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Entrepreneurship and Poverty Reduction among Women in Makarfi Local Government Area, Kaduna State, Nigeria

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Abstract

The study examined the effect of entrepreneurship on poverty reduction among women entrepreneurs in Mafarfi LGA, Kaduna State, Nigeria. While the poverty in this study is measured in monetary terms using average monthly earnings of women entrepreneurs from their entrepreneurial activities, the entrepreneurship is measured in terms of its four (4) dimensions, which include years of experience in enterprise, ability to create employment, monthly average wage bill and the size of enterprise of women entrepreneurs. A sample of fifty (50) women entrepreneurs was purposively selected from each of the ten (10) local wards of Makarfi LGA, for a total of five hundred (500) women entrepreneurs as the study's sample population. In contrast, a total of four hundred and twenty (420) were valid returned responses and used for analysis. The study used a survey method to collect data, and subsequently, Ordinary Least Squares (OLS) regression was adopted for analysis. Consequently, the findings of this study indicate that business size and years of experience in the enterprise of women entrepreneurs have positive and significant effects on women entrepreneurs' average monthly earnings, whereas employees and the monthly wage bill negatively affect their average monthly earnings. In conclusion, entrepreneurship is a veritable means of addressing poverty by enhancing the living standards of women entrepreneurs in Makarfi LGA, Kaduna State. Therefore, the study's recommendations include promoting entrepreneurship among women from a tender age to equip them with entrepreneurship skills, thereby fostering enthusiasm to tackle the problem of poverty among women in Makarfi LGA, Kaduna State, Nigeria.

Keywords: Entrepreneurship, OLS, Poverty, Women Entrepreneurs

Introduction

Poverty has been identified as a key problem threatening the progress of many societies in Nigeria at both the local and national levels (Agbionu, Agbionu, Ikon & Chinwe, 2015). It is a known problem that distresses more women than men due to disparity in education, employment and economic opportunities, among others. Therefore, abating poverty through income growth subsequently improves the quality of life in Nigeria, which is the most influential indicator of an economy's well-being. However, reducing poverty, particularly among women, is a focal point for any society seeking to place itself on the path of progress, since women are regarded as the backbone of development (Liman & Njiforte, 2018). In light of this, reducing poverty and improving women's incomes entails equipping them with the skills and knowledge to participate in entrepreneurial activities. Therefore, entrepreneurship has been universally applauded as the foundation for the progress of any economy (Ayogu &

Agu, 2015; Agbionu et al., 2015). Hence, entrepreneurship can be a tool for loosening the knot of generational poverty, particularly among women, in many Nigerian societies, such as Makarfi LGA, Kaduna State, over the years. As such, the significance of entrepreneurship in breaking the cycle of poverty endured by people, especially women, whose roles in economic progress have been undervalued for decades in emerging economies like Nigeria, particularly in Makarfi LGA, Kaduna State, cannot be overstated. Admittedly, women, as a means of enhancing economic advancement in many societies, play remarkable roles through resourcefulness and innovation in both the formal and informal sectors. However, they are highly dominant in the informal sector. Therefore, women can be equipped with vocational and entrepreneurial skills to gradually become more vibrant in society's socio-economic development, since they already constitute a significant percentage of those participating in Small and Medium Enterprises informally (Kjeldsen & Nielson, 2000).

Consequently, women entrepreneurs make a significant contribution to national economies through their involvement in start-ups and the growth of small and medium enterprises (Sajjad, Kaleem, Irfan & Ahmad, 2020). Hence, their roles in the process of growing and developing the economy of a society like Makarfi LGA, Kaduna State, through entrepreneurship have received significant interest from researchers and scholars in academia (Ayogu & Agu, 2015). This is because women's contributions to economic advancement have been largely recognized in job creation, poverty alleviation, wealth creation, and human capital development (Ojo, 2006). Therefore, the ability of a country to initiate and provide empowerment programs in form of entrepreneurship skill acquisition, provision of credit facilities, and essential social services, among others, would inspire women on their involvement in small and medium enterprises that would in turns results in a multiplier effect and significantly affects the overall well-being of women thereby, trickling down the poverty syndrome among women who participates in enterprising in Makarfi LGA, Kaduna state in particular and the country at large (Organization for Economic Co-operation and Development [OECD], 2011).

However, despite extensive studies on entrepreneurship and poverty, particularly the role of women entrepreneurs in abating poverty, there is limited empirical evidence on rural women entrepreneurs and poverty reduction in Makarfi LGA, thereby creating a gap that this study seeks to fill. From the foregoing, this study seeks to investigate entrepreneurship and poverty among women entrepreneurs in Makarfi LGA, Kaduna State, Nigeria.

Literature Review

Conceptual Clarification

Poverty is a multidimensional concept that is always difficult to define in a specific term. However, the World Bank conceptualised poverty as the inability of an individual to attain a minimum standard of living (World Bank Report, 2008). This conceptualisation was further elaborated by the definition given in a study by Nwagwu (2014), which states that poverty is a condition of lacking the basic needs of life, such as shelter, food, clothing, and clean drinking water. In a similar vein, Liman and Njiforti (2018) argued that poverty is a situation in which an individual is unable to live a comfortable and easy livelihood due to difficulties in accessing the necessities of everyday life, such as food, shelter, clothing, and education. The import of the definitions given by Nwagwu (2014) and Liman and Njiforti (2018) presupposes that any individual whose financial status cannot provide for basic needs for making a living belongs to a class of people classified as poor. However, the World Bank (2023) defined poverty in monetary terms, stating that it means living below USD2.15 per day. This declaration is made based on the prevailing purchasing power parity (PPP) of 2023

and thus simplifies the conceptualisation of poverty. In this view, this study adopted the World Bank's (2023) conceptualisation of poverty as its operational definition.

On the other hand, the concept of entrepreneurship is essentially about self-reliance, self-sufficiency, and self-satisfaction, and this has led to several definitions of entrepreneurship since the Middle Ages (Igbo, 2006). However, Innocent (2016) defined entrepreneurship as the readiness and aptitude of an individual to pursue investment opportunities, launch, and run an enterprise efficiently. Stevenson and Jarillo (2007) defined entrepreneurship as the art of identifying a business opportunity, marshalling resources, and persevering to exploit it. The end aim is to improve one's or others' living standards through gains or income realised from harnessing the identified new opportunities. This thus points to an indicator of the success of an entrepreneur's enterprising efforts, for which the most commonly used indicators are income and profits (Cho & Honorati, 2014).

Following the established meaning of entrepreneurship, owing to the several definitions of the concept of entrepreneurship by various scholars as a basis of conceptualising the basic concept of this study, women entrepreneurs can be defined as all women who take vibrant measures in hunting entrepreneurial activities in the manufacturing and service industries (Agbionu et al., 2015). Similarly, Okafor and Mordi (2010) defined women entrepreneurs as women who engage in whole entrepreneurial activities, taking the risks involved in distinctively merging resources to exploit opportunities identified in their immediate environment through the creation of goods and services. From the foregoing, this study views women entrepreneurs as any woman who fully participates in entrepreneurial activities by way of bearing the involved risks in uniquely combining resources for the purpose of exploiting the identified prospect in their immediate environment through the creation of goods and services to realise income or gains for better enhancement of living standards. Therefore, the realisation of gain or income for better living conditions serves as the principal motive that propels women in Makarfi LGA, Kaduna State, to undertake enterprising ventures.

Theoretical Framework

The study is underpinned by the vicious circle of poverty, which provides a theoretical basis for explaining the effect of entrepreneurship on poverty among women entrepreneurs in Makarfi Local Government Area of Kaduna State, Nigeria, and for specifying the model to be estimated. The vicious circle of poverty theory was propounded by Nurkse (1953) to explain the set of factors or events by which poverty, once started, is likely to remain unless there is outside intervention. According to the theorist, families trapped in the cycle of poverty have either limited or no resources and, as such, many disadvantaged individuals collectively work in a circular process that becomes practically unmanageable for them to halt (Marger, 2008). This is especially so when underprivileged individuals lack essential resources like financial capital, education, or connections to break out of the poverty cycle. In other words, poor people do not gain access to economic and social resources. As their poverty status increases, their tendency to remain in the cycle of poverty, and, by implication, the poor remain poor throughout their lives (Payne, 2005).

As Payne (2005) notes, poverty is classified into situational poverty and generational poverty, where the former relates to particular occasions within the lifetimes of an individual or family members in poverty, while the latter is generalised poverty as a cycle that passes from one generation to another. Thus, the traditional and cultural beliefs in many societies in Nigeria, particularly the Makarfi local government area of Kaduna state, perpetuate poverty among

women as a generational poverty that graduates from one generation to the next. As the theory suggests, therefore, external mediation must be pursued to halt the cycle of poverty among women. Consequently, many individuals (particularly women) are devising ways to break the cycle of poverty by strengthening entrepreneurial skills and education. On this note, Harris (1996) stressed that the poor and dependent segment of the society (especially women) can be made self–sufficient and richer by inculcating and teaching the importance of education (particularly entrepreneurial skills) on the dependent segment of the society and deliberate efforts of government apparatus to address cultural and traditional beliefs held against women entrepreneurs as well as availing them the opportunities to acquire rudimental qualities necessary for self-empowerment as a way of breaking the cycle of poverty among them.

Consequently, Wootton (2014) developed a two-generation poverty-alleviation plan to break the cycle of poverty. The model provides a holistic strategy for poverty alleviation and is intended to help low-income parents and children improve their poverty situation by equipping parents with additional career skills, offering leadership training, and providing access to higher-wage job opportunities, on the one hand. On the other hand, children (particularly females) are provided with access to enhanced educational programs such as technical and vocational education, free preschool, free childcare, and the supplies required to succeed in school. Subsequently, the two-generation poverty alleviation approach perceives each member in the circle of poverty to have been consoled with the pressures of elementary needs that weigh their minds, safeguard their physical and mental health, afford them the opportunities to acquire the skills required for higher wage jobs, and give them access to higher wage jobs without discrimination.

From the foregoing, the two-generation approach to poverty alleviation implies that breaking the cycle of poverty among women is a function of many social and economic factors, but prominent among those factors are: access to education and skills acquisition; entrepreneurial and leadership training, access to health care facilities, disquieting discrimination against women, and access to finance and credit facilities. These can be expressed in a functional model form as:

$$POV = f(X_1, X_2, X_3, \dots, X_n \quad (1)$$

Where POV, which is poverty, is expressed as a function of several related factors $(X_1, X_2, X_3, \dots, X_n)$, and so, breaking the chain of poverty among women requires a number measures prominently among them is availing women to entrepreneurship such that, entrepreneurship can be taken in terms of its dimensions like size of enterprising (Bs), years of experience in enterprising (YiB), and ability to creates jobs for others through hiring the services of others (Yp), among others, and this can be thus, expressed as:

$$POV = f(Bs, YiB, Yp) \quad (2)$$

Empirical Review

An empirical study by Sajjad et al. (2020) examined the global role of women entrepreneurs in economic development, using multiple regression analyses of data from 69 countries worldwide. The study reveals that women's entrepreneurship has a significant impact on the growth and development of the world's economies. The study also reports that women's participation in entrepreneurial activities does not support the income generation of their immediate families, but also plays a significant role in economic development and the social well-being of society.

In the same vein, Liman and Njiforti (2018) conducted research on the role of entrepreneurship in poverty reduction among women entrepreneurs in Kaduna metropolis. The study utilised Foster-Greer and Thorbecke's mathematical measurement of poverty to analyse data collected from 367 sampled women entrepreneurs in Kaduna metropolis. The study found that 52% of the 367 sampled women entrepreneurs live below the poverty line, while 48% live above it. Moreover, by implication, women's participation in business has economically empowered them by enabling them to become self-employed and reducing poverty.

Also, Taiwo et al. (2016) examined the impact of financing women entrepreneurs and employment generation within the Nigerian state. The study employed descriptive statistics for analysis. The study showed that financing women entrepreneurs has incremental effects on employment generation, and their efforts also result in multiple rounds of employment through improvements in their business activities, thereby increasing the number of self-employed individuals in the country.

Similarly, Okun and Akinjole (2016) researched entrepreneurship and poverty status among female household participants in small- and medium-scale enterprises in Lagos State, Nigeria. The study utilised descriptive statistics, Foster, Greer, and Thorbecke's (FGT) weighted poverty index, and Probit Regression analysis of data collected from 114 sampled respondents in the study areas, and revealed that 60% of the sampled non-participant female households in SME have higher poverty incidence. In contrast, 15% of the sample participants' female-headed households in SME have lower poverty incidence. The results also show that the non-participants contributed significantly to the poverty of the entire female group, whereas SME participants benefited directly from government entrepreneurship programmes; the non-participants did not. The estimated regression analysis revealed that educational status, participation in SMEs, access to microfinance credit, household income, and monogamous household type are factors that reduce households' poverty status.

More so, Adeleye et al. (2016) examined the effects of goat production on the livelihood of women in Igabi, Chikun and Kajuru Local Government Areas, Kaduna State, where 150 respondents (goat farmers) were purposively sampled from the three local government areas of the state. The study employed descriptive statistics and a Likert scale to show that goat rearing had positive effects on the lives of women in the study area, as evidenced by increased savings, income, household food security, and household assets. Consequently, the prospect of goat rearing as a strategy for alleviating poverty in rural communities should be bolstered by concerted efforts by the government and other relevant agencies to raise awareness of recommended goat production practices through radio and extension advisory services.

Similarly, Ojo et al. (2016) investigated determinants of poverty among women beekeepers in Kaduna State. The study utilised descriptive statistics, mean per capita household income, and logistic regression on 128 of 256 women beekeepers (respondents) randomly sampled. The study found that, by age, 96% of beekeepers have a mean of 8.8 years of beekeeping experience. The bulk of the beekeepers (86%) had few inflammations of 2-20. Conversely, the study also showed that only 6% of the beekeepers had access to credit, while 21% had access to extension visits. The mean per-household income revealed that 48% of the beekeepers were poor. At the same time, logit regression analysis established that age, beekeeping experience, number of inflammations, household size, number of dependents, cooperative, extension visits, and re-training were determinants of poverty. Therefore, theft,

bush burning, and pest and predator problems were among the major problems militating against beekeeping in the study area and against women entrepreneurs in this sphere.

In the same vein, Okezie and Joshua (2016), in their study "Analysis of women entrepreneurship development in agribusiness sector in Benue State, Nigeria," used descriptive statistics and a probit regression model to analyse data from 120 respondents. The study therefore found that the majority of respondents expressed a positive attitude towards agribusiness entrepreneurship but had low participation in such programmes. The probit regression analysis showed that access to loans, government support, household size, income level, attitude, age, and constraints were either positively or negatively associated with women's participation in agribusiness entrepreneurship at varying levels of significance.

Also, a study by Ayogu and Agu (2015) on the assessment of the contribution of women entrepreneurs to entrepreneurship development in Nigeria used descriptive statistics based on data collected from 176 of 182 sampled respondents via questionnaire. The results of the study show that a desire for independence and self-reliance will considerably stimulate women to enter entrepreneurship. In contrast, financial constraints and government regulations are substantial challenges to the development of women's entrepreneurship. Also, Job creation and poverty alleviation are the most glaring push factors for the development of women's entrepreneurship.

Methodology

The population of the study is women entrepreneurs in Makarfi local government area of Kaduna state and since Makarfi local government comprised ten (10) local wards, fifty (50) women entrepreneurs were drawn from the targeted respondents in each of the local ward that made up Makarfi LG as the population of the study since, there is no available statistics on the exact number of women entrepreneurs in the study area, a mixture of purposive and random sampling techniques was utilised to select the sampled five hundred (500) respondents of women entrepreneurs in Makarfi local government area of Kaduna state, where fifty (50) sampled women entrepreneurs was selected from each of the ten (10) local ward of the Makarfi local government area of Kaduna State.

The survey method was employed by distributing questionnaires for data collection. The questionnaire contained structured questions on the study variables, such as the size of business of women entrepreneurs, years of experience in business, the capacity of women entrepreneurs to hire others' services to generate employment, average monthly income, and other information pertinent to the study. The use of questionnaires aids the collection of information more quickly, cheaply, and easily (Mugenda & Mugenda, 2003). Moreover, the questionnaire used was an adaptation of those used in studies by Liman and Njiforti (2018) and Adeleye et al. (2016), with some modifications to reflect the variables of interest. Importantly, the questionnaire is divided into two main sections, namely: Section A- bio-data; Section B–views of the respondents on entrepreneurship and poverty among women entrepreneurs in Makarfi LGA, Kaduna State, which was based on yes or no questions and categorical response questions.

Flowing from extant literature, particularly the vicious cycle of poverty where the individuals within the poverty trap harboured the sole interest of breaking and slipping out of that trap, and then adopting entrepreneurship as a mechanism for actualising the said interest, this study therefore models entrepreneurship among women as an impetus for breaking the circle of poverty among women entrepreneurs in Makarfi local government area of Kaduna state.

Thus, the model is built around a single equation model, which is specified as:

$$P_i = f(X_{i1}, X_{i2}, X_{i3}, \ldots, X_{in}) \quad (3)$$

Where P_i is poverty, the dependent variable, which is influenced by several independent variables expressed as X_{i1}, X_{i2}, X_{i3}…, X_n in equation (3). Consequently, the model (equation 3) can be restated with the introduction of the key explanatory variables in relation to the study's dependent variable. Thus, the model is specified as:

$$P_i = f(Bs_i, YiB_i, Yp_i, Mwb_i) \quad (4)$$

Where: P_i is the poverty; Bs_i is the business size of women entrepreneurs; YiBi is the women entrepreneurs' years in enterprising (business); Ypi is the entrepreneurs' intention to hire the services of others (employees); Mwbi is the average monthly wage bill of the women entrepreneurs.

Consequently, the above equation is restated in econometric form as:

$$P_i = \beta_0 + \beta_1 Bs_i + \beta_2 YiB_i + \beta_3 Yp_i + \beta_4 MWB_i + \varepsilon_i \quad (5)$$

Where β_0 is constant, β_1 to β_4 are the respective parameters for business size, women entrepreneurs' years in enterprising (business), entrepreneurs' tendency to hire others (employees), and the average monthly wage bill of women entrepreneurs.

To achieve the objectives of this study, an empirical research design was adopted, and a regression model was subsequently used for data analysis. This is because there is no clear ranking or ordering of responses in the questionnaire, and the possible responses are essentially nominal. Consequently, the technique of OLS regression was employed in the study due to its distinct properties of Best Linear Unbiased Estimator (BLUE), which make it the most efficient estimation technique among other regression techniques, and thus, make the adoption of the OLS regression technique the appropriate technique for this study (Gujarati & Porter, 2009).

After the utilisation of OLS as an estimation technique for this study, the estimated model was then verified to know whether or not the estimated model satisfies the feature of the BLUE property of the adopted model (OLS regression) in the estimated results by conducting the prescribed post-estimation diagnostic test as a basis to uphold the estimated results for policy usage. Consequently, tests like Variance Inflation Factor (VIF) for multicollinearity, Breaush–pagan for heteroscedasticity, White's test for homoscedasticity, Ramsey RESET for specification error of the model and Kernel density for normality of residuals were conducted.

Results

A total number of five hundred (500) copies of questionnaires were distributed to the women entrepreneurs in Makarfi local government area of Kaduna State, of which four hundred and sixty (460), representing 92% of the administered questionnaires, were returned, and forty (40), representing 8%, were not retrieved during field work, as thus, presented in the 1 (Panel A).

Table 1: Data Reporting

Variables	Frequency	Percentage (%)
Panel A: Questionnaire Distribution		
Returned Questionnaire	460	92.0
Not Returned Questionnaire	40	8.0
Total	**500**	**100**
Panel B: Distribution of Returned Questionnaire		
Valid Questionnaire	420	91.3
Invalid Questionnaire	40	8.7
Total	**460**	**100**

Source: Fieldwork, 2025

However, panel (B) of Table 4.1 shows that of the four hundred and sixty (460) returned questionnaires, four hundred and twenty (420), representing 91.3%, were correctly filled; hence, declared valid for this research use. Whilst forty (40) of four hundred and twenty (420) representing 8.7% of the returned questionnaire were rejected due to the problem of inadequate responses to the list of schedule in the questionnaire, choosing more than one response to some of the questions in the questionnaire among the provided options and non-response to some questions on the questionnaire list, among others.

In this light, the summary of descriptive statistics (Table 2) presents the various statistical criteria for the variables specified in the study's model. It is revealed in Table 2 that all the variables under investigation have positive and non–zero means that range between 1.62, the least and 2.81, the highest value of mean in the table; thus, the monthly net earnings of women entrepreneurs (MYn) have the highest mean of 2.81, while the variable entrepreneur employee (Yp) has the minimum mean of 1.62. This shows that, on average, respondents perceive that women entrepreneurs are moderately helpful in tackling poverty among women in the study area, and that the variability between the mean and individual responses is low. The MYn with the highest mean and Yp with the smallest mean are also corroborated by their respective value of standard deviation, with MYn having the highest standard deviation of 1.35 and Yp having the lowest standard deviation of 0.50.

Table 2: Summary Statistics of the Variables

Statistics Criteria	Myn	YiBYp	Bs	MWb
Observations	420	420420	420	420
Mean	2.81	2.041.62	1.66	1.75
Variance	1.82	1.180.25	0.68	0.85
Standard Deviation	1.35	1.090.50	0.82	0.92
Skewness	0.31	1.09-0.28	0.70	0.50
Kurtosis	1.91	3.421.62	1.83	1.40
Minimum	1.00	1.001.00	1.00	1.00
Maximum	5	53	3	3

Source: *Author's Computation (2025)*

Similarly, Table 2 shows that all variables are positively skewed to the right, except for Yp, which is negatively skewed to the left. At the same time, Kurtosis statistics indicated that all the series for the variables fall within the range of 1.40-3.42, suggesting a distribution that is seemingly symmetric and bell–shaped.

Results of Correlation and Covariance

The result of the correlation between the variables under examination presented in Table 3 revealed that the entrepreneur's ability to hire the services of others (Yp) and the entrepreneur's net earnings per month (MYn) depict a weak and negative correlation because

the coefficient of correlation (-0.2829) between the two variables is negative and farther from one (1). Also shown in Table 3 is the correlation between MYn being the dependent variable measuring the poverty in this study, and the rest of the examined variables like Bs, YiB and MWB are both weak and positive, because the respective coefficients of correlation coefficient (0.2244, 0.2720 and 0.1790) between MYn and Bs, MYn and YiB, MYn and MWB are all positive and farther from one (1). The weak correlation among the examined variables suggests that multicollinearity is absent.

Table 3: Correlation and Covariance

Variables	MYn	Bs	YiB	Yp	MWB
MYn	1.000000				
Bs	0.2244	1.000000			
YiB	0.2720	0.3577	1.000000		
Yp	-0.2829	-0.8558	-0.6324	1.000000	
MWB	0.1790	0.7607	0.4379	-0.7284	1.000000

Source: Author's Computation (2025)

Regression Estimates

The results in Table 4 show that the size of business (Bs) of women entrepreneurs has a positive effect on their monthly average earnings. This means that a unit increase in the size of business of women entrepreneurs leads to a 0.341 increase in the monthly average earnings of women entrepreneurs, and, since poverty in the context of this study is measured in terms of money income, the higher the money income, the less the poverty. As such, the size of women entrepreneurs' businesses contributes to reducing poverty among women by increasing their monthly average earnings. Also, the results indicate a positive effect of women entrepreneurs' business sizes on monthly average earnings, as evidenced by the corresponding probability value (0.004).

In addition, the years of experience in the business of women entrepreneurs (YiB) positively affect women entrepreneurs' monthly average earnings at the statistical level of significance, conforming to the a priori expectation of the study. This implies that one year of additional spending by women entrepreneurs in business leads to a marginal increase in their monthly average earnings of 0.298. As such, the number of years women entrepreneurs have been in business has a marginal effect on the poverty rate among women, through a marginal increase in the average earnings of women entrepreneurs. The statistical significance of the result was attributed to the probability value (0.000), which was less than the 5% level of statistical significance.

Table 4: Result of Regression

Variable	Coef. (β)	Std Err	t –Statistics	P–Value
Bs	0.341	0.117	2.92	0.004
YiB	0.298	0.064	4.67	0.004
Yp	-0.481	0.168	-2.87	0.004
MWB	-0.116	0.108	-1.07	0.284
_Cons	2.720	0.337	8.08	0.000
R2	0.112			
Adj. R2	0.1036			

Source: Author's Computation, 2025

Moreover, the results in Table 4 indicate that women entrepreneurs' ability to hire others' services (Yp) negatively affects their monthly net earnings, consistent with the a priori expectation of the study. That is, a unit increase in the number of employees of women entrepreneurs marginally led to a 0.481 decline in their monthly net earnings. Also, the

negative effect of women entrepreneurs' employees on the monthly net earnings of women entrepreneurs is statistically significant, as the corresponding probability value (0.004) is less than the 5% significance level.

In addition, the regression results presented in Table 4 show that women entrepreneurs' monthly wage bill negatively affects their monthly average earnings, confirming the study's a priori expectation. This means that 0.116 units of the women entrepreneurs' average monthly earnings are accounted for by a unit increase in the wage bill. This negative effect of the monthly wage bill of women entrepreneurs on the women entrepreneurs' average earnings per month is statistically insignificant since the corresponding p –value (0.0284) is greater than 5% significant level of statistics. Also shown in Table 4, holding all variables specified in the estimated model constant, the model indicates that the constant term (/0) has a positive effect on women entrepreneurs' average monthly earnings of approximately 2.720 units.

Post Estimation Diagnostic Tests

In order to validate the obtained results of regression on the effects of women entrepreneurs on poverty in Makarfi LGA, Kaduna State, the estimated model is subsequently subjected to the post estimation diagnostics test like Variance Inflation Factor (VIF) test for Multi – collinearity, Breusch-Pagan / Cook-Weisberg test for heteroscedasticity; White's test for homoscedasticity; test for specification error of the model using Ramsey RESET and normality of residuals using Kernel Density estimates were conducted thereby, confirming the presence of BLUE property of OLS regression model in the estimated results.

The Variance Inflation Factor (VIF) is utilised to test for the presence of multicollinearity, for which the estimated value of the VIF is expected to be less than 10 or 1/VIF is expected to be greater than 0.10 for the model to be assumed free from the problem of multicollinearity. Consequently, from the estimated result of Multi–Collinearity test conducted using Variance Inflation Factor (VIF), none of the variable under investigation have VIF value of greater than 10 or have 1/VIF value of less than 0.10 pointing to the absence of multi –collinear among the regressors; hence, this validates the obtained results of regression to be free from the problem of Multi–Collinearity as thus presented in the table 5.

Table 5: Variance Inflation Factor (VIF)

Variables	VIF	1/VIF
Bs	2.39	0.419025
YiB	1.24	0.805021
Yp	1.01	0.992331
MWB	2.57	0.389328
Mean VIF	**1.80**	

Source: Author's Computation, 2025

Also, the White's test and the Breusch-Pagan test for homoscedasticity of the model are presented in Tables 6 and 7, respectively. Both test the null hypothesis that the residuals' variances are homogeneous. Consequently, in the case of heteroscadasticity test using Breusch–Pagan, the p–value is expected to be greater than 5% for the model to be assumed to be free from heteroscadasticity problem; while, in the case of homoscedasticity of using White's test, the p–value of heteroscadasticity (which is the preference test here) is expected

to be greater than 5%, so, if the p–value is less than 5%, we would have to reject the hypothesis and conclude that, the variance is heterogeneous.

Table 6: Cameron & Trivedi's decomposition of IM-test (White's test)

Tests	Chi2	Df	Prob
Heteroskedasticity	19.94	13	0.0968
Skewness	47.91	4	0.0000
Kurtosis	22.91	1	0.0000
Total	**90.76**	**18**	**0.0000**

Source: Authors' Computation, 2025

Table 7: Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity

Chi2(1)	Prob.
1.52	0.2174

Source: Authors' Computation, 2025

Hence, in this case, it is evident that the model is free from heteroscedasticity, since the respective p–value (0.2174) of the prescribed tests is greater than the 5% level of significance. We therefore accept the hypothesis that the variance is homogeneous. This is also supported by diagnostic plots, as shown in Figure 1.

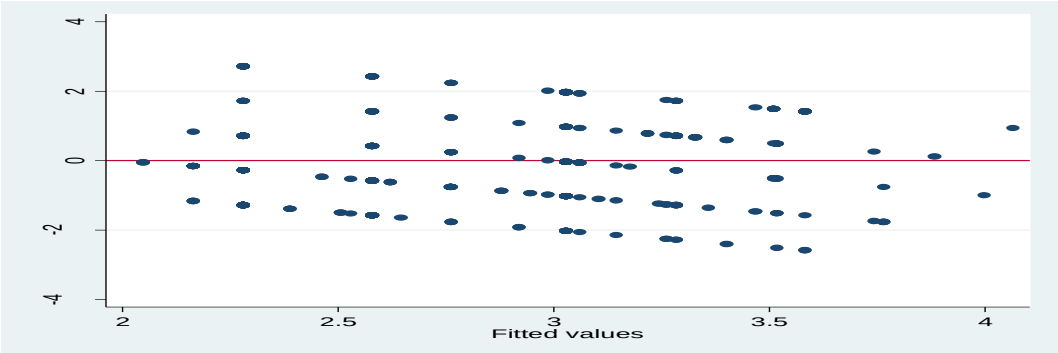

Fig. 1 Test for Heteroscedasticity by Diagnostic plot

Following the assumption that, the error term and the independent variables in the model are not correlated (E(e|X) = 0), it is imperative to test for the omitted variable bias for the model using Ramsey RESET, because, if there is presence of missing variable in the estimated model, then, there is possibility of the error term to be correlated with the included regressor or the missing variable is a determinant of the regressand; hence, the estimated regression coefficient can be said to be inconsistent (Stock & Watson, 2007). Therefore, for the model to be considered free of missing-variable bias, or for the hypothesis that the estimated model has no missing-variable bias, the p–value of the omitted-variable test is expected to exceed 5%. Consequently, the test results revealed that there is no missing-variable bias in the model, as the p–value (0.8938) is greater than 5%, as shown in Table 8; hence, the model requires no additional variables.

Table 8: Ramsey RESET Test

F(3, 412)	Prob.
0.20	0.8938

Source: Authors' Computation

To corroborate the result of omitted-variable bias, the model specification error test is conducted to determine whether we need more variables in our model by running a new regression with the observed population (Y) against the estimated population (). The point of note here is "hatsq," and the hypothesis is that there is no specification error. If the p–value of "hatsq" is not significant, then we fail to reject the null and conclude that our model is correctly specified.

Table 9: Model Misspecification or Model Specification Error Test

AMY	Coef. (β)	Std Err	t –Statistics	P–Value	C.I
Hat	1.255	1.784	0.70	0.482	4.761
Hatsq	-0.044	0.310	-0.14	0.886	0.563
Cons	-0.357	2.530	-0.14	0.888	4.609

Source: Authors' Computation

As indicated by the obtained result of specification of the model and rule of thumb that, the p –value of "hatsq" must be greater than 5% for the model to be considered correctly specified, the estimated prove that, the estimated model is correctly specified since, the p –value of "hatsq" (0.505) is greater than 0.05; hence, it is needless to include more variables in the estimated model thereby lending support to the result presented in the table 7.

Discussion

The effect of years of experience of women entrepreneurs on poverty among women entrepreneurs and the effect of business size of women entrepreneurs on poverty among women entrepreneurs in Makarfi LGA, Kaduna State: drawing from Table 4.4, it is evident that the magnitude of the parameters particularly that of business size of the women entrepreneurs (Bs) (0.341) and that of year of experience of women entrepreneur in business (YiB) (0.298) signifies that, a unit rise in Bs and YiB marginally leads to 0.341 and 0.298 rise in the average earnings of women entrepreneurs per month. In the same vein, the respective probability values of 0.004 and 0.000 are below the 5% significance level, indicating that the two indicators of women entrepreneurship are significant in explaining the average earnings of women entrepreneurs in Makarfi LGA, Kaduna State.

It is noteworthy that poverty, being the dependent variable, is measured in terms of money income (average earnings of women entrepreneurs). Since the two aforementioned indicators of women's entrepreneurship positively and significantly affect women's average earnings, they can be inferred to contribute to reducing poverty by raising women's average earnings. Similarly, women entrepreneurs' ability to hire others' services (Yp) and their average monthly wage bill (MWB), as indicators of entrepreneurship, negatively affect women entrepreneurs' average monthly earnings. This means that a unit rise in the Yp and MWB marginally leads to corresponding falls in the monthly average earnings of women entrepreneurs (AMY) by 0.481 and 0.116, respectively. At the same time, Yp's negative effect on AMY is significant statistically because its P–value (0.004) is less than 5% significant level; MWB's negative effect on AMY is insignificant statistically because its P–value (0.284) is greater than 5% significant level.

Based on the indicators of women entrepreneurship adopted in this study, the estimated model results indicate that entrepreneurship affects poverty among women entrepreneurs through its impact on their average monthly earnings. This finding is consistent to the findings of quite several empirical of studies conducted like that of Sajjad, Kaleem, Irfan and Ahmad (2020); Liman and Njiforti (2018), Okun and Akinjole (2016) and Ayogu and Agu (2015), among others are in their respective studies affirmed that, women entrepreneurship (measured in

terms of varied parameters in different studies) is a key driver to policy or any move directed towards alleviating poverty and ensuring self –reliance among female gender in Nigeria. More so, engaging women in entrepreneurial activities avails them the opportunities not only to attain self –reliance and tackle the problem of poverty among women but also to expose them to lend their contribution to the growth and development of the society through income generation, employment generation and social value enhancement, particularly to women folks.

Conclusion

Entrepreneurship is a veritable means of addressing poverty and enhancing living standards among women entrepreneurs in human society, such as in Makarfi LGA, Kaduna State. Importantly, the influential effect of business size (Bs) and years of experience in business (YiB) of women entrepreneurs as indicators of entrepreneurship on poverty among women entrepreneurs is so effective that, both Bs and YiB portends positive and significant effect on the monthly average money income of women entrepreneurs, thus, contributing to the dropping rate of poverty among women entrepreneurs in Makarfi local government area of Kaduna State. Similarly, the study concluded that women entrepreneurs' ability and willingness to hire others' services do not contribute to the eradication of poverty among women entrepreneurs in Makarfi LGA, Kaduna State, as both Yp and MWB negatively affect their average monthly income.

Recommendations

Based on the findings of the study, the following recommendations are suggested:

1. Women entrepreneurs must pay close attention to their business expansion plan by ploughing back a substantial portion of earned profits into the business and by acquiring facilities, such as credit, from relatives and financial institutions for expansion. This would allow for the expansion of the business size, thereby substantiating the finding of this study that the business size of women entrepreneurs is positively and significantly related to poverty among women entrepreneurs in Makarfi LGA, Kaduna State.
2. The act of engaging women in entrepreneurship should be introduced at an early stage by inculcating the principle of enterprising in the female gender at a tender age, by involving and exposing them to the secrets of business, such as anticipated costs, revenue, and profit. This would channel their enthusiasm towards entrepreneurial ventures, thereby equipping more women with entrepreneurial skills and mindsets. This would allow women to gather a reasonable number of years of business experience before embarking on their independent enterprise and becoming self–reliant. This thus follows the lessons from this study's findings: years of business experience positively and significantly affect the average earnings of women entrepreneurs in Makarfi LGA, Kaduna State.
3. Importantly, serious caution must be applied when seeking the service to be hired from others to avoid hiring others to do what can be done by herself, because the effect of hiring the services of others for what can ordinarily be done by herself would contribute to inefficiency in the running of the enterprise, thereby overburdening the wage bill on the enterprise's earnings. This is imperative because the findings of this study indicate that the monthly wage bill negatively and significantly affects the average earnings of women entrepreneurs in Makarfi LGA, Kaduna State.

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