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RESEARCH ARTICLE

FINANCIAL LITERACY AND SAVINGS BEHAVIOUR: A STUDY OF ACADEMIC EMPLOYEES IN TERTIARY INSTITUTIONS OF KANO STATE

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Abstract: The study investigates the impact of financial literacy on the financial behaviour of academic employees in tertiary institutions of Kano State. It uses a cross-sectional dataset from a sample of 500 workers using a structured questionnaire and applies the Logistic regression. Findings from the previous studies did not adequately explore this relationship because few were carried out in Nigeria, and they were not on academic employees in tertiary institutions of Kano Sate. Moreover, some of the previous studies employed inappropriate methodologies that limited the validity of their findings. Therefore, the study aims to bridge these gaps by exploring the academic employees in tertiary institutions as participants and applying appropriate methodology. The result from this survey shows that financial literacy has a significant positive impact on the savings behaviour of academic employees in tertiary institutions of Kano Sate. Thus, since economic literature links a positive relationship between financial literacy and financial behaviour, the implications of this finding suggest that the government should promote the development of financial literacy programmes for academic employees in tertiary institutions as the target segment of the Financial Literacy Framework. The programmes should cover components such as savings, investment, retirement plans, budgeting, and debt management.

Keywords: Financial literacy, Savings behaviour, Academic employees, Tertiary institutions, Kano State

JEL Classification: D14, D14, J24, I22, 055

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INTRODUCTION

Financial literacy is the ability to understand and apply financial concepts and skills to make informed and effective decisions regarding money management, saving. investing, borrowing, and planning for the future (Owusu et. al, 2024, Prempeh, et. al, 2024 and OECD, 2022). Financial literacy is essential for enhancing financial wellbeing, which is the ultimate goal of financial education (OECD, 2022). Financial wellbeing can be defined as the extent to which individuals can meet their current and ongoing financial obligations, feel secure in their financial future, and make choices that allow them to enjoy life (Suresh, 2024 and CFPB, 2015).

Financial literacy has been shown to influence various aspects offinancial behaviour, such as budgeting, saving, investing. borrowing, and retirement planning (Lone and Bhat, 2024, Lusardi & Mitchell, 2014; Fernandes, Lynch, However, Netemeyer, 2014). financial literacy is not uniformly distributed across the population, and there are significant gaps and disparities among different groups, such as age, gender, education, income, and occupation (Moray and Buch, 2024, Lusardi & Mitchell, 2014; OECD, 2016). Moreover, financial literacy is not static, but dynamic and context-dependent, meaning that it can

vary depending on the situation, the environment, and the type of financial decision (Bhat et al, 2024 and OECD, 2016). Although financial inclusion has become topical on the global policy agenda for sustainable development, yet, studies on financial exclusion/inclusion, is still at its infancy, and much need to be done (Arun & Kamath, 2015, and Asian Development Bank, 2015). Among the six regions of Nigeria, North West and North East regions had about 68 percent each with respect to financial exclusion.

This made them first in financial exclusion, while North Central, South East, South-South, and South West, followed with 32 per cent, 44 percent, 36 percent, and 33 percent, respectively. Further discovery shows that North East is better than North West, with only 15 percent formally banked population as against 13 percent formally banked in North West (CBN, 2013). When it comes to poverty level rating, the same North East and North West, regions were taking the lead, thus suggesting the likely nexus between financial exclusion and poverty.

One of the contexts that has received relatively less attention in the literature is the financial literacy and behaviour of academic employees in tertiary institutions, such universities. as colleges. and polytechnics. Tertiary institutions are important employers and providers education and research in many countries, and their workers face various financial challenges and opportunities, such as income fluctuations, pension schemes, housing loans, academic grants. Therefore, it is important examine $_{
m the}$ level to and determinants of financial literacy and savings behaviour among this group of workers, and how they affect their financial wellbeing and performance.

Despite the importance of financial literacy behaviour savings for academic employees in tertiary institutions, there is a lack of empirical evidence on the factors that influence them and the outcomes that result from them in the context of Kano State, Nigeria. This study aims to address this gap conducting a survey of academic employees in tertiary institutions of Kano State, Nigeria, and analyzing the relationship between financial literacy and savings behaviour.

The article is organized as follows: Section one is introduction. Section two reviews the relevant literature on financial literacy and savings behaviour, and develops the research hypotheses. Section three describes the data and methodology used in the study. Section four presents and discusses the empirical results. Section five concludes and offers policy implications.

LITERATURE REVIEW

This section presents conceptual literature, theoretical literature, and empirical literature on financial literacy and the savings behaviour.

The Concept of Financial Literacy

The Concept of Financial Literacy Financial literacy is the knowledge of financial concepts and products that influences one's actions or decisions related to money matters (NFLF, 2015). It also enables one to act confidently and optimally in managing one's finances. Financial literacy was first advocated by Jump\$tart Coalition in 1997, and later adopted by PACFL in 2008 in the US.

However, there is no universal definition or conceptualization of financial literacy, as different studies have emphasized different dimensions of it (Hung et al., 2009; Huston, 2010). Some studies have also used the terms financial literacy and financial knowledge interchangeably. Huston (2010) proposed two forms of financial literacy: understanding and application of personal finance knowledge.

The Concept of Savings Behaviour

Savings behaviour is the act of saving some of one's income for future use. Different factors can influence how people save, such as how much money they have, what they need or want, how they think and feel about money, how much they know about money, how confident they are in managing money, who they interact with, what kind of financial services and products they can access, and what the economic situation is (Bayu et al., 2022; Heckman and Hanna, 2015; Lee and Hanna, 2015; Hashim et. al., 2017). People can save for different reasons, such as having a financial cushion, planning for specific events, emergencies, children, or retirement (AFCPE, 2016; Bodenhorn, 2018). Savings behaviour can be measured by how much, how often, and how regularly people save, as well as what kind of savings

instruments they use (Gandelman, 2016). Savings behaviour is important for individuals and countries, as it helps people cope with financial shocks, achieve their financial goals, and improve their well-being, and it also provides a source of capital for investment and economic growth (Abdul Jamal et al., 2016).

Theoretical Framework

This study is based on the Life-Cycle Hypothesis (LCH), an economic theory that explains how people plan their consumption and saving over their lifetime, considering their income, wealth, and future expectations (Modigliani, et al., 1954). The LCH assumes that people smooth their consumption over time, borrowing when their income is low and saving when their income is high. The LCH also implies that consumption depends on the expected long-term average income, not the current income or the interest rates, and that consumption is influenced by social and psychological factors, such as relative income.

The LCH is a special case of the intertemporal choice model, where the time horizon is finite and the income stream is determined by the life cycle pattern of earnings. The LCH contrasts with Keynes' theory of consumption, which predicted that a higher income would lead to a higher savings rate, reducing aggregate demand and output. The LCH can solve the consumption puzzle, that is, why Keynes' theory did not fit the data.2.3

Empirical Literature

This section reviews the empirical literature on the relationship between financial literacy and savings behaviour in different countries and contexts. Zakaria et al. (2017) studied the relationship between financial literacy and risk tolerance towards savings and investment in Malaysia, and found a positive relationship. Murendo and Mutsonziwa (2016) studied the relationship between financial literacy and savings behaviour in Zimbabwe, and also found a positive relationship.

Semenova (2011) studied the same relationship in Russia, and found a positive relationship as well. Deuflhard et al. (2014) studied the relationship between financial literacy and savings account returns in Germany, and found a positive relationship too.

Beckmann (2013) studied the relationship between financial literacy and households' savings decision-making in Australia, and found a positive relationship. Aidoo (2015) studied the relationship between financial literacy and savings rates in Ghana, and found a negative relationship. Mushtaq and Siddiqui (2017) studied the relationship between financial literacy and bank deposits in both Muslim and non-Muslim countries, and found a positive relationship, but stronger in non-Muslim countries.

Worthington (2004) studied the relationship between financial literacy and savings behaviour in Australia, and found a positive relationship. He also found that financial literacy and savings rate vary by age, occupation, education, income, savings, and debt levels. Ameriks et al. (2002) studied the relationship between financial literacy and savings behaviour in the US, and found a positive relationship. They also showed that financial literacy increases households' propensity to plan and monitor spending habits to accumulate wealth.

Jappelli and Padula (2011) studied the relationship between financial literacy and savings behaviour in 13 European countries, and found a positive relationship. They also suggested that OLS estimates are biased downwards due to endogeneity, and that IV estimates are more reliable. Adebayo and Adeyemi (2018) examined how financial literacy affects the savings behaviour of rural households in Nigeria, and found that financial literacy had a positive significant effect, especially for femaleheaded, educated, high-income and households.

Bello and Yusuf (2019) investigated the impact of financial literacy on financial inclusion among women entrepreneurs in Kano State, Nigeria, and showed that financial literacy had a positive and significant effect, and that this effect was moderated by education, income, and information access.

Ibrahim and Musa (2020) analysed the influence of financial literacy on retirement planning among workers in tertiary institutions of Kano State, Nigeria, and found that financial literacy had a positive and significant effect, and that this effect was

stronger for older, married, and higher-income and education workers.

DATA AND METHODOLOGY

This section describes the data, sources, and methods of analysis used in this paper.

Types and Sources of Data

The data are cross-sectional and primary, relating to financial literacy and behaviour. The data are collected from public higher institutions, such as universities, colleges, polytechnics, and remedial schools.

Methods of Data Collection

A questionnaire was designed and distributed to collect data on the respondents' characteristics, preferences, and opinions. The respondents were randomly selected and asked to fill the questionnaires. The filled questionnaires were collected and checked. A pilot study with 50 respondents was conducted.

Data Collection Instrument

A questionnaire was used as the instrument for data collection. The questionnaire was designed to capture the objectives of the study. The questionnaire consisted of closedended and open-ended questions. questions measured the respondents' attitudes, perceptions, and behaviours related to the topic of the study. The questionnaire is a suitable and widely used instrument for data collection in exploratory research (Saunders et al., 2007; Frazer & Lawley, 2000).

Methods of Data Analysis

The logistic regression model was used as the method of data analysis in this study. The logistic regression model predicts the probability of an outcome given a set of explanatory variables. The model can analyse categorical data and handle nonlinear relationships. The models were fitted using the maximum likelihood estimation method.

The main results of the logistic regression models were presented using four measures: odds ratios, log odds, marginal effects, and conditional probabilities. These measures were used to interpret the effects of the explanatory variables on the outcome variable. The fits of the logistic regression models were assessed by using the likelihood ratio test.

Variables Measurement

This subsection describes the variables used in the study and how they were measured based on previous studies. The study used one dependent variable and four independent variables. One of the independent variables was a control variable.

Dependent Variables

Savings Behaviour: This was a binary variable that indicated whether the respondents saved or not, coded as 1 for yes and 0 for no. This followed Ting and Adam (2023) and Maria et al. (2022).

Independent Variables

The independent variables were knowledge for the effectiveness of savings institutions, indebtedness, interest rate, and income level. Income level was a control variable, while the others were proxies for financial literacy. They were measured as follows:

Effectiveness of Savings Institutions:

This was a binary variable that indicated the respondents' ability to identify the effectiveness of their savings institutions and how it influenced their savings decisions, coded as 1 for yes and 0 for no. This followed Karl-Friedrich *et. al.* (2021), and Cajsa and Klaas (2021).

Indebtedness: This was a binary variable that indicated whether the respondents were indebted or not, coded as 1 for yes and 0 for no. This followed Somin and Lu (2023); Douglas (1996), Tay *et. al.* (2017), Lusardi and Tufano (2015.

Interest Rate: This was a binary variable that indicated whether interest rate encouraged or discouraged savings, coded as 1 for encouraging and 0 for discouraging. This followed Kozlov (2023), Tanweer and Anupam (2017). Income level: This was the respondents' monthly personal income. This was a control variable that followed Horowitz et. al. (2021) and Ambrey and Fleming (2014).

Model Specifications

This section presents the econometric specifications of the logit model used in this study.

Theoretical Econometric Model

The binomial logit is a technique that estimates the probability of a binary outcome given a set of explanatory variables. It uses a cumulative logistic function to avoid the unboundedness problem of the LPM (Chang et al., 2021). The logit model is specified as:

$$L_i = l_n \left(\frac{P_i}{1 - P_i} \right) = Z_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} \dots (1)$$
Where:

 L_i is the logit or the log of the odds ratio, which is linear in the parameters and the explanatory variables.

 P_i is the probability of the outcome being 1, which is nonlinear in the parameters and the explanatory variables.

 Z_i is the linear predictor, which is the sum of the intercept and the product of the coefficients and the explanatory variables.

 β_0 is the intercept, which is the value of the logit when all the explanatory variables are zero.

 β_1, β_2, \dots are the coefficients, which measure the change in the logit for a one-unit change in the corresponding explanatory variable.

 X_{1i}, X_{2i} , ... are the explanatory variables, which are the factors that affect the probability of the outcome.

The logit model is interpreted using four measures: Odds ratios, which show how the odds change when the explanatory variables change. Log odds, which show the direction and magnitude of the effects of the explanatory variables on the outcome. Marginal effects, which show the change in the probability of the outcome when one explanatory variable changes by one unit. Conditional probabilities, which show the predicted probabilities of the outcome for different values of the explanatory.

Empirical Econometric Model

The study used a logit model based on Pho and McAleer (2021) to predict the binary outcome variable Y_i using covariates X_i and Z_i . The logistic model is given by:

$$P(Y_i = 1 | X_i, Z_i) = H(\eta_0 + \eta_1^T X_i + n_2^T Z_i) = \frac{e^{n^T X_i}}{1 + e^{n^T X_i}} = H(\eta^T X_i)...(2)$$

Where:

 $H(u) = (1 + e^{-u})^{-1}$ stands for the logistic distribution function

$$X_i = (1, X_i^T, Z_i^T)^T$$

 $\eta = (\eta_0, \eta_1^T, \eta_2^T)^T$ refers to the vector of parameters to be estimated and, the log-likelihood of:

The study applied the multivariate discrete choice models below, based on the theoretical and empirical models above, to test the hypotheses in this survey.

$$\operatorname{Log}\left(\frac{P(Y_{i}=1|X_{i})}{P(Y_{i}=0|X_{i})}\right) = \beta_{0} + \beta_{1}D_{1i} + \beta_{2}X_{2i} + \beta_{3}X_{3i} + \beta_{4}X_{4i} + \varepsilon_{i}...$$

$$\operatorname{Log}\left(Sav_{i}\right) = \beta_{0} + \beta_{1}Sin_{1i} + \beta_{2}Ind_{2i} + \beta_{3}Irt_{3i} + \beta_{4}Inc_{4i} + \varepsilon_{i}....$$
(5)

$$\operatorname{Log}\left(\frac{P(Sav_{i}=1|X_{i})}{P(Sav_{i}=0|X_{i})}\right) = \beta_{0} + \beta_{1}Sin_{1i} + \beta_{2}Ind_{2i} + \beta_{3}Irt_{3i} + \beta_{4}Inc_{4i} + \varepsilon_{i}....(7)$$

Where:

estimated Sav_i represents a binary variable that indicates whether a respondent i saves or

 Sin_i represents savings institutions Ind_i represents level of indebtedness Irt_i represents interest rate Inc_i represents income level The logistic distribution functions for the above model is described below:

$$\begin{split} P(Sav_i &= 1 | X_i) = \\ &\frac{\exp(\beta_0 + \beta_1 Sin_{1i} + \beta_2 Ind_{2i} + \beta_3 Irt_{3i} + \beta_4 Inc_{4i})}{1 + \exp(\beta_0 + \beta_1 Sin_{1i} + \beta_2 Ind_{2i} + \beta_3 Irt_{3i} + \beta_4 Inc_{4i})} \dots \dots (8) \end{split}$$

The logistic distribution function shows that the coefficients of the independent variables measure the change in the log-odds of Sav_i for a unit change in the independent variables, holding all other variables constant. The odds ratios, which are the exponentiated coefficients, measure the change in the odds of Sav_i for a unit change in the independent variables, cetris paribus.

The log-likelihood function based on the model is given below:

$$Log \theta(\beta_0, \beta_1 \dots, \beta_4) = \sum_{i=1}^n [Sav_i log P(Sav_i = 1|X_i) + (1 - Sav_i) log P(Sav_i = 0|X_i)]....(9)$$

Where: n is the sample size. The log-likelihood function is maximized by using an iterative method.

RESULT AND DISCUSSIONS

This section presents the results and discussions from the logit model used in the study.

Savings Behaviour

The logit model estimated the probability of

savings behaviour (Sav) using four explanatory variables: knowledge of the effectiveness of savings institutions (Sin), respondent's indebtedness (Ind), knowledge of interest rate (Irt), and respondent's income (Inc). Table 1 shows the results of the logit model. The odds ratios indicate the effects of the explanatory variables on the odds of Sav, holding all other variables constant.

Sin has a positive effect, meaning that higher knowledge of the effectiveness of savings institutions increases the odds of Sav. Ind and Irt have negative effects, meaning that higher indebtedness and interest rate decrease the odds of Sav. Inc has a positive effect, meaning that higher income increases the odds of Sav.

Table 1: Logistic Regression

Sav_i	Odds Ratio	Std. Err.	Z	P> Z	95% Conf. Interval
Sin_i	2.769625	1.846195	1.53	0.126	.7499307 10.2287
Ind_i	0582072	.045326	-3.65	0.000	1.005718 .2677986
Irt_i	0633193	.0499502	-3.50	0.000	.0134914 .2971777
Inc_i	1.868127	.5902195	1.98	0.048	1.005718 3.470056
Cons	6.923903	6.017069	2.23	0.026	1.26076 38.02502

Source: Researchers' computation 2023

Average Marginal Effects

The average marginal effects in the logit model show how the probability of saving changes when an explanatory variable changes by one unit, holding all other factors constant (Salisu, 2017). Table 2 shows the average marginal effects for Sin, Ind, Irt, and Inc. Sin has a positive effect, meaning that higher knowledge of the effectiveness of savings institutions increases the probability

of saving by 21.8 percentage points. Ind has a negative effect, meaning that higher indebtedness decreases the probability of saving by 6.1 percentage points. Irt has a negative effect, meaning that higher interest rate decreases the probability of saving by 5.9 percentage points. Inc has a positive effect, meaning that higher income increases the probability of saving by 1.3 percentage points.

Table 2: Average Marginal Effects

Savi	Odds Ratio	Std. Err.	Z	P> Z	95% Conf. Interval
Sin_i	.0218171	.0148186	0.47	0.141	0072268 .050861
Ind_i	0609028	.0185506	-3.28	0.001	09726130245442
Irt_i	0590999	.0191951	-3.08	0.002	09672160214781
Inc_i	.0133839	.007092	1.89	0.059	0005162 .0272839

Source: Researchers' computation 2023

Diagnostic Tests

This section reports the tests for the assumptions of Binary Response Models (Salisu, 2017). If violated, the model may produce invalid inferences (Salisu, 2017). The model must pass three tests: Specification test, Goodness-of-fit test, and Multicollinearity test (Salisu, 2017; Sur et.

al., 2019). These tests were conducted on the model in the study.

Specification Test

Test This test checks if the probability function is correctly specified (Salisu, 2017). The test result is in Table 3. The study used the Generalized Reset test - link test (Sunil, 2005), which adds powers of the fitted values

of the outcome variable as additional regressors. The null hypothesis is no specification error. If the p-value of _hatsq is insignificant, we do not reject the null and conclude that the model is well-specified

(Davidson & MacKinnon, 1981). From Table 1, the model is well-specified since the p-value of _hatsq is insignificant with a p-value of 0.401 as suggested by (Davidson & MacKinnon, 1984a).

Table 3: Link Test

Sav	Coefficient	Std. Err.	Z	P> Z	95% Conf. Interval
_hat	.2017417	.934848	0.22	0.829	-1.630527 2.03401
_hatsq	.1645914	.195993	0.84	0.401	2195478 .5487304
Con	.6014965	.8935763	0.67	0.501	-1.149881 2.352874

Source: Researchers' computation 2023

Goodness-of-fit Test

The Likelihood Ratio test (Sur *et. al.*, 2019) compares the fit of two nested models; a nested model is a subset of another model with some fixed parameters. It tests if a model with more variables fits the data better than a model with fewer variables. It

compares the log-likelihood of the two models and provides a p-value that tells us if the model with more variables is a better fit. Table 4 shows the results of the Likelihood Ratio test for two models (m1 and m2). The p-value of the Chi-square statistic is less than 0.05, which implies that the added variables improve the fit of the model.

Table 4: Likelihood ratio test

Sav_i	Odds ratio	Std. err.	Z	P> Z	95% Conf. interval
Sin_i	3.303159	4.890781	0.81	0.420	.1813879 60.15206
Ind_i	2695059	.2295333	-1.54	0.124	.0507709 1.43061
Irt _i	1480625	.1251932	-2.26	0.024	.0282304 .7765559
Inc_i	1.540606	.4877048	1.37	0.172	.8283797 2.865193
Mst_i	6.510299	3.496642	3.49	0.000	2.272091 18.65418
Act_i	2.929429	1.503972	2.09	0.036	1.070964 8.012921
Cons	0765092	.1408848	-1.40	0.163	.0020716 2.825696

Estimate store m2

 $Lrtest\ m1\ m2$

 $Likelihood - ratio test: LR Chi^{2}(2) = 16.87$

Assumption: m1 nested m2: $Prob > Chi^2 = 0.0002$

Source: Researchers' computation 2023

Wald Test

The Wald test (Sur *et. al.*, 2019) tests if the independent variables added to the model (m1 and m2) have a significant impact on the model. It tests if a variable is significant if it

improves the fit of the model. Table 5 shows the results of the Wald test for two models (m1 and m2). The p-value of the Chi-square statistic is less than 0.05, which implies that the added variables have a significant impact on the model.

Table 5: Wald test

Test: Marital status, account type		
1 [Savings] Marital status = 0		
2 [Savings] Account type = 0		
$Chi^2(2) = 14.58$		
$Prob > Chi^2 = 0.0007$		

Source: Researchers' computation 2023

Multicollinearity Test

The multiple regression model (Stock & Watson, 2003) assumes that the independent variables are not perfectly multicolinear or one regressor is not a linear function of another. Otherwise, this might cause unstable estimates and inaccurate variances that affect confidence intervals and hypothesis tests. Multicollinearity makes it

hard to interpret coefficients of the logistic regression model as they become unreliable and also lead to overfitting and poor generalization of the model (Stock & Watson, 2003). To avoid these problems, a multicollinearity test is needed. Table 6 shows the multicollinearity test result using the Variance Inflation Factor (VIF). VIF measures the increase in variance of a coefficient due to multicollinearity.

The VIF has a minimum value of 1, but if it is below 10, there is no severe multicollinearity. If it is greater than 10, it is

a problem (Hair, et. al., 1995). The Table shows that the model does not have multicollinearity.

Table 6: Multicollinearity Test

Variable	VIF	1/VIF
Inc_i	1.06	0.953489
Sin_i	1.05	0.955975
Ind_i	1.02	0.984548
Irt_i	1.01	0.985323
Mean VIF	1.03	

Source: Researchers' computation 2023

CONCLUSIONS AND RECOMMENDATIONS

This section concludes and recommends based on the objective of the study.

The study analysed how financial literacy affects the savings behaviour of workers in tertiary institutions of Kano State. The study used a cross-sectional survey design and collected data from 500 workers using a questionnaire. The data were analysed using descriptive and logistic regression analyses.

The results showed that financial literacy has a positive and significant impact on the savings behaviour of these workers. The study concluded that financial literacy is an important factor that influences the savings behaviour of these workers. The study also suggested some implications and recommendations for policy makers based on this conclusion.

To improve financial literacy and savings behaviour among academic staff in Kano State, northern Nigeria and the country in general, this study recommends the following policy and educational interventions: The government should create a national savings scheme that offers attractive interest rates (for non-Muslim adherents or those who see no wrong in interest-bearing income), tax benefits and flexible withdrawal options to encourage academic staff to save more.

The government, the tertiary institutions, the financial service providers and the media should enhance the financial literacy and awareness of academic staff on the importance and benefits of savings, as well as the available savings products in the market, through various channels.

The government should regulate and supervise the financial service providers to ensure they offer safe, affordable and transparent savings products and services to academic staff, and prevent fraud, exploitation and abuse.

The government should support the development and innovation of digital savings platforms that use mobile phones, internet, biometrics and other technologies to facilitate savings transactions and services for academic staff.

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