$  is the random element with zero mean. Equation (5) yields a consistent estimate of  $\beta_j$  if coefficient  $\lambda_{si}$  is significant which indicates presence of selectivity.

### Empirical results

The estimates of the sectoral choice model<sup>8</sup> (equations (3) and (4)) revealed evidence of gender differences across employment categories (Table 4). By implication, men and women were assigned to SE or PE for different reasons based on individual characteristics. Marriage significantly increased the probability of SE and PE for both genders. However, the coefficient of marriage was lowest for PE women and highest for SE men.

For females, this suggests that SE married women had a higher probability of labour market participation than single women even when compared to married women in PE. Married men had a higher probability of participation than single men and relative to non-labour market participants in both employment categories. Contrary to the

**Table 4.** Multinomial logit sectoral choice model (base category: non-participation).

Variables	Self-employment		Paid employment	
	(1)	(2)	(3)	(4)
	Male	Female	Male	Female
Marriage	3.214*** (0.246)	1.543*** (0.140)	2.916*** (0.303)	0.931*** (0.208)
1 child	-0.415*** (0.148)	-0.308** (0.153)	-0.244 (0.208)	-0.123 (0.213)
2 children	-0.131 (0.086)	0.051 (0.079)	-0.202* (0.114)	0.139 (0.119)
3 children	-0.194*** (0.057)	-0.072 (0.055)	-0.052 (0.076)	-0.103 (0.080)
>3 children	-0.106*** (0.026)	-0.088*** (0.030)	-0.112*** (0.043)	-0.100*** (0.044)
Age (15–25)				
26–35	1.680*** (0.176)	1.470*** (0.153)	1.798*** (0.210)	1.321*** (0.228)
36–45	3.491*** (0.549)	2.533*** (0.234)	3.564*** (0.546)	2.751*** (0.309)
46–55	5.133*** (1.022)	2.871*** (0.348)	5.462*** (1.034)	3.226*** (0.384)
56–64	1.017*** (0.316)	2.451*** (0.315)	1.117*** (0.395)	2.122*** (0.438)
GeoPol. zones (NC)				
North-East	1.577*** (0.183)	0.771*** (0.209)	0.704*** (0.262)	-0.182 (0.306)
North-West	0.842*** (0.183)	-1.099*** (0.256)	0.121 (0.230)	-1.415*** (0.414)
South-East	0.467** (0.182)	0.467*** (0.168)	0.024 (0.243)	-0.563** (0.243)
South-South	-0.328* (0.182)	-0.166 (0.166)	0.071 (0.224)	-0.425* (0.221)
South-West	-0.091 (0.202)	0.462** (0.183)	0.034 (0.267)	0.008 (0.247)
Urban	-0.707*** (0.126)	-0.758*** (0.124)	0.227 (0.152)	0.014 (0.171)
Education (primary)				
Secondary	-0.781*** (0.143)	-0.305** (0.138)	0.129 (0.192)	0.519** (0.217)
College	-1.594*** (0.279)	-0.854*** (0.266)	0.469* (0.284)	1.728*** (0.276)
University	-2.296*** (0.329)	-2.028*** (0.372)	0.746** (0.325)	1.533*** (0.331)

**Table 4.** (Continued)

Variables	Self-employment		Paid employment	
	(1)	(2)	(3)	(4)
	Male	Female	Male	Female
Constant	-0.321 (0.201)	-0.989*** (0.215)	-2.532*** (0.294)	-2.936*** (0.302)
Observations	4485	3933	4485	3933
LR Chi <sup>2</sup>	3133.70*** (0.000)		2344.05*** (0.000)	
Pseudo R <sup>2</sup>	0.340		0.308	

LR: likelihood ratio.

Standard errors in parentheses.

\*\*\*, \*\* and \* significant at 0.01, 0.05 and 0.1, respectively.

literature, the impact of fatherhood or motherhood was observed to have a decreasing effect on participation. While the presence of one or more children decreased the probability of SE for men, the presence of three or more children equally limited female SE. The same limiting effects of three or more children on choices were observed in PE for males and females. Compared with findings in developed countries that children limit female SE and increase male SE (Hundley, 2000; Marshall and Flaig, 2014; Simon and Way, 2016), our results only partly support the hypothesis for Nigerian women.

The demographic characteristics in both employment choices were highly significant, with an inverted U-shaped relationship between age and employment mode choice. Female younger and older workers (26–35 and 56–64 age groups) were more likely to be found in SE than PE. Similarly, middle-aged male workers (aged 36–54 years) were concentrated in PE. North-East, South-East and South-West women had a higher probability of being SE compared to women of the North-Central region (the base category). However, women in the North-West and South-South had a lower probability of being in PE. The findings related to geopolitical zones are intuitively meaningful. A predominant number of occupations in the North or South-East range from agriculture to commerce; hence, a higher likelihood of men and women being SE in these zones was as expected. In oil-rich South Nigeria, males are less likely to be SE, owing to the economic opportunities offered by the presence of larger and more institutionalised private companies offering jobs with high pay and good working conditions, and by the greater prevalence of higher level public sector jobs. Also, female urban residents have a lower probability of being SE compared to male SE. This result is not far from the characteristics of rural SE in the developing countries where agricultural workers' occupation dominates (Gindling, 1991).

The coefficients of all the educational levels were highly significant and negative for both male/female SE. This implies that education decreases the probability of both female and male SE: compared to primary education, the coefficients decrease for secondary education and again for university. Education increases the probability of male and female PE except for secondary education for males. Comparatively across the two employment modes, female workers of higher educational levels are more strongly

attracted to PE. In PE, a regulated sector with other fringe employment benefits, education is an essential determinant of participation for women. This finding could explain the varying nature of SE based on various demographic and human capital characteristics. Similar African studies on sectoral participation confirm education to be one of the major determinants of workers' sectoral location. For example, see Glick and Sahn (1997) for Guinea, Vijverberg (1993) for Cote D'Ivoire, and Aminu (2010) for Nigeria.

### *Wage estimates – Male and females*

Since employees are indeed non-randomly selected into the three sectors, we estimated a wage equation by including the selectivity term ( $\lambda$ ) obtained from equation (5). The statistical significance of this coefficient would confirm whether non-random allocation of workers into the employment modes had any impact on wages (Gindling, 1991). Our estimates of  $\lambda$  were found insignificant at all levels of significance based on the t-statistics.<sup>9</sup> The intuitive implication of the insignificance of  $\lambda$  is that there is no evidence of sample selection bias in ordinary least squares (OLS) estimations of the wage equation (5). Thus, employers in these sectors determine worker's allocation based on their characteristics. Table 5 reports the estimated wage equations for males and females accordingly. In order to check whether marriage and children matter, two different estimations were performed for comparison. Results for the restricted model can be found in the online supplementary material (<http://elr.sagepub.com/content/by/supplemental-data>).

Estimates for male workers are reported in columns 3 and 4 of Table 5 while the restricted model is presented in Table A3 (online supplementary material, <http://elr.sagepub.com/content/by/supplemental-data>). Findings showed that all human capital variables – education and years of experience, were positively associated with wages across both employment modes. However, we found education to be more valued in PE than in SE. Estimates of the demographic coefficients were highly significant and positive for self-employed in the South-West and for PE in the North-East, North-West and South-South regions. SE men in the agricultural and service sectors earned lower than their industrial (base category) colleagues. Across the nine occupational categories, self-employed managers and crafts earned significantly more than the elementary occupations. Except for clerks and machine operators in the PE sector, all occupational categories had a significant positive impact on wages. We found no significant effect of access to financial capital (home ownership) on wages for males in SE, but a, however, marginally positive effect in PE.

Consistent with studies on developed countries (Budig, 2006; Marshall and Flaig, 2014), marriage was positively associated with wages in SE but had no effects in the PE sector. Hence, a married man in the SE category earned about three times more than those categorised as other marital status<sup>10</sup> which is consistent with the marriage premium literature. Interestingly, in SE, single men also had a higher coefficient than married men. Even though the presence of children was negatively associated with PE wages, children had no effect on wages in SE.

In the online supplementary material (<http://elr.sagepub.com/content/by/supplemental-data>), Table A3 columns 1 and 2 present the estimates for the restricted model of

**Table 5.** Estimates of hourly wages for self-employed and paid employed by gender.

Variables	Females		Males	
	SE	PE	SE	PE
Married (base category: others)	0.724** (0.314)	-0.782* (0.466)	1.450*** (0.522)	-0.769 (0.608)
Single	0.253 (0.497)	-0.897 (0.558)	1.546** (0.623)	-1.083 (0.745)
1 child	1.096** (0.513)	0.281 (0.844)	-0.022 (0.664)	-1.433*** (0.424)
2 children	0.670** (0.274)	0.007 (0.455)	0.096 (0.352)	-0.562*** (0.195)
3 children	0.549*** (0.200)	0.045 (0.343)	0.031 (0.243)	-0.366*** (0.137)
4 children and more	0.440*** (0.122)	-0.034 (0.267)	0.029 (0.139)	-0.210** (0.103)
Married#Child(ren)	-0.307*** (0.078)	0.086 (0.194)	-0.102 (0.066)	-0.028 (0.086)
Family size	-0.022 (0.029)	0.069** (0.032)	0.018 (0.041)	-0.018 (0.042)
Exper	0.079*** (0.018)	-0.007 (0.027)	0.066*** (0.020)	0.039* (0.023)
Exper2	-0.097*** (0.029)	0.056 (0.053)	-0.083*** (0.032)	-0.021 (0.040)
Education (base category: primary)				
Secondary	0.277** (0.116)	0.678*** (0.231)	0.208 (0.131)	0.598 (0.375)
College	0.110 (0.280)	1.588*** (0.248)	0.425** (0.191)	1.334*** (0.394)
University	0.269 (0.562)	1.810*** (0.314)	0.695** (0.312)	1.942*** (0.398)
GeoPol. zones (base category: North-Central)				
North-East	-0.185 (0.289)	0.926*** (0.310)	-0.155 (0.309)	0.515*** (0.197)
North-West	0.047 (0.241)	0.554* (0.296)	-0.091 (0.241)	0.859*** (0.199)
South-East	-0.103 (0.303)	0.294 (0.193)	-0.236 (0.211)	0.234 (0.226)
South-South	0.828** (0.338)	0.475** (0.200)	0.125 (0.249)	0.651*** (0.172)
South-West	0.236 (0.264)	-0.100 (0.190)	0.477** (0.198)	-0.012 (0.275)
Sectors (base category: Industries)				
Agriculture	-0.116 (0.292)	-0.233 (0.393)	-0.860*** (0.218)	-0.204 (0.231)
Services	-0.166 (0.191)	-0.297 (0.244)	-0.238* (0.139)	-0.384** (0.191)

**Table 5.** (Continued)

Variables	Females		Males	
	SE	PE	SE	PE
Occupations (base category: elementary)				
Managers	2.489*** (0.539)	-0.428 (0.480)	1.240*** (0.337)	1.126** (0.453)
Professionals	0.098 (0.223)	-0.185 (0.324)	-0.204 (0.297)	1.108** (0.465)
Associate professionals	2.691*** (0.305)	-0.297 (0.434)		1.354** (0.555)
Clerks	0.226 (0.244)	-0.051 (0.301)	0.196 (0.288)	0.926 (0.614)
Service workers	-0.681** (0.343)	-0.647 (0.502)	0.039 (0.215)	1.100** (0.506)
Skilled agriculture	0.027 (0.246)	-0.462 (0.417)	0.108 (0.204)	0.776* (0.422)
Crafts	-0.535* (0.296)	-0.594 (0.384)	0.555** (0.269)	0.993** (0.466)
Machine operators	1.528** (0.652)	0.032 (0.307)	0.352 (0.267)	0.439 (0.406)
Home owner	0.220** (0.107)	0.096 (0.175)	0.051 (0.120)	0.293* (0.174)
Urban	0.244** (0.112)	0.520*** (0.157)	-0.026 (0.116)	0.334** (0.135)
Constant	3.705*** (0.373)	3.463*** (0.939)	3.889*** (0.679)	4.667*** (0.787)
Observations	672	186	615	386
R <sup>2</sup>	0.321	0.640	0.274	0.525
Wald test	102.89	8.36	9.22	7.79
(p-values)	(0.000)	(0.000)	(0.000)	(0.000)

SE: self-employment; PE: paid employment.

Robust standard errors in parentheses.

\*\*\*, \*\* and \* significant at 0.01, 0.05 and 0.1, respectively.

female workers. The coefficients of experience and squared experience were highly significant, but with the expected signs in SE only. The negative sign for squared experience indicated diminishing returns. All levels of education were highly significant with positive return to wages in PE while only secondary education had a significant positive impact on wages in SE. This result suggests the role of higher training and skill as productivity augmenting elements in PE.

Considering the estimates in columns 1 and 2 of Table 5, PE women in the North-East and South-South regions earned significantly more than those in North-Central. However, only those in the South-South region earned higher in the SE mode. While SE South-South women earned about 162% more than those in the North-Central zone, those in the

PE sector of the same region earned 43% more than the base category. Occupations did not matter for female SE except for managers and crafts, with positive and highly significant coefficients. However, in PE wage determination, associate professionals, service workers and crafts earned significantly more than elementary occupations. Female with access to finance earned more than those with none.

Finally, the inclusion of the marriage and children variables in columns 1 and 2 led to significant changes on most of the variables. Against the literature of a negative relationship between marriage and SE wages, our results show a small marriage premium (0.724) for females compared with that of men (1.450). Also, the presence of children was positively associated with wages in SE. However, as the number of children increased, wages fell by 56%. The interaction term of being married and having children was negatively associated with female wages in SE. In PE, however, we found no effect of number of children, yet marginal but negative effect of the marriage variable in PE. This could suggest a motherhood earning penalty in the PE sector.

In this section, estimation of separate wage equations for males and females allowed us to make an interpretation of the possible gender pay differentials with regard to various characteristics, individual, family, zones or others that constituted the condition for the mean wage. To account for a complete analysis of gender pay difference, we further consider its decomposition not only at the mean but at various quantiles of the wage distribution. This is called for because mean regressions are sensitive to outliers whereas quantile regressions allow gender pay gap estimates at particular quantiles of the conditional wage distribution (see for example Koenker, 2005).

### *Male versus female wage difference*

This section presents an analysis of the gender wage gap using the standard Oaxaca (1973) and Blinder (1973) decomposition at various quantiles of conditional wages (Table 6).

The gender wage difference was positive and varied along the quantiles. In SE, the gap was largest at the 25th quantile. As posited in the literature, a larger gender wage difference at the lowest part of the wage distribution was consistent with the sticky floor hypothesis (see Nicodemo, 2009). In PE, the wage difference was smaller at the 25th percentile (negative 38%) and larger at the 75th quantile (6.4%). Contrary to SE, the PE sector conformed to the glass ceiling hypothesis where the gender wage difference was larger at the top of the wage distribution.

The observed wage differential across the employment modes was partly due to differences in endowments (job characteristics) and partly due to unobserved characteristics or gender discrimination. The wage difference explained by endowments varied across the quantiles. Differences in individual characteristics in SE only explained 0.002 log points of the total difference at the 75th quantile and 0.028 log points in the 25th quantile. We might argue that at lower and higher quantiles there was gender discrimination since the explained part was lower than the unexplained part. This inference is also supported by the negative values of the explained part of the wage difference, suggesting that women had better endowments but lower earnings. At the median again the unexplained part,  $i$  was much larger than the difference due to observed characteristics.



**Table 6.** Oaxaca–Blinder log Wage Decomposition Estimates across employment and wage quantiles.

	Mean		Self-employment			Paid employment		
	Mean	Q75	Q25	Q50	Q75	Q25	Q50	Q75
Mean log of wages (Males)	4.951	5.300	3.263	4.498	5.300	3.124	4.506	5.280
Mean log of wages (Females)	4.237	5.234	3.153	4.458	5.234	3.606	4.473	5.220
Differential (a)	0.714	0.066	0.110	0.041	0.066	-0.482	0.032	0.062
Exponential differential	2.042	1.070	1.116	1.041	1.070	0.618	1.032	1.064
Explained by characteristics (b)	-0.0191	-0.002	-0.028	-0.031	-0.002	0.116	-0.013	0.008
Unexplained	0.733	0.063	0.138	0.723	0.063	-0.599	0.045	0.054
Characteristics								
Marriage	0.005	3.0e-03	0.029	-0.016	3.0e-03	0.006	-0.022	0.004
1 child	-2.24e-04	6.0e-03	-0.003	0.005	6.0e-03	0.008	5.0e-03	-0.003
2 children	9.96e-03	-2.0e-04	-4.0e-03	0.002	-2.0e-04	-0.031	0.010	-0.001
3 children	-8.83e-03	-3.0e-03	1.0e-03	7.0e-03	-3.0e-03	0.049	5.0e-04	-0.007
>3 children	-0.003	4.0e-03	-1.0e-03	-0.014	4.0e-03	0.079	-0.006	-0.002
Family size	-0.002	-5.0e-03	9.0e-03	-0.005	-5.0e-03	-0.043	0.110	-0.002
Education	0.0303	8.0e-03	0.003	3.0e-03	8.0e-03	-0.079	-0.006	0.005
Others	-0.087	-0.004	-0.057	-0.010	-0.004	0.126	0.010	0.026

Similarly, in the PE sector, the raw wage difference could mostly be attributed to gender discrimination rather than to endowments except at the lowest end of the wage distribution. Women in PE earned lower than men with the same observed characteristics. Unlike in the SE mode, the unexplained part of relativities in PE at the 50th and 75th quantiles, respectively, and may reflect a case of less discrimination than in SE. This is consistent with the empirical literature where the unexplained part of the gender wage difference is highest in the SE.

## Concluding remarks

The estimates show that marriage and children matter in explaining gender wage differences in Nigeria. They partly support Becker's (1991) household specialisation model in the case of SE. The results are, however, contrary to those for developed countries (Budig, 2006; Hundley, 2000; Marshall and Flaig, 2014). In both SE and PE, the presence of children was less negative in its impact on females' employment options, when compared to males'. Even though the variables indicating presence of children were associated with a wage premium for self-employed women, the magnitude of the coefficient fell for each additional child in the family. Geopolitical and regional disparities, financial accessibility and discrimination were observed to be some of the causes of wage differences, in addition to family characteristics. In terms of earning advantage, PE workers were better off than those in SE.

Our findings suggest some policy inputs relating to the welfare impacts of female earning disadvantage in the labour market. In the case of SE, the suggested significant strong negative relationship between the interaction term (married with children) and the female wage provides a focal point for measures that could help to decrease gender wage differential. Provision of childcare, accessible in terms of the price and proximity of the service, would allow SE females to be innovative with ample time channelled to high paying occupations, thereby decreasing the wage difference. Additionally, given the significant impact of financial accessibility on the women's wages, the government's attention can be drawn to establishing more flexible and functional micro finance banks that allow SE females access to loans for their establishments.

Since our findings lend support to the glass ceiling hypothesis in PE, special programmes that will allow women to fast-track their way up the career ladder can be achieved through affirmative action and professional development training. To also address the marriage penalty effect in PE, a flexible employment policy that considers marriage as an essential phase of life should be put in place.

At the macro level, regional disparities can be addressed by tax reductions particularly for those geopolitical zones with relatively limited PE opportunities. Such flexible tax systems can stimulate employment by allowing institutions to thrive. Additionally, a more embracing agricultural policy built on advances in technology can help to transform the nature of SE in Nigeria.

However, it is important to draw attention to data constraints which limited the study and indicate the need for further analysis, based on temporal changes in the labour market structure and gender wage decomposition. The welfare implications of regional disparities and the dominance of SE are still major concerns in Nigeria. These

issues, together with a study of spouses' joint decision-making processes, are topics for further research in the future.

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## Notes

1. The dominance calculation is inspired by Hakim's (1993) preference theory as follows: share of women in overall employment is 49.9%. Hence, 64.9% (49.9 + 15) and above represents female dominance in an occupation while 34.9% (49.9 – 15) and below is male dominated. Mixed occupations have equal representations of men and women.
2. The report is based on the 2010 real effective exchange rate for Nigeria. Hence, 2010 = 100 (USD1 = 100 Naira).
3. For the wage equation, we consider wage earners in both the self-employment and paid employment modes while the employment choice equation considers the non-participants as the base category; hence, the total sample is 14,182 individuals.
4. The General Household Survey (GHS) is undertaken in two stages where the primary unit is Enumeration areas and in the second step households are selected by systematic sampling. This work is based on survey weighted data.
5. Given that some individuals reported weekly, monthly or daily wages, these values were converted to hourly wages.
6. However, there is consensus in the literature that spouses' decisions should be considered as joint decisions in order to avoid misleading results (see Becker, 1991; Schafgans and Stelcner, 2006).
7. See online supplementary material for variable definitions (Table A2) (<http://elr.sagepub.com/content/by/supplemental-data>).
8. In order to justify the overall significance of the model, Hausman and Hsiao tests were conducted, which confirmed adequacy of the multinomial logit estimates. The likelihood ratio test statistic also confirmed the joint significance of the variables at 1% level of significance. This also implies that employees are non-randomly assigned into employment modes.
9. These estimates are not presented to save space but are available on request.
10. Other marital status categories (base category) include divorced, separated or widowed individuals.

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