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**Keywords**: Entrepreneurship; Occupational Choice; Wages; Gender; Nigeria; Africa

**JEL Classification Codes**: J24, E24, J16, J23, J46, J21

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This paper examines the economic returns to being employers, paid workers and self-employed own account individuals in a lower middle income economy using quantile regressions while accounting for selection using Heckman selection models. The results suggest that although the majority of employers experience labour wage premiums throughout the income distribution, self-employed own account individuals experience a wage penalty at the lower quantiles of the income distribution where paid workers reap benefits from minimum wage guarantees, suggesting that minimum wage legislations may push individuals with low skills into self- employment. Furthermore, female employers and paid workers tend to be relatively well educated implying that education enables females to escape the job glass ceiling although males typically earn significantly more than females.

**Keywords**: Entrepreneurship; Occupational Choice; Wages; Gender; Nigeria; Africa

**JEL Classification Codes**: L26, J24, E24, J16, J21, J46

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# Introduction

The wage differential between occupational groups is a topic of remarkable scholarly interest, particularly with regard to the contrast between self-employed individuals and employees (Acs et al., 2016, Tamvada 2010). Belonging to an occupational category can result in income premiums or penalties as individuals seek to maximise expected utility by opting for an employment option that gives the greatest economic returns based on their human capital. The occupational choice however can be constrained by external factors such as minimum wage regulations, and social norms such as those related to gender.

The occupational decision-making has been thoroughly investigated for developed countries (Acs et al., 2016; Carmona, Congregado, Golpe, & Iglesias, 2016). An emerging body of research suggests that self-employed individuals represent two-thirds of economically active population of the developing world ([Gindling & Newhouse, 2014).](#_bookmark9) Self-employment is a compelling choice for both the new entrants into the labour market as well as the unemployed in Less Developed Countries (LDC’s) ([Maloney, 2003;](#_bookmark18) [Rees & Shah, 1986).](#_bookmark24) However, the large body of self-employment literature (see Parker (2009), for a survey) has treated self-employed individuals as a homogeneous group. In contrast to this view, recent studies suggest that self- employed individuals in developing countries are a heterogeneous group consisting of highly qualified professionals as well as individuals choosing self-employment out of necessity (Maloney 2003; Tamvada 2010; Günther & Launov 2012; Fields 2013, Gindling & Newhouse

2014).

Nevertheless, the literature rarely examines the nature of income distribution across these heterogeneous self-employed groups, and the relative positioning of self-employed individuals’

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income with respect to other occupational categories.1 This paper provides a novel approach to resolve these compelling questions by analysing the returns to self-employment across the income distribution, distinguishing between narrowly defined self-employed “own account” workers and employers, in the emerging market economy context.

We make several contributions using data from Nigeria. Firstly, by separating employers from self-employed own-account workers, and by examining the returns across the distribution using quantile regressions, we provide a more nuanced picture of the heterogeneity within self- employment and entrepreneurship. Secondly, by examining economic returns to occupations though the lens of gender, we provide novel insights into heterogeneity in economic returns to self-employment that are driven by culture. Thirdly, we examine the role of institutional characteristics for labour outcomes in a developing economy by underscoring the role of minimum wage legislation for occupational selection and subsequent economic returns, an area of research that has received little attention in the occupational choice and self-employment literature in the context of emerging market economies. Finally, we open a new line of research on self-employment in Africa’s largest economy, Nigeria, offering policy implications.

Our results suggest that employers of labour tend to experience labour wage premiums throughout the labour wage distribution, demonstrating that self-employed individuals and employers who employ others are two distinct occupational categories with widely different levels of economic returns. In contrast to this, at the lower end of the income distribution, there is a nuanced labour income penalty for self-employed individuals, while paid workers reap the benefits of minimum wage guarantees. Furthermore, we discover that although there are more

1 Tamvada (2010) examines self-employment welfare using consumption measures in the absence of income data for the Indian context.

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male employers, female employers tend to be relatively more educated than male employers although males typically earn significantly more than females.

The rest of the paper is organized as follows. The next section discusses the nature of self- employment in a developing country environment. The third section presents the Nigerian country context of this study. The fourth presents the data and the empirical methodology used. The fifth section discusses the results while the final section provides implications and concludes.

# Theoretical Background

The seminal [Harris and Todaro (1970](#_bookmark12)) model assumes that the self-employed are worse-off in the labour wage hierarchy relative to paid workers in developing countries ([Fields, 2013).](#_bookmark7) Indeed a plethora of empirical studies seem to point in this direction ([Bosch & Maloney, 2010)](#_bookmark1) and the literature on developing countries traditionally classifies the self-employed as a distressed residual group of workers, rationed out of formal sector jobs, reporting lower labour wages compared to paid workers ([Gindling & Newhouse, 2014).](#_bookmark9) Negative earnings premium for self- employment in developing countries were found for example by [Jhabvala, Sudarshan, and Unni](#_bookmark15) [(2003)](#_bookmark15) in India and by [Gong and Van Soest (2002)](#_bookmark10) in Mexico.

However, recent studies have shown that some self-employed individuals may be advantaged for non-pecuniary motives [(Maloney, 2003;](#_bookmark18) [2004)](#_bookmark19)**,** and purely monetary reasons ([Mohapatra,](#_bookmark20) [Rozelle, & Goodhue, 2007;](#_bookmark20) [Yamada, 1996)](#_bookmark29)**.** For example, [Cunningham and Maloney (2001)](#_bookmark4) suggest that there are six clusters of the self-employed individuals in Mexico, and two of the

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self-employed clusters were actually advantaged compared to paid workers while others were not. An informative distinction is made by Tamvada (2010), who suggests that Indian self- employed individuals with employees have significantly greater economic returns than both salaried employees and self-employed individuals without employees in terms of household consumption.

These results operationalize two distinct parts of the self-employment sector, an “upper” and “lower” tier (Fields 2004). The upper tier consists of individuals who voluntarily enter this sector because, given their characteristics, they expect to earn more in the self-employment sector than they would earn in the paid sector; while the lower tier is made up of individuals who expect to earn little in self-employment, but have no choice but to persist.

Webb et al. (2014) discuss the myriad activities that fall within the boundaries of the informal economy and distinguish between the institutional foundations of informality in developed versus developing economies. This has implications for our study as entrepreneurial activities differ in lesser developed contexts characterized by formal institutional voids compared to developed contexts (e.g., lack of property rights, contract law, utilities, transportation, and communication infrastructures) and so entrepreneurs might have to rely on more informally construed structures in developing economies (Khanna, Palepu, & Sinha, 2005; Khanna & Palepu, 2013).

Furthermore, we recognize that gender differences driven by social norms might exist for occupational statuses. For exam[ple, Boden Jr (1996)](#_bookmark0) reports that women are more likely than men to shoulder family-related obligations, especially child rearing: and there is evidence that this affects the female propensity to become self-employed. In addition, women might

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experience some bias in paid employment (commonly called a “glass ceiling”), and gender inequality in terms of earnings has also been documented ([Hughes, 2003).](#_bookmark14) [Hundley (2000)](#_bookmark16) investigated the earnings gap associated with self-employment and reported that self-employed male earnings increased with marriage and family size. The author reported that women tended to be self-employed to facilitate household production while men tended towards self- employment to achieve higher earnings (males being traditionally viewed as breadwinners).

[Wellington (2006)](#_bookmark26) also, suggested that married women with greater family responsibilities were more likely to be self-employed.

These social distinctions may be even stronger in developing countries, there might be some strong perceptions of gender roles for women and perhaps a cultural bias against women in formal paid employment which might ‘push’ females once again into self-employment. In our country of study – Nigeria, it is reported that only one third of its labour force are women, and although women occupy about 30 percent of all posts in the public sector, they only occupy 17 percent of senior positions. Women at every educational level also earn less than their male counterparts ([BritishCouncil, 2012a).](#_bookmark2) While there are no gender-specific laws in Nigeria, the inequalities are most notable in the formal sector representation for women in the country.

Women are also five times less likely to own land, despite accounting for 70 percent of the rural labour force, and the haphazard application of the “Sharia Law” in some northern states of the country might affect women even more ([BritishCouncil, 2012a).](#_bookmark2)

The literature also indicates that there can be significant distributional disparities especially within lower and middle income nations (Palma, 2011). Nigeria is a lower middle income country with a gini coefficient 48.8, which indicates significant inequalities ([World Bank, 2016).](#_bookmark28)

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Nigeria is also a highly entrepreneurial economy and therefore not only offers attractive opportunities in the entrepreneurial employer sector of the job market, but represents social norms, where those opportunities are more likely to be recognised and taken, implying the potential for high returns from self-employment, that may be more difficult to detect elsewhere.

More generally, following a long-standing bias in development literature, institutional settings have received little attention (Easterly, 2013), and that includes cultural norms supporting entrepreneurship we just discussed. However, institutional settings are important for explaining income distributions. In this paper, we also pay attention to one well-defined characteristic of the formal institutional system which is highly relevant to the labour market, the minimum wage.

The literature on minimum wage in developing countries is inconclusive but recent evidence suggests that raising the minimum wage could increase or decrease poverty, depending on labour market characteristics (Lemos, 2009).

Pertinent to our inquiry, [Gindling (2014)](#_bookmark8) reports that if job losses in the formal sector are small, raising the minimum wage is likely to reduce poverty and if informal sector wages rise when the minimum wage increases, higher minimum wages are also likely to reduce poverty. However, if higher minimum wages cause workers to lose formal sector salaried jobs and if minimum wage legislation does not cover a large pool of informal workers such as in the case of Nigeria, higher minimum wages are not likely to reduce poverty.

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# Context

With a population of about 177.5 million people, Nigeria is currently the most populous country in Africa; it was classified as a lower-middle-income country at the time the data used in this research were collected and that classification has not changed ([World Bank, 2016).](#_bookmark28) It is the largest economy in Africa and is also the biggest oil exporter on the continent with the continents’ largest natural gas reserves. About 66 percent of the Nigerian population are active in the labour force ([NBS, 2014).](#_bookmark21)

# Entrepreneurship In Nigeria

According to World Bank estimates during our period of study, 44.8 percent of the Nigerian labour force worked in agriculture, 13.5 percent in industry, and 41.7 percent in services. A significant majority, consisting of about 70.9 percent of men and 74.8 percent of women in the economically active group reported being self-employed ([SLOAN, 2014).](#_bookmark25) From 2003 – 2008, Nigeria set out an ambitious reforms program; the most important element of the program is to base the budget on a conservative reference price for oil, with the excess saved in a special ‘Excess Crude Account’ (ECA) because there are concerns that the economy is over reliant on revenue from oil. Following these measures, the economy responded with strong growth between 2003 to 2010, and our study falls within this period ([World Bank, 2015).](#_bookmark27) However, during that time, Nigeria also continued to have a less favourable profile in terms of poverty, government corruption, illiteracy and poor infrastructure ([NBS, 2014;](#_bookmark21) [World Bank, 2015).](#_bookmark27)

Regarding self-employment, indices from the Nigerian Global Entrepreneurship Monitor (GEM) survey suggest that 68 percent of male entrepreneurs and 63 percent female entrepreneurs are

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opportunity entrepreneurs, while the remaining are necessity entrepreneurs (Bosma & Levie, 2010). Traditional labour theories e.g. the [Harris and Todaro (1970](#_bookmark12)) and [Fei and Ranis (1964)](#_bookmark6) models we already mentioned suggest that Nigeria should have a higher level of necessity driven entrepreneurship given its relatively low GDP per capita. However, GEM reports indicate that it has a higher opportunity entrepreneurship rate than many developed countries with significantly greater GDPs. This disparity may be explained by the insufficient attention being paid in traditional development literature to both culture as already mentioned, and to institutions (Easterly, 2013). As argued by Du and Mickiewicz (2016), entrepreneurship may thrive under a non-transparent government, but not under a predatory governance regime. Despite its shortcomings and high level of corruption, Nigeria cannot be classified as having a “predatory government” as it does not have policies that specifically pillage entrepreneurs as understood by Tocqueville (1840/2003: 285).

# Entrepreneurship and Institutions in Nigeria

Unless we stress the significance of political institutions and culture, the high proportion of opportunity entrepreneurs may appear puzzling in Nigeria, as *Doing Business* (DB) ranked Nigeria 147th out of 189 countries in its index; it also ranked the country 122nd in ease to start a business. However, this low score was primarily due to the low scores on electricity supply and registering property; the country placed 185 out of 189 in both instances. According to data collected by DB, starting a registered business in Nigeria requires 8 procedures, takes 28.0 days, and costs 58.3 percent of the nation’s income per capita. It is therefore not surprising that the

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informal sector in Nigeria consisting of unregistered businesses is quite substantial ([DoingBusiness, 2014).](#_bookmark5)

While informality may become a constraint on the size and growth of businesses (De Soto, 1989), it is not in itself the major barrier to entrepreneurship especially if entrepreneurship is supported by favourable social norms. For example, research from Nigeria has highlighted how organizations adopt informal rules and identify ambiguity of formal institutions as a major source of organizational defiance (Decker, 2007; Uzo & Mair, 2014).

Finally, there are compelling reasons to argue that both types of self-employment (push and pulled) are likely to co-exist in Nigeria. High poverty and unemployment rates could serve as push factors forcing people into self-employment; while perceived opportunities, like both (1) deficiencies in the infrastructure that can be exploited by would be entrepreneurs and (2) opportunities triggered by the high economic growth rates, could serve as a catalyst for pulling individuals into self-employment ([Parker, 2009).](#_bookmark23)

# The Minimum Wage Regulation in Nigeria

Nevertheless, while some regulations may have less impact, we would expect those directly related to labour markets to matter. The minimum wage is a regulatory dimension we wish to consider in more detail. Its current level is N18,0002 monthly (Eighteen thousand Naira) in

Nigeria (equivalent to roughly $113 monthly at the time of writing), and it is generally enforced across the country. Enacted by the National assembly of the Federal Republic of Nigeria, the

2 The exchange rate was approximately $1 : N 158.

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minimum wage act covers both the public and private sector of Nigeria (The National Minimum Wage Act Cap. N61 Laws of the Federation of Nigeria, 2004).

It also covers workers at federal, state and local government levels ([NBS, 2014).](#_bookmark21) It has implications for labour market decisions as individuals could accept the minimum wage instead of venturing into self-employment because incomes in self-employment can be volatile and uncertain, but as other regulatory features it does not restrict entrepreneurship in a substantive way. At the same time, the Nigerian government does not provide any unemployment benefits to unemployed or disabled people, which taken together may generate necessity driven entry into self-employment at the low end of the spectrum.

One possible explanation of the paradox of high level of entrepreneurship in Nigeria despite regulatory barriers has been hinted at above: since the end of military rule in 1999, Nigeria does not have a predatory government, social norms promote entrepreneurship the country and enjoys relatively effective constraints on the executive (Polity 4, 2017). These higher order constitutional features have a significant impact on entrepreneurship, compared with the impact of lower level regulations as captured by DB indices (Estrin, Korosteleva, & Mickiewicz, 2013). Similarly, to some extent, private entrepreneurs aim to fill voids resulting from government ineptitude, by providing amenities and services in terms of housing, medical services, agriculture, education, security and power generation. For example, Nigeria was recently reported as the world’s largest importer of private generators by *The Economist* because there is a huge void in electricity generation. The extant literature has also clearly highlighted the large informal economy in Nigeria and sizable infrastructural deficits existing in the country (Russ et al.,2017; Meagher, 2016).

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# Gender and Occupation in Nigeria

However informal institutions and social attitudes while generally supportive to entrepreneurship, may also have negative impact in some respects. In particular, while the Nigerian constitution prohibits discrimination on the grounds of gender, this is not universally enforced, and customary and religious laws restrict women’s rights ([British Council, 2012b).](#_bookmark3) There are also regional differences in Nigeria that might be interesting to investigate (Ehrhardt, 2017). For example, some interpretations of Sharia and customary laws, prevalent especially in the North of the country, restrict freedom of movement, marriage and inheritance for women. In addition to these, Nigeria has large gender gaps in education, economic empowerment, income, and political participation ([OECD,](#_bookmark22) 2014). For these reasons, we need to examine the self- employment profile from a gender perspective in the Nigerian context.

The gender debate is very pertinent because women might be unable to participate fully in the labour market because they are required to combine their household activities with income yielding jobs. For example, research from India, a country with similar gender characteristics as Nigeria has found that constrained choice, limited contacts of women and physical segmentation of the labour market perpetuate forces that entrap women workers in a low-income situation with worse outcomes than those of their male counterparts (Mitra, 2005).

While the focus above is on opportunity driven entrepreneurship, individuals can be pushed into self-employment either by unemployment or other negative factors. This can also be said to be the case in many developing countries ([Fields, 2013;](#_bookmark7) [Gindling & Newhouse, 2014;](#_bookmark9) [W.F.](#_bookmark19) [Maloney, 2004).](#_bookmark19) As opportunity driven self-employment is likely to be associated with a higher income and necessity driven self-employment with a lower income, the paper examines the

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returns to occupations across the income distribution to investigate if self-employed individuals experience wages penalties when compared to employers and paid workers.

# Research Questions

Guided by the gaps in the literature and given the context, this paper examines the nature of income distribution across self-employed groups, and the relative positioning of self-employed individuals’ income with respect to other occupational categories. The central questions answered by this paper are: (i) Are the self-employed likely to experience income premiums or penalties when compared to paid workers? (ii) Does the minimum wage have any implications for self-employed and paid workers? (iii) Are there distinguishable patterns among occupational status and gender in this context? We hypothesize that given the occupational structure of individuals typical in low income and lower middle income countries and exemplified in Nigeria, interesting insights can be derived by examining the income returns to employment across the income distribution.

# Data and Methods

The database used for this analysis is from the Nigerian Living Standards Survey (NLSS) otherwise known as the Living Standards Measurement Survey (LSMS) for the year 2004. The NLSS is an extensive micro-level household survey detailed in its coverage of various topics; it provides a solid basis for an in-depth analysis of households and individuals in the country. The survey was conducted by the Nigerian Bureau of Statistics (NBS), a body that has received

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support from the World Bank. The data covers both rural and urban areas of all the 36 states of Nigeria and the Federal Capital Territory.

To encourage full disclosure, respondents were assured that their responses would be used for research, planning and statistical purposes alone and not for taxation. In line with the extant literature, the final sample is restricted to the individuals between the ages of 16 and 65 (representing the legal working age within the country). Individuals employed in the agricultural sector are removed from the sample, as well as retired persons and full time students ([Gindling &](#_bookmark9) [Newhouse, 2014;](#_bookmark9) [Parker, 2009).](#_bookmark23)

The final database consists of 18,397 individuals (10,206 males and 8,191 females) and covers the entire country. As expected from official reports, most economically active individuals are self-employed “own account” individuals (self-employed without workers). The next largest category are paid workers (wage workers) and the smallest employed group are the employers (self-employed with workers). All the information and descriptive statistics pertaining to the variables used in our empirical analyses are available in the online appendices section.

Our descriptive statistics demonstrate that employers have the highest annual labour wages, followed by paid-employees and self-employed own account individuals. The labour wage earning sample in the survey consists of a total of 10,832 respondents made up of 605 employers, 3,669 paid workers and 6,558 self-employed individuals who reported labour wages ranging from 3N 36,000 to N 2,160,000 annually which implies a wage range of N 3,000 to N 180,000

monthly. It also appears that males always earn more than females except in few cases: interestingly, female employers in the survey earn more on average than male employers when

3 The exchange rate was $1 : ~~N~~ 158 at the time of writing.

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individual characteristics have not been controlled for. The labour wage and employment statistics are also in line with macro-indicators given by t[he World Bank (2015](#_bookmark27)) and [NBS (2014),](#_bookmark21) in terms of regional and gender differences in employment within the country (Olarewaju, 2016). We use all the variables that are available to us from the survey and perform detailed robustness checks that are available on request.

# Methodology

First, to investigate the income differential relationship, this paper makes use of two techniques. We start with the [Heckman (1979)](#_bookmark13) model and estimate the conditional annual labour wage (income) amongst occupations, taking into account labour force participation. Next, we utilize quantile regressions as they compute several different regression curves corresponding to the various percentage points on the labour wage distribution, thus giving a more complete picture of the wage spectrum and enabling us to distinguish between low-value-added and high-value- added activities as implied by achieved income.

Our motivation to apply the Heckman selection model is to note that people who work are selected non-randomly from the population; we have access to annual income observations only for those who work and estimating the determinants of wages from the subpopulation who work may thus introduce a selection bias. The Heckman correction solves this potential selection bias by first estimating the probability of working and then estimating the annual income. In all our estimations, we can denote annual income and explanatory variables comprising standard human capital formation literature variables such as age, sector, gender, marital status, educational

attainment, ability to speak a Nigerian language, region and credit constraints. The estimated

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coefficients are thus interpreted as a measure of the conditional earnings premium/penalty experienced by the self-employed and employers respectively compared to paid wage earners.

This paper also makes use of quantile regressions in addition to Heckman estimates to calculate self-employment own account and employer premiums/penalties conditional on observable individual characteristics. We do this because while the Heckman selection based regression coefficients give a grand summary of averages in the distribution, quantile regressions offer additional insights since we can compute several different sets of coefficients corresponding to various percentage points specified, thus giving a more complete picture of the wage distribution ([Koenker and Hallock, 2001).](#_bookmark17)

The quantile regression allows us to determine if individuals in any of the employment states are bound to experience a labour wage/income premium or penalty relative to another employment option, as evaluated at different points on the labour income distribution. For example workers at the lower income levels might have a different experience compared to workers at the higher income levels. All our equations are available in the online appendices section. Our results are presented in the next section.

# Results and Discussion

All our tables and figures are available in the online appendices section as we restrict our discussion in this text to what is comprehensible to a general reader. Our results indicate that self-employed own account individuals earn about 16 percent less than wage workers, while employers earn about 12.6 percent more than wage workers. The quantile regressions suggest a distinct pattern with self-employed own account individuals consistently earning less than paid

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employees until the upper end of the income spectrum. Crucially, the labour wage differential between paid workers and self-employed own account workers steadily increases at the lower end of the income spectrum until where the minimum wage of N18,000 is. After this point, the

labour wage differential starts to reduce steadily with the differences in earnings disappearing at the top most quantiles. Throughout the earnings distribution, employers have the highest earnings.

Our results are consistent with the extant literature [(Fields, 2013;](#_bookmark7) [Gindling & Newhouse, 2014;](#_bookmark9) [Günther & Launov, 2012)](#_bookmark11) suggesting that self-employed individuals are a heterogeneous group, with employers having significantly more economic returns than self-employed own account individuals. Employers have significant earnings premiums and do better than paid workers and self-employed own account individuals throughout the income distribution, and hence we can conjecture they are mostly engaged in pulled (opportunity-driven) self-employment if only monetary indicators are considered. In contrast, self-employed own account individuals are worse off in terms of labour wage until the upper end of the income spectrum, however from that point onwards they begin to have earnings comparable with employers and paid workers.

In examining the impact of occupational choice on wages for men and women, we estimate our model for men and women separately. The results suggest that both male and female employers experience income premiums and do better than paid workers and self-employed own account individuals for most part of the income distribution until the upper quantiles. The labour wage penalty for self-employed “own-account” workers occurs up to a certain point on the labour wage distribution and then starts to improve. This cut-off point is the 10th percentile for men, and interestingly a higher threshold of the 20th percentile for women, consistent with what we already

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discussed regarding minimum wage; as self-employed individuals are not guaranteed minimum wages, they appear to be worse off towards the lower end of the distribution.

Our results in sum show that the labour wage penalty for self-employed own account individuals is found towards the lower end of the distribution where paid workers enjoy some minimum wage guarantee; this amount has been reviewed several times but is currently N18,000 monthly.

The trend is for the labour wage penalty to progressively increase up to the minimum wage level point between the 10th and 20th percentiles and then improve later as this effect wears off. This finding is significant and robust, and in the absence of other economic reasoning, this may indicate two things: (1) that potential workers who cannot receive employment at minimum wage are displaced towards low income self-employment as they cannot legally be hired below minimum wage, (2) that these individuals are special in the sense that they cannot even attain a job that provides the minimum wage, which is subsequently reflected in the fact that they are penalized.

As the World Bank, NBS and other data providing bodies have highlighted significant regional differences in Nigeria, we examine the robustness of the results for different regions (also included in our regressions). Thus, we recreate our model for each of the four regions in Nigeria (the North, Mid-belt, South-East and South-West). The results are robust, and consistently show that self-employed own account individuals are worse off in terms of labour wages in all the four regions and that due to the fact that self-employed individuals are not guaranteed minimum wages in the manner already described.

Results from our classification tests also imply that women need higher educational attainments

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than men to: (1) become employers and (2) be in paid employment. Our results from the

Heckman estimation indicate that men earn on average 25 percent more than women. From our Quantile regressions, we also find that these gender differences can be found throughout the income distribution but gets progressively worse towards the higher end of the distribution; men earn on average 13 percent more than women at the lower income level to 40 percent more at the upper income level.

# Conclusion

This paper examines the heterogeneity in income across different occupational categories by distinguishing between employers, paid workers and self-employed own account individuals in Nigeria. The results suggest that employers experience labour wage premiums throughout the income distribution and self-employed own account individuals experience labour wage premiums at the upper quantiles, but suffer labour wage penalties at the lower quantiles compared to paid workers.

Furthermore, the results suggest that a labour wage penalty for the self-employed individuals is mainly found towards the lower end of the distribution, particularly below the threshold where paid workers enjoy a minimum wage guarantee (currently N18,000 monthly in Nigeria). After

the minimum wage effect that we find has worn-off, the labour wage differential starts to reduce steadily. We also find gender disparities in this context.

Given the context of similar low income and lower middle income countries that have minimum wage and gender characteristics like Nigeria, the paper provides some policy implications. First, since the self-employed in such countries do not receive any monetary benefits from the

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government, we agree with other authors who call for policies that create an enabling business environment for the self-employed seeing that they are clearly disadvantaged by not being guaranteed minimum wages (Van Beers, 2008; [Fields, 2013).](#_bookmark7)

Furthermore, the role of education in closing the gender gap is clear, as women who are highly educated have a greater probability of being employers or paid workers and thus reap the benefits of the higher incomes associated with these occupational statuses. Importantly, the results suggest that being an entrepreneur (having an occupational status as an “employer”) is an important avenue for women to overcome constraints they seem to be facing in paid employment and to earn significant incomes.

As argued by Estrin et al. (2013), effective constrains on the nations executive that prevent the government from becoming predatory, are more important for value-creating entrepreneurship than lower level regulations. In this context, the paper sheds light on the potential impact of such minimum wage regulations. Given the fact that the country spends a huge amount of its oil revenue on its executive government, some of the funds could be used to reduce the costs and challenges associated with own account self-employment (Baumol, Litan, and Schramm, 2007; World Bank, 2016).

A common denominator that makes this replicable for other low income and lower middle income emerging market economies characterised by a non-transparent but non-predatory government as in the case of Nigeria, is that although self-employment may present important opportunities of value creating activities, it might be prudent to consider other ways to assure sources of decent income for individuals who cannot obtain employment that guarantees a minimum wage.

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# Detailed Description of Methodology

First, to investigate the income differential relationship, this paper makes use of two techniques. We start with the [Heckman (1979)](#_bookmark30) model and estimate the conditional annual labour wage (income) amongst occupations, taking into account labour force participation. Next, we utilize quantile regressions as they compute several different regression curves corresponding to the various percentage points on the labour wage distribution, thus giving a more complete picture of the wage spectrum and enabling us to distinguish between low- value-added and high-value-added activities as implied by achieved income.

Our motivation to apply the Heckman selection model is to note that people who work are selected non-randomly from the population; we have access to annual income observations only for those who work and estimating the determinants of wages from the subpopulation who work may thus introduce a selection bias. The Heckman correction solves this potential selection bias and estimation takes place in two stages. In the first stage, we formulate a model, based on economic theory, for the probability of working as opposed to belonging to the “non- active” labour force. The canonical specification for this relationship is the initial probit equation:

Pr (𝐸𝑚𝑝𝑙𝑜𝑦𝑒𝑑 = 1 │ 𝑊) = 𝜙 (𝑊'𝛽)

𝑃(𝐸𝑚𝑝𝑙𝑜𝑦𝑒𝑑 = 1 |𝑊) = 𝑃(𝑥'𝑖𝐸 + 𝑥'𝑖𝑋 + 𝑒𝑖 > 0|𝑊)

[1.1]

Where *Employed* indicates employment (*Employed* = 1 if the respondent is employed, i.e. the individual has either an employment status of employer, self-employed own account individual, or paid worker), and *Employed* = 0 non-employed (the individual has the employment status of either unemployed or not in labour force), thus the variable *W* implies selection into occupational categories but not income. As before, *E* is the vector that includes

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the different levels of education, *X* is a vector of control variables, and *e* is the error term. 𝛽 is a vector of control parameters, and 𝜙 is the cumulative distribution function of the

standard normal distribution. The estimates from this model yield results that can be used to predict the employment probability for each individual, given each individual’s observable characteristics.

The Heckman procedure next corrects for self-selection by incorporating a transformation of these predicted individual probabilities as an additional explanatory variable in the second

stage wage equation, which is now specified as:

𝑌𝑖 = 𝑥𝑖𝛽 + 𝛿𝑆𝑒𝑖 + 𝜂𝐸𝑚𝑖 + 𝜇𝑖

[1.2]

Where 𝑌𝑖 denotes logged annual income of individuals. The dummies 𝑆𝑒𝑖 and 𝐸𝑚𝑖 take the

value of 1 if person *i* is a self-employed own account individual or employer respectively. The estimated coefficients 𝛿 and 𝜂 are interpreted as a measure of the Heckman corrected

conditional earnings premium/penalty experienced by the self-employed and employers

respectively, compared to paid workers. We can denote 𝑌 ∗ as the underlying wage offer,

𝑖

which is not observed if the respondent does not work. The conditional expectation of income given the person works is then:

Ε[𝑌𝑖|𝑥𝑖,𝑊 = 1] = 𝑥𝑖𝛽 + 𝛿𝑆𝑒𝑖 + 𝜂𝐸𝑚𝑖 + Ε[𝜇𝑖|𝑥𝑖,𝑊 = 1]

Ε[Yi|xi,X = 1] = xiβ + δSei + ηEmi + ρσμλ(X'β)

[1.3]

Where *ρ* is the correlation between unobserved determinants of propensity to work Ε and unobserved determinants of wage offers 𝜇𝑖, the variable *W* implies selection into employment, *σ u* is the standard deviation of 𝜇𝑖, and 𝜆 is the inverse Mills ratio evaluated at

𝑊'𝛽 . This equation thus solves the sample selection issue that can be viewed as a form

of omitted-variables bias, as conditional on 𝑥𝑖,𝛿,𝜂

and on 𝜆 as if the sample is randomly

selected.

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In all our estimations, 𝑌𝑖 denotes logged annual income, explanatory variables 𝑥𝑖 comprise

standard human capital formation literature variables (age, age squared, sector, gender, marital status, educational attainment, ability to speak a Nigerian language, region and credit constraints). The dummies 𝑆𝑒𝑖 and 𝐸𝑚𝑖 take the value of 1 if person *i* is a self-employed own

account worker or employer respectively. The estimated coefficients 𝛿 and 𝜂 are thus

interpreted as a measure of the conditional earnings premium/penalty experienced by the self- employed and employers respectively compared to paid wage earners.

This paper also makes use of quantile regressions in addition to Heckman estimates to calculate self-employment own account and employer premiums/penalties conditional on observable individual characteristics. We do this because while the Heckman selection based regression coefficients give a grand summary of averages in the distribution, quantile regressions offer additional insights since we can compute several different sets of coefficients corresponding to various percentage points specified, thus giving a more complete picture of the wage distribution (Koenker and Hallock, 2001). Thus, our quantile regression sorts employers, paid workers and self employed own account individuals into percentiles at the .05, .10, .30, .50, .70, .90, .95 and .99 positions on the income distribution and compares them to each other.

The quantile regression allows us to determine if individuals in any of the employment states are bound to experience a labour wage/income premium or penalty relative to another employment option, as evaluated at different points on the labour income distribution. Thus the expression for any worker i at the τth quantile of the 𝑌 distribution conditional on

observable characteristics can be thus expressed as:

𝐹 ‒ 1(𝜏|𝑥 ) = 𝑥 𝛽(𝜏) + 𝛿(𝜏)𝑆𝑒 + 𝜂(𝜏)𝐸𝑚 + 𝜇 , ∀𝜏 ∈ [0,1]

[1.4]

𝑦𝑖 𝑖 𝑖 𝑖 𝑖 𝑖

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For all estimations in this paper, the base employment category was the paid worker category; the category of educational attainment that was left out of the estimations was the ‘no education’ category, for marriage it was ‘unmarried’, for region it was the ‘middle-belt’ of the country, for language it was those who do not speak a Nigerian language and for the location it was the rural location.

Table 1 reports the variables used in our empirical analyses and Table 2 reports the descriptive statistics of the variables. Table 3 shows how annual labour wages are distributed in the survey. Table 4 presents both the Heckman-corrected conditional labour wage premium/penalty estimates for the whole sample and quantile regression estimates based on models [1.3] and [1.4]. Figure 1 is a graph of the labour wage gap conditional on observable characteristics from estimations [1.3] and [1.4] for the whole employed sample. The horizontal y-axis represents the conditional labour wage of paid workers, while the dotted and thick black lines show the conditional income premiums/penalties of employers and self- employed own account individuals respectively. The labour wages captured on the graph represents the responses from the wage-earning sample in the survey i.e. employers, paid workers and self-employed own account individuals. In examining the impact of occupational choice on wages for men and women, we estimate equations [1.3] and [1.4] for men and women separately. These results are presented in Table 5 and Figure 2 for men and Table 6 and Figure 3 for women.

# Detailed Description of Results

Table 4 presents both the Heckman-corrected conditional labour wage premium/penalty estimates for the whole sample and quantile regression estimates based on models [1.3] and

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[1.4]. The results indicate that self-employed own account individuals earn about 16 percent less than wage workers, while employers earn about 12.6 percent more than wage workers. The quantile regressions suggest a distinct pattern with self-employed own account individuals consistently earning less than paid employees until Q(.80). Crucially, the labour wage differential between paid workers and self-employed own account workers steadily increases at the lower end of the income spectrum until Q(.20), where the minimum wage of N18,000 is. After this point, the labour wage differential starts to reduce steadily with the

differences in earnings disappearing at the top most quantiles. Throughout the earnings distribution, employers have the highest earnings.

Figure 1 is a graph of the labour wage gap conditional on observable characteristics from estimations [1.3] and [1.4] for the whole employed sample. The horizontal y-axis represents the conditional labour wage of paid workers, while the dotted and thick black lines show the conditional income premiums/penalties of employers and self-employed own account individuals respectively. The labour wages captured on the graph represents the responses from the wage-earning sample in the survey i.e. employers, paid workers and self-employed own account individuals and ranges from N 3,000 to N 180,000 monthly. The results in

Figure 1 and Table 4 suggest that self-employed individuals are a heterogeneous group, with employers having significantly more economic returns than self-employed own account individuals.

Employers have significant earnings premiums and do better than paid workers and self- employed own account individuals throughout the income distribution, and hence we can conjecture they are mostly engaged in pulled (opportunity-driven) self-employment if only monetary indicators are considered. Self-employed own account individuals are worse off in

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terms of labour wage until about the 80th quantile, however from that point onwards they begin to have earnings comparable with employers and paid workers.

In examining the impact of occupational choice on wages for men and women, we estimate equations [1.3] and [1.4] for men and women separately. The results are presented in Table 5 and Figure 2 for men and Table 6 and Figure 3 for women. The results suggest that both male and female employers experience income premiums and do better than paid workers and self- employed own account individuals for most part of the distribution until the upper quantiles. The labour wage penalty for self-employed “own-account” workers occurs up to a certain point on the labour wage distribution and then starts to improve. This cut-off point is the 10th percentile for men, and interestingly a higher threshold of the 20th percentile for women, consistent with what we already discussed regarding minimum wage; as self-employed individuals are not guaranteed minimum wages, they appear to be worse off towards the lower end of the distribution.

Our results in sum show that the labour wage penalty for self-employed own account individuals is found towards the lower end of the distribution where paid workers enjoy some minimum wage guarantee; this amount has been reviewed several times but is currently N18,000 monthly. The trend is for the labour wage penalty to progressively increase up to the

minimum wage level point between the 10th and 20th percentiles and then improve later as this effect wears off. This finding is significant and robust, and in the absence of other economic reasoning, this may indicate two things: (1) that potential workers who cannot receive employment at minimum wage are displaced towards low income self-employment as they cannot legally be hired below minimum wage, (2) that these individuals are special in the sense that they cannot even attain a job that provides the minimum wage, which is subsequently reflected in the fact that they are penalized.

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As the World Bank, Nigerian Bureau of Statistics and other data providing bodies have highlighted significant regional differences in Nigeria, we examine the robustness of the results for different regions (also included in our regressions). Thus, we recreate the estimations [1.3] and [1.4] for each of the four regions in Nigeria (the North, Mid-belt, South- East and South-West). The results are robust, and consistently show that self-employed own account individuals are worse off in terms of labour wages in all the four regions and that due to the fact that self-employed individuals are not guaranteed minimum wages in the manner already described.

Results from our classification tests in Table 7 imply that women need higher educational attainments than men to: (1) become employers and (2) be in paid employment. Our results from the Heckman estimation in Table 4 indicate that men earn on average 25 percent more than women. From our Quantile regressions, we also find that these gender differences can be found throughout the income distribution but gets progressively worse towards the higher end of the distribution; men earn on average 13 percent more than women at the 5th quantile to 40 percent at the 99th quantile. These results are all significant at the 1 percent level.

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**Table 1.** Variables Used in Empirical Estimations – Descriptive Statistics are presented in Table 2

Variable What it Measures Methodology

Employment Status Employment Status Employer = 1

Self-Employed (Own Account) =2 Paid Worker = 3

Unemployed = 4

Not in Labour Force = 5

Employed Being in Employment Dummy (1/0)

[Employed = 1 if Employer, Self-Employed (Own Account) or Paid Worker]

[Non-Worker = 0 if Unemployed or Not in Labour Force]

Sex Male or Female Dummy (1/0) [Male = 1]

[Female = 0]

Age in Years Age in years Age in Years

Age Square Age Squared Age Squared

Sector Urban or Rural

Residence

Dummy (1/0) [Urban = 1]

[Rural = 0]

Marital Status Marital Status Dummy (1/0) [Married]

[Not Married = 0]

Religion Religion Dummy (1/0) for 4 religions: [Christian, Muslim & Others]

Educational Attainment Educational attainment Dummy (1/0) for 5 categories:

[No Ed = No Education]

[Lo Ed = Low Education (primary to junior secondary)]

[Mid Ed = Medium Education (senior secondary to ‘O’ level)]

[High Ed = High Education (BSc and equivalent)]

Very High Ed = Very High Education (Masters to Doctorate)]

Region Region of the country Dummy (1/0) for 4 regions: [South-East = South East] [Mid-Belt = Middle Belt] [South-West = South West] [North = North]

House or Land A proxy for source of collateral for bank loan

Local Language Ability to speak or/and write a Nigerian Language

Dummy (1/0) measuring if the Individual owns a Plot of Land or House:

[Owns = 1]

[Does not own = 0]

Dummy (1/0) measuring if the Individual can speak/write a Nigerian Language: [Can Speak/Write = 1]

[Cannot Speak/Write = 0]

Log (Annual Income) Log of Annual Income Log of Annual Income

**Table 2.** Descriptive Statistics

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Whole Sample Mean | Male Mean | Female Mean |
|  | (Std Dev) | (Std Dev) | (Std Dev) |
| *Employment* |  |  |  |
| Employer | 3.3% | 4.4% | 1.85% |
| Self-Employed (Own Account) | 35.64% | 41.12% | 28.84% |
| Paid Worker | 19.94% | 25.71% | 12.75% |
| Unemployed | 29.73% | 20.3% | 41.55% |
| Non Labour Force | 11.39% | 8.5% | 15.01 |
| *Education* |  |  |  |
| No Ed | 4.4% | 3.8% | 5.2% |
| Low Ed | 31.5% | 33.5% | 29.1% |
| Mid Ed | 32.4% | 37.5% | 26.1% |
| High Ed | 6.8% | 8.6% | 4.7% |
| Very high Ed | 1.7% | 2.1% | 0.7% |
| Unspecified | 23.2% | 14.5% | 34.2% |
| *Demographic* |  |  |  |
| Age in years | 34.32 | 35.14 | 33.3 |
|  | (13.165) | (13.114) | (13.159) |
| Married | 55.2% | 50.1% | 61.8% |
| Christian | 63.4% | 65.8% | 60.4% |
| Muslim | 35.3% | 32.9% | 38.3% |
| *Geographic* |  |  |  |
| Urban | 42.8% | 45.3% | 39.7% |
| Rural | 57.2% | 54.7% | 60.3% |
| Region |  |  |  |
| South-East | 34.2% | 35% | 33.2% |
| South-West | 24.8% | 25.9% | 23.4% |
| Mid-Belt | 18.5% | 18.6% | 18.4% |
| North | 22.4% | 20.5% | 25% |
| *Further Controls* |  |  |  |
| House or Land | 10.1% | 08.9% | 11.8% |
| Local Language | 67.5% | 74.5% | 59.0% |
| Log of Annual Income | 6.973 | 8.511 | 5.057 |
|  | (5.8607) | (5.4462) | (5.7944) |
| N | 18,397 | 10,206 | 8,191 |

**Table 3.** Mean Annual Labour Income of Employed Sample by Employment Type, Gender and Region

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Male |  | Female |  |
|  |  | Mean Wage N1 |  | Mean Wage N |  |
|  |  | (Std Err) | N | (Std Err) | N |
| *North* |  |  |  |  |  |
|  | Self-Employed | 185,965.8 | 751 | *219,091* \* | 140 |
|  | (O.A)2 | (9,644.5) |  | (24,881.5) |  |
|  | Paid Worker | 281,630.5 | 621 | 191,768.2 | 137 |
|  |  | (13,692.16) |  | (10,059.76) |  |
|  | Employer | 311,048.9 | 165 | *412,033.3 \** | 24 |
|  |  | (28,595.95) |  | (78,699.14) |  |
| *Mid-Belt* |  |  |  |  |  |
|  | Self-Employed (O.A) | 206,539 | 703 | 140,146.8 | 313 |
|  |  | (10,299.61) |  | (12,662.84) |  |
|  | Paid Worker | 238,019.9 | 507 | 195,603.8 | 153 |
|  |  | (10,548.42) |  | (9,299.89) |  |
|  | Employer | 266,039.3 | 125 | *293,468.8 \** | 32 |
|  |  | (24,226.71) |  | (52,992.66) |  |
| *South-East* |  |  |  |  |  |
|  | Self-Employed (O.A) | 208,569.5 | 1,650 | 133,462.6 | 1,010 |
|  |  | (5,471.77) |  | (5,250.546) |  |
|  | Paid Worker | 260,804.9 | 712 | 222,930.6 | 389 |
|  |  | (12,123.49) |  | (10,861.79) |  |
|  | Employer | 343,745.2 | 86 | 171,220 | 47 |
|  |  | (29,518.05) |  | (12,743.83) |  |
| *South-West* |  |  |  |  |  |
|  | Self-Employed (O.A) | 184,967.1 | 1093 | 129,438.1 | 898 |
|  |  | (6,752.93) |  | (6,706.68) |  |
|  | Paid Worker | 225,743.8 | 784 | 205,809.8 | 366 |
|  |  | (7,332.42) |  | (10,436.51) |  |
|  | Employer | 213,274.6 | 77 | *358,962.9* \* | 49 |
|  |  | (16,228.51) |  | (57,584.58) |  |
| *Entire Sample* |  |  |  |  |  |
|  | Self-Employed (O.A) | 198,038.1 | 4,197 | 137,895.5 | 2,361 |
|  |  | (3,700.58) |  | (4,086.32) |  |
|  | Paid Worker | 250,855.5 | 2,624 | 208,847.8 | 1,045 |
|  |  | (5,515.434) |  | (5,776.33) |  |
|  | Employer | 288,216.8 | 453 | *295,502.1 \** | 152 |
|  |  | (13,973.58) |  | (26,074.22) |  |
|  | *Gender Total* | *222,707.3* | *7,274* | *165,467.6* | *3,558* |
|  |  | *(3,065.33)* |  | *(3,458.49)* |  |
|  | *Survey Total* | *194,087.45* |  |  |  |
|  |  | *(3,261.91)* |  |  |  |
|  | N | 10,832 | 7,274 |  | 3,558 |

1 Conversion rate was about 158 N ≈ $1 during the writing period.

2 “Own Account” workers represent the Self-Employed.

**Table 4.** Labour Income Premiums and Penalties, Estimations [1.4] and [1.5] - Whole Sample

Variables Heckman Quantile Estimation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Estimation | Q(.05) | Q(.10) | Q(.30) | Q(.50) | Q(.70) | Q(.90) | Q(.95) | Q(.99) |
| Employer | 0.126\*\*\* | 0.007 | 0.065 | 0.100\*\*\* | 0.109\*\* | 0.070\*\* | 0.286\*\*\* | 0.316\*\* | 0.057 |
|  | (0.033) | (0.093) | (0.082) | (0.031) | (0.055) | (0.028) | (0.071) | (0.146) | (0.148) |
| S.E (O.A) | -0.160\*\*\* | -0.156\*\*\* | -0.273\*\*\* | -0.242\*\*\* | -0.206\*\*\* | -0.095\*\*\* | 0.076 | 0.076 | 0.182 |
|  | (0.017) | (0.037) | (0.029) | (0.021) | (0.023) | (0.019) | (0.051) | (0.053) | (0.108) |
| Age in Years | 0.033\*\*\* | 0.035\*\*\* | 0.037\*\*\* | 0.041\*\*\* | 0.031\*\*\* | 0.033\*\*\* | -0.028\*\* | 0.001 | -0.038 |
|  | (0.010) | (0.006) | (0.008) | (0.004) | (0.006) | (0.007) | (0.014) | (0.018) | (0.031) |
| Age Square | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* | 0.000\*\* | 0.000 | 0.001 |
|  | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Urban | 0.123\*\*\* | 0.113\*\*\* | 0.100\*\*\* | 0.151\*\*\* | 0.141\*\*\* | 0.109\*\*\* | 0.148\*\*\* | 0.033 | 0.091 |
|  | (0.017) | (0.018) | (0.027) | (0.016) | (0.025) | (0.026) | (0.040) | (0.070) | (0.112) |
| Unspecified | 0.014 | 0.041 | -0.002 | -0.054 | -0.096\*\* | -0.004 | 0.284\*\*\* | 0.791\*\*\* | 0.353 |
|  | (0.041) | (0.047) | (0.063) | (0.057) | (0.045) | (0.067) | (0.100) | (0.100) | (0.332) |
| Low Ed | 0.207\*\*\* | 0.157\*\*\* | 0.214\*\*\* | 0.247\*\*\* | 0.146\*\*\* | 0.194\*\*\* | 0.325\*\*\* | 0.754\*\*\* | -0.041 |
|  | (0.039) | (0.046) | (0.063) | (0.048) | (0.046) | (0.060) | (0.053) | (0.101) | (0.426) |
| Mid Ed | 0.344\*\*\* | 0.256\*\*\* | 0.324\*\*\* | 0.392\*\*\* | 0.316\*\*\* | 0.356\*\*\* | 0.453\*\*\* | 0.744\*\*\* | 0.003 |
|  | (0.040) | (0.041) | (0.063) | (0.050) | (0.051) | (0.059) | (0.072) | (0.086) | (0.432) |
| High Ed | 0.783\*\*\* | 0.806\*\*\* | 0.945\*\*\* | 0.922\*\*\* | 0.780\*\*\* | 0.728\*\*\* | 0.793\*\*\* | 0.988\*\*\* | -0.226 |
|  | (0.046) | (0.085) | (0.077) | (0.038) | (0.043) | (0.064) | (0.089) | (0.101) | (0.420) |
| Very high Ed | 0.999\*\*\* | 0.286 | 1.105\*\*\* | 1.213\*\*\* | 0.980\*\*\* | 1.215\*\*\* | 1.370\*\*\* | 1.311\*\*\* | 0.178 |
|  | (0.062) | (0.233) | (0.378) | (0.067) | (0.062) | (0.078) | (0.108) | (0.084) | (0.455) |
| Male | 0.251\*\*\* | 0.131\*\*\* | 0.150\*\*\* | 0.233\*\*\* | 0.238\*\*\* | 0.240\*\*\* | 0.272\*\*\* | 0.275\*\*\* | 0.405\*\*\* |
|  | (0.023) | (0.023) | (0.024) | (0.021) | (0.019) | (0.017) | (0.047) | (0.038) | (0.065) |
| Married | -0.002 | 0.013 | -0.008 | -0.020 | 0.013 | 0.016 | 0.053 | -0.028 | -0.184\* |
|  | (0.017) | (0.023) | (0.025) | (0.017) | (0.018) | (0.021) | (0.039) | (0.048) | (0.110) |
| Christian | 0.053 | 0.010 | -0.028 | -0.019 | 0.049 | 0.031 | 0.297\*\* | 0.277 | -0.393 |
|  | (0.069) | (0.076) | (0.090) | (0.064) | (0.108) | (0.115) | (0.126) | (0.466) | (0.496) |
| Muslim | 0.032 | 0.063 | -0.004 | -0.018 | -0.001 | -0.009 | 0.267\* | 0.228 | -0.515 |
|  | (0.070) | (0.074) | (0.096) | (0.068) | (0.111) | (0.106) | (0.138) | (0.480) | (0.498) |
| House or Land | -0.087\*\*\* | -0.015 | -0.059\*\*\* | -0.117\*\*\* | -0.069\*\*\* | -0.059 | -0.019 | 0.000 | -0.000 |
|  | (0.027) | (0.020) | (0.016) | (0.031) | (0.026) | (0.041) | (0.064) | (0.069) | (0.102) |
| Local Language | -0.033 | -0.006 | -0.036 | -0.098\*\*\* | -0.034 | 0.029 | -0.024 | -0.045 | 0.087 |
|  | (0.021) | (0.033) | (0.025) | (0.023) | (0.024) | (0.028) | (0.049) | (0.041) | (0.119) |
| South-East | 0.092\*\*\* | 0.139\*\*\* | 0.104\*\*\* | 0.117\*\*\* | 0.081\*\*\* | 0.054\* | 0.137\*\* | 0.093 | 0.109 |
|  | (0.023) | (0.031) | (0.035) | (0.025) | (0.018) | (0.033) | (0.062) | (0.121) | (0.128) |
| South-West | -0.099\*\*\* | -0.058\*\* | -0.095\*\*\* | -0.047\*\* | -0.110\*\*\* | -0.130\*\*\* | -0.196\*\*\* | -0.210\* | -0.180\* |
|  | (0.024) | (0.028) | (0.031) | (0.023) | (0.032) | (0.028) | (0.057) | (0.114) | (0.096) |
| North | 0.039 | 0.009 | -0.025 | 0.021 | -0.024 | -0.023 | 0.150 | 0.519\*\*\* | 0.156 |
|  | (0.026) | (0.025) | (0.032) | (0.025) | (0.020) | (0.031) | (0.094) | (0.094) | (0.126) |
| Cons | 10.602\*\*\* | 9.696\*\*\* | 9.971\*\*\* | 10.202\*\*\* | 10.679\*\*\* | 10.833\*\*\* | 12.246\*\*\* | 11.756\*\*\* | 14.949\*\*\* |
|  | (0.254) | (0.145) | (0.148) | (0.121) | (0.147) | (0.126) | (0.358) | (0.564) | (0.999) |
| Sigma R2 | 0.046 | 0.0796 | 0.1080 | 0.1545 | 0.1348 | 0.1071 | 0.0627 | 0.0537 | 0.0348 |

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01, Dependent Variable is Log of Annual Wage

**Table 5.** Labour Income Premiums and Penalties, Estimations [1.4] and [1.5] - Male Sample

Variables Heckman Quantile Estimation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Estimation | Q(.05) | Q(.10) | Q(.30) | Q(.50) | Q(.70) | Q(.90) | Q(.95) | Q(.99) |
| Employer | 0.115\*\*\* | 0.056 | 0.144\* | 0.099\*\*\* | 0.130\* | 0.131\*\*\* | 0.155\*\* | 0.148 | 0.199 |
|  | (0.038) | (0.051) | (0.086) | (0.027) | (0.072) | (0.036) | (0.064) | (0.147) | (0.192) |
| S.E (O.A) | -0.086\*\*\* | -0.101\*\* | -0.198\*\*\* | -0.164\*\*\* | -0.121\*\*\* | 0.029 | 0.108\*\* | 0.143 | 0.183 |
|  | (0.021) | (0.045) | (0.038) | (0.025) | (0.030) | (0.019) | (0.046) | (0.091) | (0.106) |
| Age in Years | -0.015 | 0.044\*\*\* | 0.046\*\*\* | 0.029\*\*\* | 0.012\* | 0.023\*\*\* | -0.039\*\*\* | -0.012 | -0.092\*\* |
|  | (0.011) | (0.009) | (0.009) | (0.008) | (0.006) | (0.006) | (0.015) | (0.025) | (0.038) |
| Age Square | 0.000 | -0.000\*\*\* | -0.001\*\*\* | -0.000\*\*\* | -0.000 | -0.000\*\* | 0.000\*\*\* | 0.000 | 0.001\*\* |
|  | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Urban | 0.199\*\*\* | 0.191\*\*\* | 0.231\*\*\* | 0.179\*\*\* | 0.189\*\*\* | 0.198\*\*\* | 0.192\*\*\* | 0.235\*\*\* | 0.153 |
|  | (0.020) | (0.035) | (0.035) | (0.030) | (0.026) | (0.031) | (0.037) | (0.067) | (0.104) |
| Unspecified | -0.111\*\* | -0.105\* | -0.136\* | -0.254\*\*\* | -0.176\*\*\* | -0.222\*\* | 0.222\*\* | 0.741\*\*\* | -0.029 |
|  | (0.053) | (0.056) | (0.081) | (0.066) | (0.063) | (0.113) | (0.087) | (0.192) | (0.540) |
| Low Ed | 0.097\* | 0.067 | 0.110 | 0.086 | 0.063 | 0.019 | 0.243\*\* | 0.628\*\*\* | -0.150 |
|  | (0.050) | (0.068) | (0.076) | (0.075) | (0.060) | (0.110) | (0.094) | (0.175) | (0.511) |
| Mid Ed | 0.231\*\*\* | 0.137 | 0.222\*\*\* | 0.229\*\*\* | 0.212\*\*\* | 0.199\* | 0.338\*\*\* | 0.583\*\*\* | -0.095 |
|  | (0.050) | (0.087) | (0.072) | (0.071) | (0.058) | (0.104) | (0.056) | (0.166) | (0.473) |
| High Ed | 0.717\*\*\* | 0.934\*\*\* | 0.859\*\*\* | 0.740\*\*\* | 0.659\*\*\* | 0.577\*\*\* | 0.698\*\*\* | 0.816\*\*\* | -0.398 |
|  | (0.057) | (0.120) | (0.066) | (0.084) | (0.059) | (0.119) | (0.077) | (0.151) | (0.520) |
| Very High Ed | 0.850\*\*\* | 0.151 | 0.074 | 0.903\*\*\* | 0.911\*\*\* | 0.989\*\*\* | 1.412\*\*\* | 1.438\*\*\* | 0.090 |
|  | (0.075) | (0.183) | (0.525) | (0.095) | (0.085) | (0.137) | (0.153) | (0.181) | (0.479) |
| Married | -0.005 | -0.004 | 0.007 | 0.028 | 0.039 | 0.045 | 0.101\* | -0.014 | 0.087 |
|  | (0.025) | (0.045) | (0.026) | (0.032) | (0.024) | (0.033) | (0.057) | (0.071) | (0.161) |
| Christian | 0.014 | -0.161\*\*\* | -0.050 | 0.045 | 0.060 | 0.047 | 0.314 | -0.040 | -0.369 |
|  | (0.088) | (0.052) | (0.086) | (0.119) | (0.104) | (0.158) | (0.282) | (0.576) | (0.272) |
| Muslim | 0.014 | -0.093 | 0.008 | 0.085 | 0.057 | -0.005 | 0.256 | -0.182 | -0.623\*\* |
|  | (0.090) | (0.062) | (0.117) | (0.128) | (0.106) | (0.162) | (0.255) | (0.560) | (0.245) |
| House or Land | -0.050 | -0.033 | -0.036 | -0.102\*\*\* | -0.051\* | -0.030 | -0.000 | 0.069 | 0.025 |
|  | (0.033) | (0.028) | (0.030) | (0.039) | (0.030) | (0.029) | (0.080) | (0.113) | (0.136) |
| Local Language | 0.002 | -0.038 | -0.030 | -0.068\*\*\* | 0.048\* | -0.007 | 0.017 | -0.029 | -0.029 |
|  | (0.026) | (0.058) | (0.031) | (0.025) | (0.025) | (0.034) | (0.059) | (0.061) | (0.227) |
| South-East | 0.139\*\*\* | 0.156\*\*\* | 0.157\*\*\* | 0.185\*\*\* | 0.179\*\*\* | 0.063\*\* | 0.136\*\* | -0.024 | 0.116 |
|  | (0.028) | (0.036) | (0.036) | (0.041) | (0.031) | (0.027) | (0.064) | (0.105) | (0.127) |
| South-West | -0.137\*\*\* | -0.067 | -0.095\*\* | -0.041 | -0.114\*\*\* | -0.109\*\*\* | -0.197\*\*\* | -0.466\*\*\* | -0.087 |
|  | (0.028) | (0.057) | (0.042) | (0.038) | (0.039) | (0.029) | (0.048) | (0.134) | (0.099) |
| North | 0.001 | -0.004 | -0.052 | -0.001 | -0.037 | -0.025 | 0.136\* | 0.311\*\*\* | 0.389\*\* |
|  | (0.030) | (0.042) | (0.047) | (0.041) | (0.034) | (0.041) | (0.071) | (0.089) | (0.191) |
| Cons | 12.001\*\*\* | 9.835\*\*\* | 9.948\*\*\* | 10.642\*\*\* | 11.233\*\*\* | 11.349\*\*\* | 12.796\*\*\* | 12.862\*\*\* | 16.641\*\*\* |
|  | (0.277) | (0.164) | (0.264) | (0.224) | (0.150) | (0.261) | (0.369) | (0.857) | (0.859) |
| Sigma R2 | 0.7515 | 0.0936 | 0.1173 | 0.1295 | 0.1119 | 0.0931 | 0.0574 | 0.0447 | 0.0397 |

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01, Dependent Variable is Log of Annual Wage

**Table 6.** Labour Income Premiums and Penalties, Estimations [1.4] and [1.5] – Female Sample

Variables Heckman Quantile Estimation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Estimation | Q(.05) | Q(.10) | Q(.30) | Q(.50) | Q(.70) | Q(.90) | Q(.95) | Q(.99) |
| Employer | 0.172\*\*\* | 0.000 | 0.041 | -0.001 | 0.044 | 0.056 | 0.998\*\*\* | 0.636\*\*\* | 0.026 |
|  | (0.062) | (0.144) | (0.103) | (0.057) | (0.106) | (0.084) | (0.215) | (0.185) | (0.229) |
| S.E (O.A) | -0.326\*\*\* | -0.227\*\*\* | -0.326\*\*\* | -0.452\*\*\* | -0.382\*\*\* | -0.303\*\*\* | -0.180\*\* | -0.079 | 0.016 |
|  | (0.031) | (0.049) | (0.031) | (0.029) | (0.035) | (0.060) | (0.078) | (0.084) | (0.175) |
| Age in Years | 0.079\*\*\* | 0.013 | 0.024\*\*\* | 0.041\*\*\* | 0.038\*\*\* | 0.033\*\*\* | 0.001 | -0.028 | 0.032 |
|  | (0.020) | (0.008) | (0.008) | (0.009) | (0.011) | (0.012) | (0.025) | (0.030) | (0.067) |
| Age Square | -0.001\*\*\* | -0.000 | -0.000\*\* | -0.000\*\*\* | -0.000\*\* | -0.000\*\* | 0.000 | 0.000 | -0.000 |
|  | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) |
| Urban | -0.016 | -0.007 | -0.024 | 0.021 | 0.009 | -0.022 | -0.135 | -0.192\*\* | -0.147 |
|  | (0.032) | (0.031) | (0.027) | (0.025) | (0.033) | (0.054) | (0.086) | (0.075) | (0.229) |
| Unspecified | 0.143\*\* | 0.067\*\* | 0.090 | 0.058 | 0.020 | 0.208\*\* | 0.515\*\*\* | 0.765\*\*\* | 1.098 |
|  | (0.066) | (0.029) | (0.059) | (0.074) | (0.090) | (0.096) | (0.120) | (0.222) | (0.713) |
| Low Ed | 0.369\*\*\* | 0.218\*\*\* | 0.303\*\*\* | 0.309\*\*\* | 0.238\*\*\* | 0.309\*\*\* | 0.452\*\*\* | 0.790\*\*\* | 0.827 |
|  | (0.063) | (0.057) | (0.074) | (0.077) | (0.084) | (0.082) | (0.119) | (0.157) | (0.660) |
| Mid Ed | 0.534\*\*\* | 0.289\*\*\* | 0.433\*\*\* | 0.470\*\*\* | 0.500\*\*\* | 0.482\*\*\* | 0.562\*\*\* | 0.750\*\*\* | 0.873 |
|  | (0.069) | (0.058) | (0.056) | (0.081) | (0.087) | (0.083) | (0.143) | (0.158) | (0.676) |
| High Ed | 0.962\*\*\* | 0.707\*\*\* | 0.723\*\*\* | 1.063\*\*\* | 0.963\*\*\* | 0.884\*\*\* | 1.064\*\*\* | 1.227\*\*\* | 1.127 |
|  | (0.081) | (0.067) | (0.110) | (0.090) | (0.089) | (0.072) | (0.151) | (0.143) | (0.730) |
| Very High Ed | 1.393\*\*\* | 0.216 | 1.690\*\*\* | 1.382\*\*\* | 1.544\*\*\* | 1.440\*\*\* | 1.238\*\*\* | 1.310\*\*\* | 0.882 |
|  | (0.122) | (0.735) | (0.224) | (0.129) | (0.247) | (0.107) | (0.159) | (0.196) | (0.737) |
| Married | 0.022 | 0.021 | 0.033 | -0.016 | -0.013 | 0.003 | 0.159\*\*\* | 0.122 | -0.055 |
|  | (0.028) | (0.036) | (0.038) | (0.034) | (0.039) | (0.033) | (0.050) | (0.095) | (0.220) |
| Christian | 0.083 | 0.057 | 0.205\*\* | -0.069 | -0.061 | -0.059 | 0.331 | -0.264 | 0.784\*\* |
|  | (0.108) | (0.055) | (0.101) | (0.198) | (0.178) | (0.114) | (0.434) | (0.480) | (0.330) |
| Muslim | -0.028 | 0.077 | 0.158\* | -0.129 | -0.170 | -0.145 | 0.197 | -0.109 | 0.828\*\* |
|  | (0.113) | (0.055) | (0.091) | (0.210) | (0.177) | (0.107) | (0.454) | (0.494) | (0.324) |
| House or Land | -0.135\*\*\* | -0.007 | -0.038 | -0.077\* | -0.082\* | -0.099\* | -0.179\* | -0.129 | -0.410 |
|  | (0.048) | (0.048) | (0.042) | (0.045) | (0.049) | (0.059) | (0.099) | (0.178) | (0.253) |
| Local Language | -0.092\*\*\* | -0.064 | -0.082\*\* | -0.167\*\*\* | -0.151\*\*\* | -0.056 | 0.026 | -0.027 | -0.136 |
|  | (0.034) | (0.039) | (0.041) | (0.036) | (0.050) | (0.043) | (0.088) | (0.100) | (0.160) |
| South-East | 0.081\* | 0.091\*\* | 0.004 | -0.003 | -0.092\*\* | -0.073\* | 0.259\*\*\* | 0.319\*\*\* | -0.141 |
|  | (0.048) | (0.036) | (0.047) | (0.036) | (0.039) | (0.042) | (0.087) | (0.117) | (0.283) |
| South-West | 0.068 | -0.027 | -0.081\*\* | -0.041 | -0.080 | -0.087\* | 0.044 | 0.221 | -0.135 |
|  | (0.055) | (0.043) | (0.040) | (0.046) | (0.051) | (0.046) | (0.091) | (0.175) | (0.286) |
| North | 0.082 | 0.132\*\*\* | 0.118\*\* | 0.167\*\*\* | 0.100\*\* | 0.073 | 0.397\* | 0.944\*\*\* | 0.119 |
|  | (0.068) | (0.046) | (0.055) | (0.063) | (0.043) | (0.050) | (0.241) | (0.288) | (0.390) |
| Cons | 9.381\*\*\* | 10.230\*\*\* | 10.034\*\*\* | 10.456\*\*\* | 10.787\*\*\* | 11.065\*\*\* | 11.430\*\*\* | 12.571\*\*\* | 11.455\*\*\* |
|  | (0.530) | (0.170) | (0.199) | (0.315) | (0.291) | (0.295) | (0.568) | (0.465) | (1.772) |
| Sigma R2 | 0.7369 | 0.0705 | 0.1013 | 0.1578 | 0.1634 | 0.1331 | 0.0929 | 0.0885 | 0.0644 |

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01, Dependent Variable is Log of Annual Wage

**Table 7.** Results of Multinomial Probit Selection Estimation [Marginal Effects]

Male Female

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Independent Variables: | Employer | Self-Employed (O.A) | Paid Work | Non-Employed1 | Employer | Self-Employed (O.A) | Paid Work | Non-Employed |
| Age in Years | 0.0139\*\*\* | 0.0719\*\*\* | 0.0712\*\*\* | -0.157\*\*\* | 0.00453\*\*\* | 0.0741\*\*\* | 0.0415\*\*\* | -0.120\*\*\* |
|  | (0.00214) | (0.00722) | (0.00718) | (0.00802) | (0.000713) | (0.00676) | (0.00313) | (0.00770) |
| Age (Squared) | -0.00015\*\*\* | -0.000818\*\*\* | -0.00076\*\*\* | 0.00173\*\*\* | -0.0001\*\*\* | -0.00076\*\*\* | -0.0005\*\*\* | 0.00127\*\*\* |
|  | (-0.00002) | (-0.00008) | (-0.00008) | (0.000102) | (-0.00009) | (-0.00008) | (-0.00004) | (0.000101) |
| Urban | -0.0129 | 0.00232 | 0.0351 | -0.0246 | -0.00006 | 0.0486\* | -0.000887 | -0.0477 |
|  | (0.00855) | (0.0262) | (0.0296) | (0.0383) | (0.00281) | (0.0261) | (0.0120) | (0.0291) |
| Unspecified Ed | -0.0224\*\*\* | -0.00167 | -0.0720 | 0.0961 | 0.00524 | -0.0994\*\* | -0.0177 | 0.112\* |
|  | (0.00807) | (0.0767) | (0.0642) | (0.0908) | (0.0113) | (0.0489) | (0.0288) | (0.0600) |
| Low Ed | -0.00761 | -0.148\*\* | 0.158\*\* | -0.00260 | 0.0384 | -0.0503 | 0.0598 | -0.0479 |
|  | (0.0143) | (0.0597) | (0.0726) | (0.0639) | (0.0262) | (0.0475) | (0.0436) | (0.0677) |
| Mid Ed | -0.00122 | -0.306\*\*\* | 0.230\*\*\* | 0.0776 | 0.0455\*\* | -0.135\*\*\* | 0.225\*\*\* | -0.135\* |
|  | (0.0160) | (0.0604) | (0.0673) | (0.0634) | (0.0680) | (0.0415) | (0.0654) | (0.0745) |
| High Ed | 0.000642 | -0.449\*\*\* | 0.319\*\*\* | 0.129 | 0.0735\* | -0.222\*\*\* | 0.456\*\*\* | -0.308\*\*\* |
|  | (0.0176) | (0.0276) | (0.0822) | (0.0863) | (0.0549) | (0.0217) | (0.107) | (0.107) |
| Very High Ed | 0.0282 | -0.409\*\*\* | 0.443\*\*\* | -0.0621 | 0.123 | -0.245\*\*\* | 0.634\*\*\* | -0.512\*\*\* |
|  | (0.0370) | (0.0233) | (0.0867) | (0.0919) | (0.111) | (0.0166) | (0.141) | (0.121) |
| Married | 0.0183\*\* | 0.244\*\*\* | 0.0992\*\*\* | -0.361\*\*\* | -0.00305 | 0.114\*\*\* | 0.00823 | -0.119\*\*\* |
|  | (0.00715) | (0.0345) | (0.0329) | (0.0304) | (0.00395) | (0.0238) | (0.0139) | (0.0300) |
| House or Land | 0.0104 | 0.00257 | -0.0701\*\*\* | 0.0572 | -0.00605\*\* | -0.0156 | -0.00127 | 0.0229 |
|  | (0.0103) | (0.0315) | (0.0263) | (0.0393) | (0.00257) | (0.0254) | (0.0150) | (0.0291) |
| Local Language | 0.00279 | 0.0158 | -0.0230 | 0.00439 | 0.00615 | 0.0352 | 0.0208 | -0.0622 |
|  | (0.00709) | (0.0376) | (0.0337) | (0.0359) | (0.00424) | (0.0324) | (0.0166) | (0.0381) |
| South-East | -0.0255\*\*\* | 0.0729\* | -0.0865\*\*\* | 0.0391 | -0.00755\*\* | 0.198\*\*\* | 0.0385\* | -0.229\*\*\* |
|  | (0.00776) | (0.0381) | (0.0327) | (0.0429) | (0.00323) | (0.0419) | (0.0218) | (0.0392) |
| South-West | -0.0147 | 0.0817\*\* | -0.0720\*\*\* | 0.00503 | -0.00390 | 0.232\*\*\* | 0.0400\* | -0.269\*\*\* |
|  | (0.00898) | (0.0348) | (0.0275) | (0.0377) | (0.00464) | (0.0342) | (0.0232) | (0.0329) |
| North | 0.0218 | -0.0504 | 0.0167 | 0.0118 | -0.00519 | -0.246\*\*\* | -0.0228 | 0.274\*\*\* |
|  | (0.0158) | (0.0361) | (0.0306) | (0.0364) | (0.00416) | (0.0228) | (0.0193) | (0.0280) |
| Log-pseudo likelihood | -54081132 | -54081612 | -54282972 | -56425771 | -43623821 | -43624372 | -43684483 | -45092930 |
| Frequency | 453 | 4,197 | 2,624 | 2,932 | 152 | 2,361 | 1,045 | 4,633 |
| Wald (Prob > chi2) | 7281.91\*\*\* | 7281.91\*\*\* | 7281.91\*\*\* | 7281.91\*\*\* | 3108.79\*\*\* | 3108.79\*\*\* | 3108.79\*\*\* | 3108.79\*\*\* |

1 The results suggest that there are no significant differences in educational attainments between unemployed individuals and individuals not in the labour force and these two groups are combined into the “non-employed” sample in this estimation.

**Figure 1.** Heckman and Quantile Labour Income Premiums and Penalties – Total Sample

**Quantile**

-0.4

-0.3

-0.2

-0.1

0.01 0.05 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.95 0.99

0

**Wage Gap**

0.1

0.2

0.3

0.4

Employer

Heckman Employer Estimation

Self-Employed/Own Account

Heckman Self-Employed Estimation

**Figure 2.** Heckman and Quantile Labour Income Premiums and Penalties – Male Sample

**Quantile**

-0.25

-0.2

-0.15

-0.1

-0.05

0.01 0.05 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.95 0.99

0

**Wage Gap**

0.05

0.1

0.15

0.2

0.25

Employer

Heckman Employer Estimation

Self-Employed/Own Account

Heckman Self-Employed Estimation

**Figure 3.** Heckman and Quantile Labour Income Premiums and Penalties – Female Sample

**Quantile**

-0.6

-0.4

-0.2

0.01 0.05 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.95 0.99

0

0.2

**Wage Gap** 0.4

0.6

0.8

1

1.2

Employer

Heckman Employer Estimation

Self-Employed/Own Account

Heckman Self-Employed Estimation

**The Returns to Occupations: The Role of Minimum Wage and Gender in Nigeria**

**Conflict of Interest Statement**

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers’ bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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