

Moderating effect of age in the relationship between debt literacy and indebtedness of formal sector employees in Kenya.

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Abstract- This study examined the moderating effect of age in the relationship between debt literacy and indebtedness of formal sector employees in Kenya. The study showed that age has an effect on the amount of debt held by individuals. Research also found level of debt literacy particularly low among youth and elderly. The study using hierarchical moderated multiple regression (MMR) models found that the coefficients for interaction term for debt literacy and age of employees had significant moderating effect. Further, the study revealed the moderating effect of age was positive and significant for Debt Service Ratio (DSR) on one hand and negative and significant for Debt Income Ratio (DIR) on the other. The young and the elderly were found debt illiterate. The government and other institutions should roll out financial education programs

Index Terms- Debt literacy, Indebtedness, Debt Service Ratio, Debt Income Ratio

design. The study targeted about 2.4 million employees in the formal sector. Three stage sampling was done, first, cluster sampling and then, stratified sampling and finally random sampling. The study used primary data collected by use of self-administered questionnaires. 384 questionnaires were circulated. Of the returned 337, 292 questionnaires were considered usable. Cronbach's alpha for likert type items was found reliable (over 0.7). Data analysis used IBM SPSS statistics 21 for descriptive and correlation analysis. The relationship between age of employees and the two study variables was analysed using mean and ANOVA statistics. In this study, age was constructed as an eight category ordinal variable in the questionnaire (see 10). Further, hierarchical Multiple regression models were used to examine the moderating effect of age in the relationship between debt literacy and indebtedness. For easy of comparison with past studies, age was re-coded as 1 if young (<36 years), 2 if mid-aged (36-45 years) and 3 if elderly (> 45 years).

I. INTRODUCTION

Several studies relate financial literacy or debt literacy and indebtedness to several socioeconomic characteristics including age (e.g. Gathergood, 2012; Lusardi & Tufano, 2009). This study relates age of the employees to their debt literacy and indebtedness. And finally models age of the employees as a moderator.

II. RESEARCH OBJECTIVE

To assess the moderating effect of age of formal sector employees in Kenya on the relationship between debt literacy and indebtedness.

III. METHODOLOGY

Positivism paradigm was used in this study. The study adopted a cross sectional and correlational descriptive research

IV. DATA ANALYSIS, RESULTS AND DISCUSSION

In terms of response rate, the study is representative of the underlying population in terms of age because 51.2% of the respondents were aged less than 35 years (young employees) while 48.8% were aged more than 35 years (old employees). The mean age group was 31-40 years, median age group was 31-35 years and the modal age group was 25-30 years.

As revealed in this section, several authors have shown that age has an effect on the amount of debt held by individuals. They have also justified this relationship using theories such as the life cycle Theory. For example, Crawford et al. (2012) argues that the demand for credit will vary considerably across borrowers depending on their age among other socioeconomic characteristics. Crawford et al. continues to say that the willingness of the lenders to supply credit will also depend on age of the borrower among other socioeconomic characteristics. On the other hand, Legge and Heynes (2009) justify the relationship between age of the borrower and debt holding using the life cycle theory. Legge and Heynes argue that employees are increasingly

likely to borrow over the first half of their working life when they have few resources and many demands on those resources and are decreasingly likely to borrow over their second half of their working life. Therefore, age has a quadratic relationship with indebtedness.

Reviewing Figure 1 shows the profile for disposable income was typically hump-shaped; higher for middle aged and lower for young and elderly people. The figure supports the Modigliani's life cycle sociological thesis that income has a life cycle pattern

which is “inverted U”. Further and consistent with permanent income theory, there is evidence that younger people are over-indebted in their attempt to smooth consumption with future income growth. Reviewing results on Appendix 1 show the young employees had the least disposable income and F-test show that age groups were strongly significantly different, $F(2,289)=13.277$, $p=.000$, with respect to disposable income. However, there was an anomalous rise from age 50.

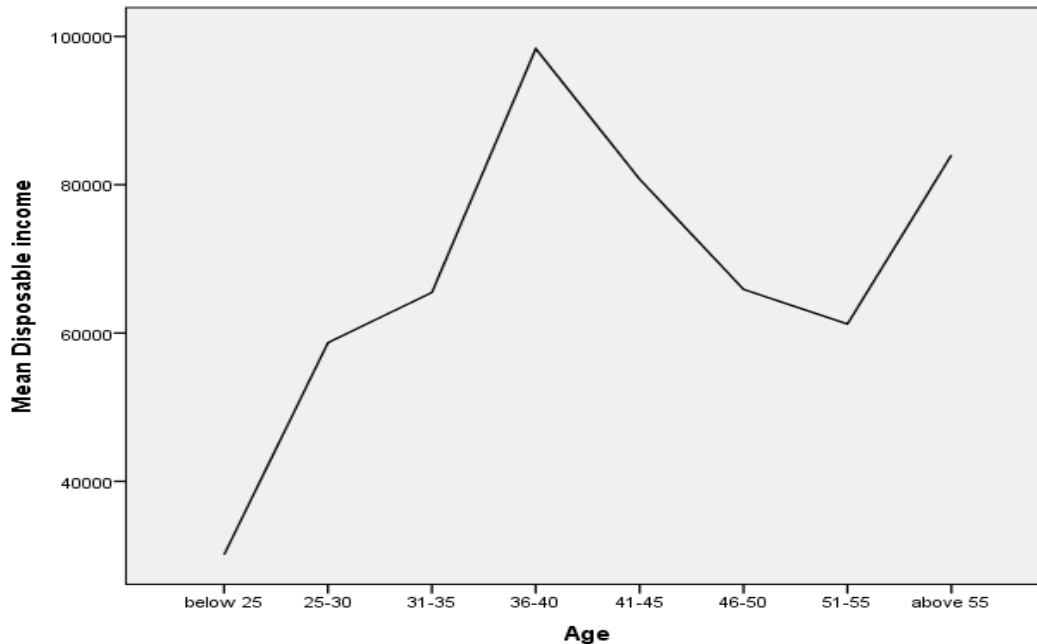


Figure 1: The profile for disposable income against age of respondents

Reviewing Appendix 1, the mid-aged employees had the largest loan balance followed by the elderly while the youth trailed. This is consistent with Herceg and Susic (2010) who concluded that the effect of age on the amount of debt depends on the individual's position in the life cycle. The effect according to Herceg and Susic is positive until the person reaches 50 years, afterwards it becomes negative. Indeed, the F-test results in Appendix 1 suggest there was statistically strong and significant difference, $F(2,289)=9.915$, $p=.000$, in loan balance outstanding within the age groups of the employees. This supports Fasianos et al. (2014) who found age the most significant determinant of debt holding. In the same line, Nguyen (2007) also found age of an individual has an increasing effect on the amount of loan received.

In line with this finding, Thachareon et al. (2004) argues that young people tend to accumulate debt until the age of 50.

Further, Figure 2 shows distribution of loan balances along the age groups. This is consistent with prior studies (Bicakova et al., 2011; Dey et al., 2008; Lusardi & Tufano, 2009) which found that debt burden usually increase among the younger population and reduce at old age. It is also consistent with the life cycle and permanent income hypotheses; that debt is for the young and that the curve for indebtedness against age is hump-shaped. According to Mwangi and Sichei (2010) the anomalous rise from age 50 is due to the respondents “topping up” so as to have their obligation terminate at the retirement date. Borrowers are usually afraid they will be credit excluded after retirement (Mwangi & Sichei, 2010).

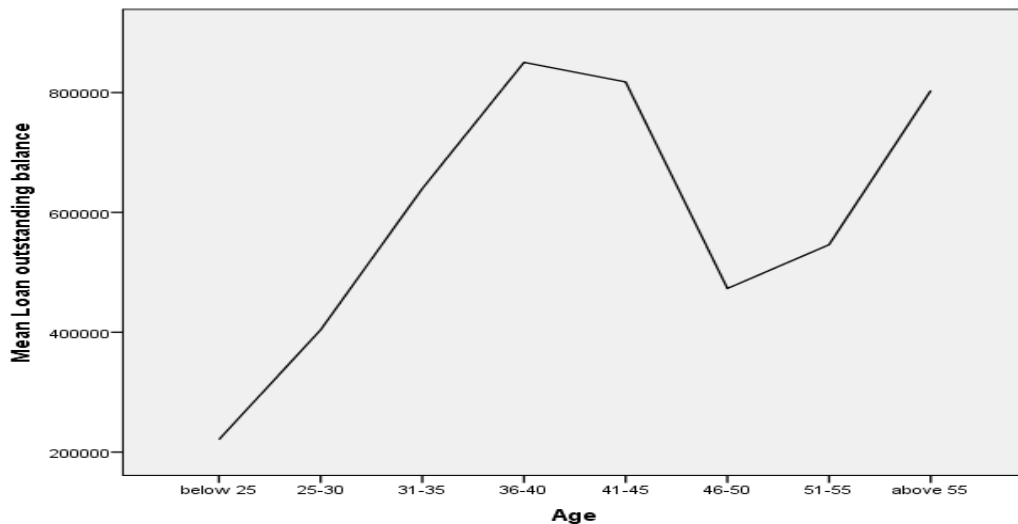


Figure 2: Graph of indebtedness against age of employees

Reviewing Appendix 1, the elderly employees had the largest score for DSR followed by the mid aged while the young trailed. Reviewing F-test results in Appendix 1 show DSR was significantly different along the three age groups, $F(2,289)=4.315$, $p=.014$, but DIR was insignificantly different ($p=.358$) across the

age groups. The graph for DSR against age was as shown in Figure 3. The finding in Figure 3 supports a regression model done by Thaichareon et al. (2004) who found a hump-shaped relationship between age and DIR.

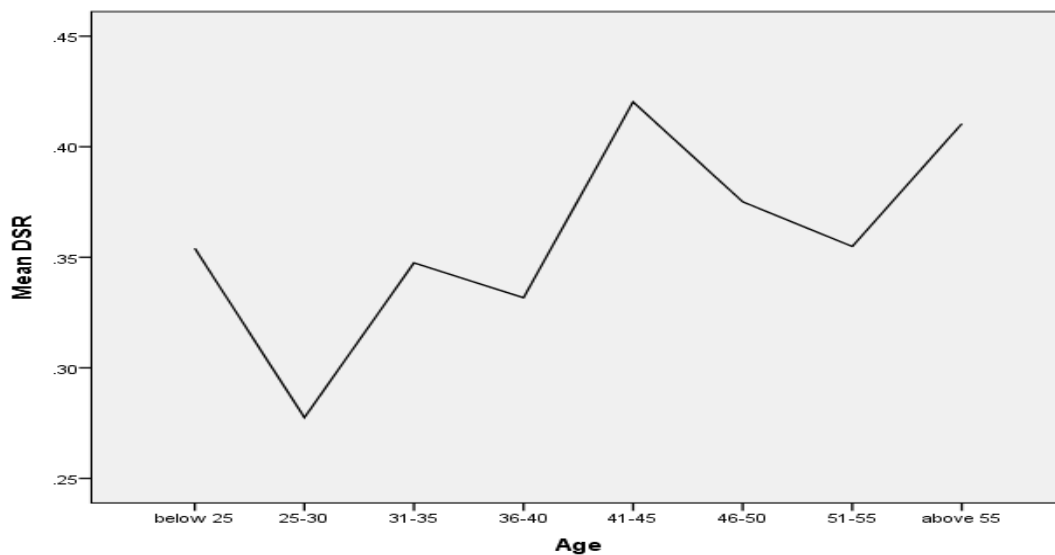


Figure 3: Graph for DSR against age of respondents

Reviewing Appendix 1, the mid age employees had the largest score for development loan followed by the young while the middle aged trailed. This supports the finding by Hurwitz and Luiz (2007) who found young people borrowed for short-term loan purpose, often consumption-oriented while older people used credit for income generation activities such as buying assets. Appendix 1 show the mid-age borrowed more for housing purpose while the young employees had car loans. This supports Bakar, Subramaniam and Tan (2013) who found that age has a significant effect on housing purpose but not on car ownership. Bakar et al. contend that the young in Malaysia prefer to drive to their work places. This phenomenon is apparently strange because many

workers in developed countries travel to work by public transport (Bakar et al., 2013). However, the F-test results suggest the three age groups of the employees are insignificantly different ($p>.05$) with respect to loan purpose except for housing loan where the age groups were significantly ($p=.000$) isolated.

Reviewing Appendix 1, the mid-aged employees had the largest number of loan followed by the elderly while the youth trailed. However, the F-test results suggest there was insignificant difference, $F(1,289)=1.013$, $p=.364$, in multiple loans uptake between the young and older employees. This supports the finding by Herceg and Sosic (2010) who found that the probability of having a loan increases with age upto age 50. This particular

finding also supports the life cycles quadratic pattern as shown by Figure 4. The increase of multiple loans after 50 years as well explains the anomalous increase of outstanding loan balances. The anomalous rise is due to fears confirmed by Mwangi and Sichei

(2010) who found probability of access to credit drops as one draws closer to the retirement age. The graph for multiple loans against age is shown as Figure 4.

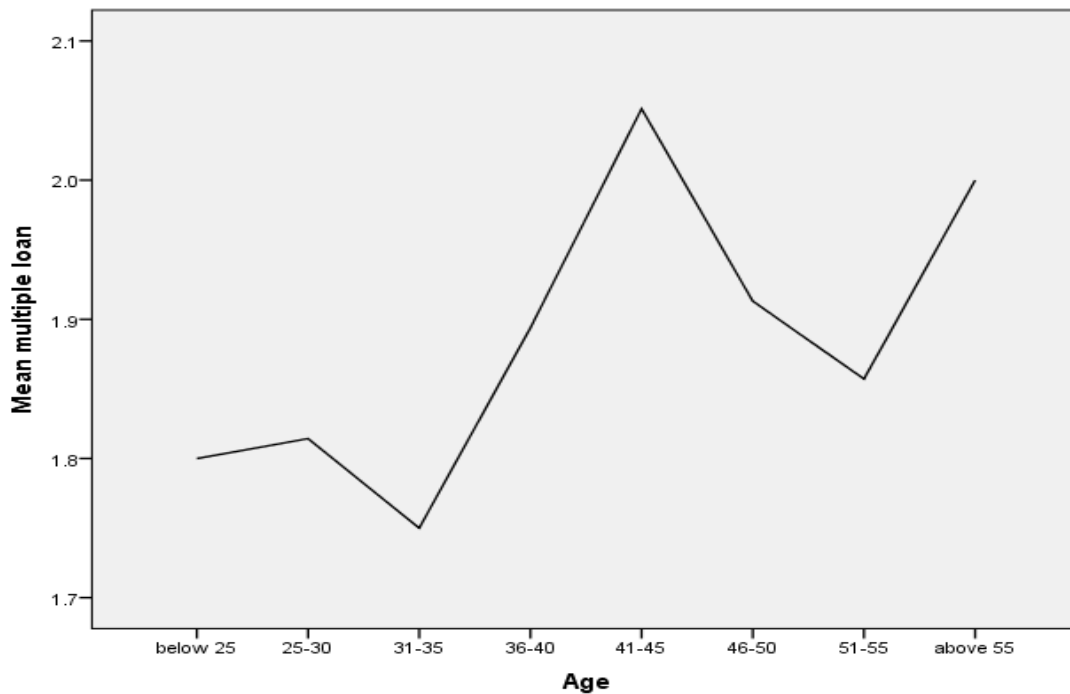


Figure 4: Graph of multiple loans against age of employees

Looking at Appendix 1, the young employees had the highest probability of having a bank loan followed by the mid-aged while the elderly trailed. This supports the finding by Herceg and Sosic (2010) who found that the probability of having a bank loan decrease with age. Similarly, Mwangi and Sichei (2010) found debt access in bank decline with age blaming this to the CAMPARI framework used by banks which ranks elderly applicants as less creditworthy. However, the F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=2.745$, $p=.066$, in having a bank loan within the age groups of the employees. Results in Appendix 1 show the elderly employees had the highest number of SACCO loan followed by the mid-aged while the young employees trailed. On the other hand, the F-test results suggest there was a strong and significant difference, $F(2,289)=5.907$, $p=.003$, within the age groups of the employees with respect to having SACCO loan.

Reviewing Appendix 1, the young had borrowed more than the older employees without any security while the mid-aged had the highest score for borrowing with security. This supports Fasianos et al. (2014) who concluded that young people are most probable to have unsecured debt. In the same breath, Bryan et al. (2010) who found that the proportion of respondents with unsecured debt was high among the age group 25-34, and only 1% of those aged over 65 had any unsecured debt. However, the F-test results suggest insignificant difference ($p>.05$) in the distribution of secure or unsecured loan within the age groups of the employees. Mwangi and Sichei (2010) found age had a positive and significant relationship to access to credit from bank and SACCOs while age had a negative relationship with loans from

government. This is confirmed by Appendix 1 where F-test results show strong and significant difference, $F(2,289)=5.668$, $p=.004$, across the age groups of the employees with respect to having a HELB loan.

Results in Appendix 1 show that the mid-aged had higher SACCO membership score followed by the young and trailed by the older respondents. This finding support extant studies, (Gloukoviezoff, 2007; Mwangi & Sichei, 2010; Nguyen, 2007; Russell et al., 2011) that it is the young and the elderly who have the most limited access to credit services. The young and the old have increased risk of debt exclusion albeit for different reasons. For example, Nguyen (2007) found age of an individual has an increasing effect on the amount of loan received. In the same line, Mwangi and Sichei (2010) found that increase in age tend to enhance access to credit but the probability of access drops as one draws close to the retirement age. Generally, age of a person has a quadratic relationship with the mid-aged persons having the highest debt access. However, F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=2.500$, $p=.084$, in SACCO membership among the age groups of the employees.

Reviewing Appendix 1, the young had highest debt advice score followed by the mid aged and trailed by the elderly respondents. This supports Dowling et al. (2009) who found most young people seek financial information more but they prefer non-professional to experts. Financial experts, argues Winchester (2011), might be particularly useful to individuals who are young. On the other hand, the F-test results in Appendix 1 suggest there was statistically significant difference, $F(2,289)=3.661$, $p=.027$, in debt advice score among the age groups of the employees. A

serious review of Appendix 1 show the young had highest debt counselling score followed by the middle-age and trailed by older respondents. This supports Disney et al. (2014) who found that the likelihood of seeking debt counsel decrease with age. However, the F-test results in Appendix 1 indicate the three age groups of the employees were insignificantly different, $F(2,429)=1.031$, $p=.358$, with respect to debt counselling score.

Results in Appendix 1 show the elderly employees had the highest aggregate debt experiences score followed by the middle aged while the young trailed. This supports Lusardi and Tufano (2009) who argue that age is positively correlated with debt experiences. Moreover, Lusardi (2009) found older people had better credit practices. In the same line, van Ooijen and van Rooij (2014) found the most experienced mortgagor had better debt contract understanding than first time homeowners. However, the F-test results in Appendix 1 suggest there was statistically insignificant difference, $F(2,289)=0.671$, $p=.512$, in debt experiences score within the age groups of the employees.

Reviewing Appendix 1, the oldest employees had the highest self-confidence score followed by the middle aged while the young trailed. This supports past studies (e.g. Agarwal et al., 2010; Chio, 2014; Finke, 2011) which found young respondents had the lowest financial confidence arguing that financial confidence is based on experience and it increases with age. Similarly, Disney and Gathergood (2008) found the young had the lowest financial confidence while Lusardi and Mitchell (2014) concluded that confidence increases with age. However, the F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=1.699$, $p=.185$, in self-confidence score among the age groups of the employees.

Reviewing Appendix 1 show that the old employees had highest peer independence score followed by the youth while the mid aged employees trailed. This supports the finding by Gloukoviezzoff (2007) who argue that the elderly tend to be highly resistant to change. Also supported was Fasianos et al. (2014) who found age the most significant determinant of debt and peer income effects. In the same line, Baddeley et al. (2012) found conformity to social influence an inverse function of age and concluded that age may moderate the susceptibility to social influence. However, the F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=1.998$, $p=.138$, in peer influence score among the age groups of the employees.

Results in Appendix 1 show the older employees had lowest borrowing behaviours score. This supports the finding by

Cynamon and Fazzari (2008) that older people are more risk averse than younger cohorts when making financial decisions. This means risky borrowing behaviours decrease with age. However, F-test results in Appendix 1 suggest there is insignificant difference, $F(2,289)=1.432$, $p=.241$, in borrowing behaviours across the age groups of the employees. Agarwal et al. (2010) argues that financial mistakes decline with age until age 50 years when they begin to increase again. This argument by Agarwal et al. explains the anomolous rise in multiple loans and loan outstanding balances from 50 years.

Findings in Appendix 1 show the old employees had highest personal budgeting scores. This supports the finding by Krah et al. (2014) who found age of individuals had a significant relationship with budgeting behaviour. But F-test results in Appendix 1 suggest there was significant difference, $F(2,289)=1.115$, $p=.329$, in personal budgeting scores among the age groups of the employees. Results in Appendix 1 show the mid-aged employees had higher planning score than the young and the old denoting a hump shaped pattern. This supports the finding by Lusardi (2009) that lack of planning is not only common among young people but also among the elderly. Although it contradicts Locke and Latham (2013) who contend in their goal setting theory that elderly persons will show higher goal commitment than both medium aged and the young. However, F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=1.181$, $p=.308$, in personal planning score within the age groups of the employees. The use of a written customised financial plan might be particularly useful to individuals who are young, argues Winchester (2011).

Results in Appendix 1 show that the old employees had the best debt capability score followed by the mid-age while the young employees trailed. This finding is consistent with a study by Bryan et al. (2010) which indicated that young people have less financial capability than older people and that financial management ability increases with age and experience. Yet a study by Ajzerle et al. (2013) found that those with low debt capability were more often elderly. Similarly, Finke (2011) found age is negatively related to decision making skills since advancement in age leads to predictable decline in cognitive ability. However, the F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=0.033$, $p=.966$, in the debt capability scores among the age groups of the employees.

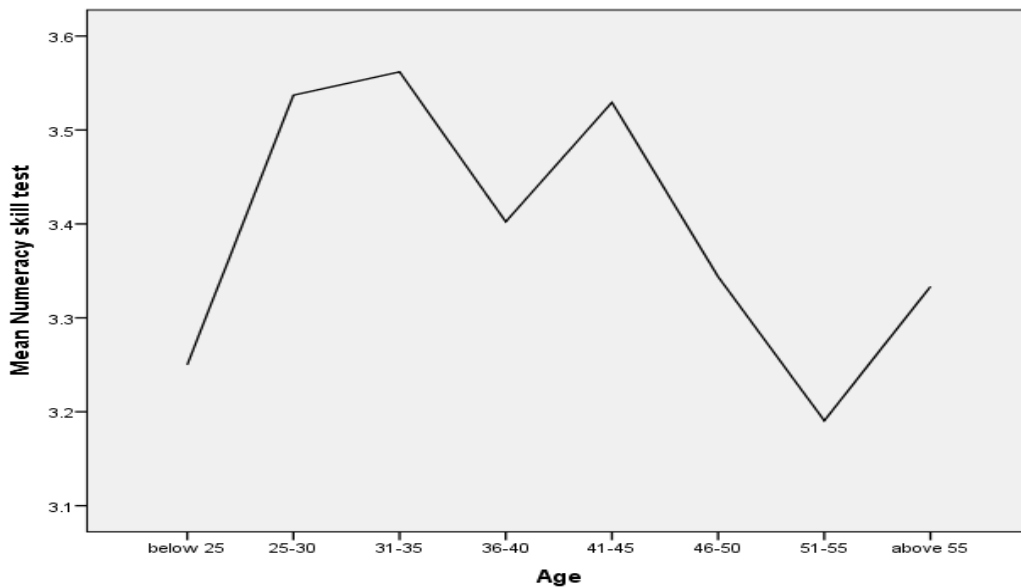


Figure 5: Graph of numeracy test score against age of employees

Similarly, Lusardi and Tufano (2009) also found older respondents displayed difficulty in numeracy test with the fraction of correct responses declining with age. However, F-test results in Appendix 1 suggest there was insignificant difference, $F(2,289)=1.110$, $p=.331$, in numeracy skills score among the age groups of the employees.

Mean results in Appendix 1 show the old employees had lowest numeracy test scores. This supports prior studies (e.g. Lusardi, 2009; van Ooijen & van Rooij, 2014) which found low rate of numeracy skills in the entire population but the most affected were the young and elderly. This was also confirmed by Figure 5. The numeracy test score follow a hump-shaped pattern; lowest for the young and older employees but peaking for the middle-aged employees. This finding is consistent with van Ooijen and van Rooij (2014) who found the relationship between

numeracy test score and age was an inverted “U” shaped. This pattern is therefore in line with the life cycle theory that knowledge rise with age but decay at old age safe for the anomalous rise after 55 years. In the same line, Brown and Graf (2013) found those aged 41-50 had higher numeracy score, followed by age group 20-30 while those aged 61-74 trailed.

Findings in Appendix 1 show the young employees had the highest self-assessment score yet the pattern in Figure 6 was hump shaped. Ambarkhane et al. (2015) argues that older people rate themselves higher but self-assessment by young people is nearer to the actual numeracy test score. However, F-test results in Appendix 1 show the three age groups of the employees were insignificantly different, $F(2,320)=0.840$, $p=.433$, in term of self-assessment score.

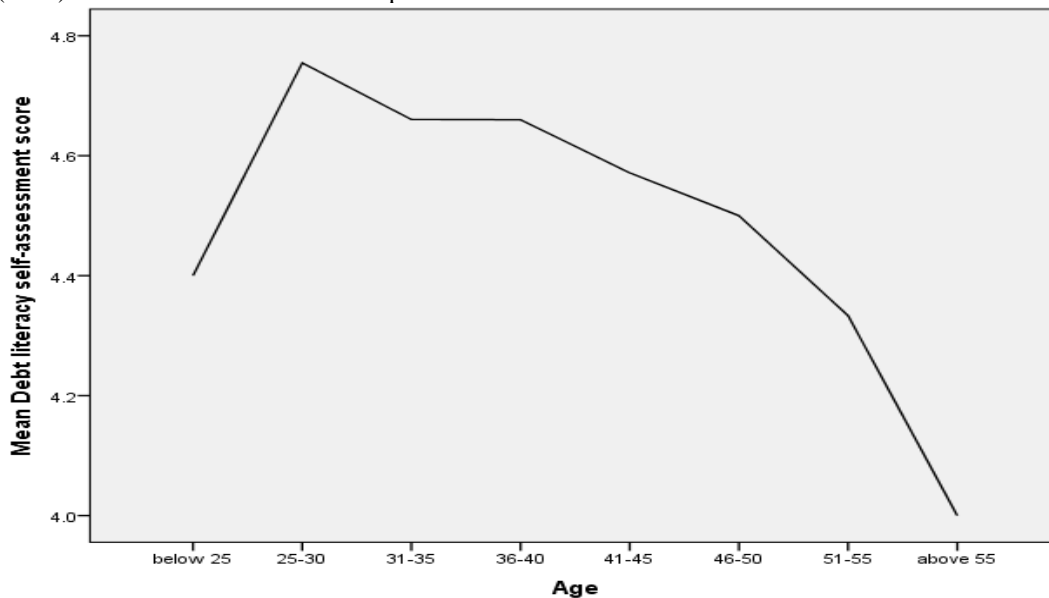


Figure 6: Graph of self-assessed debt knowledge against age

Reviewing Appendix 1, the young had higher aggregate debt knowledge score followed by the mid-aged and trailed by the older respondents. On the other hand, the F-test results suggest significant difference, $F(2,289)=5.756$, $p=.004$, in debt knowledge level across the age groups of the employees. Reviewing Figure 7, the debt literacy score for the young had an increasing slope while that for older respondents was declining safe for the anomalous rise after 55 years. On the other hand, the

F-test results in Appendix 1 suggest there was statistically significant difference, $F(2,289)=3.764$, $p=.024$, in debt literacy among the age groups of the employees. This finding supports Lusardi and Mitchell (2014) who found older people more knowledgeable than the young. On curve estimation using quadratic model, the graph for debt literacy against age was as shown in Figure 8

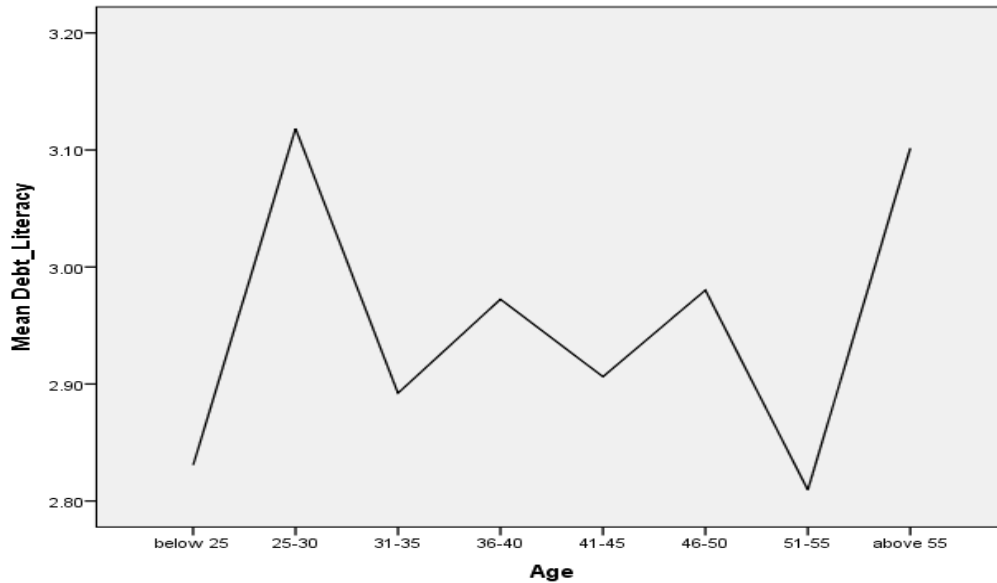


Figure 7: Graph of debt literacy against age of employees

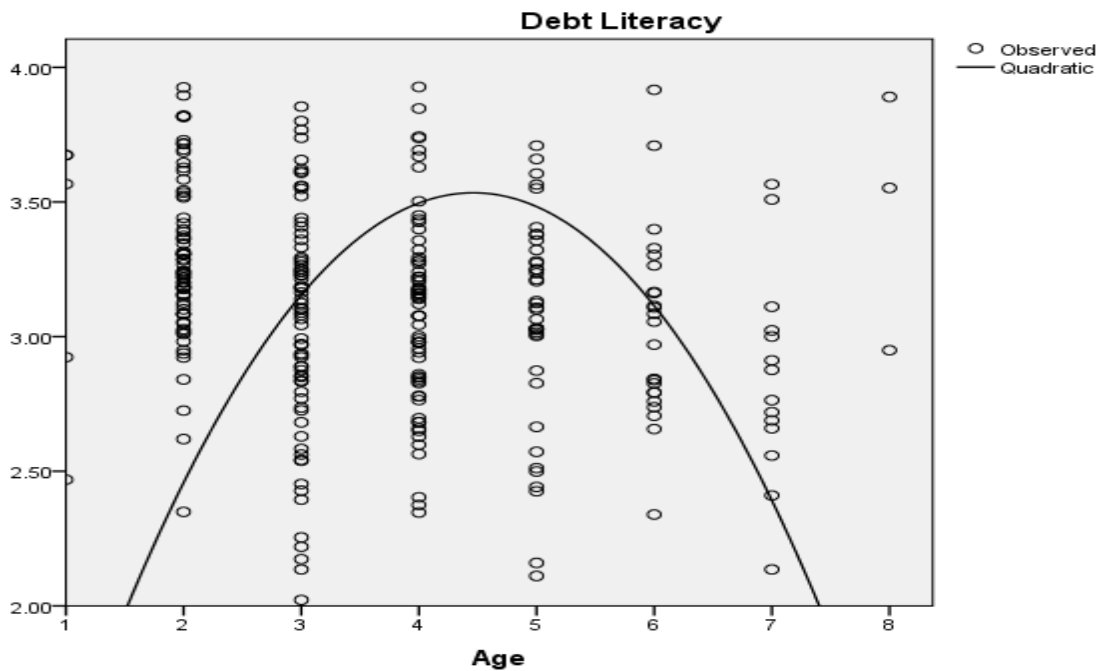


Figure 8: Curve estimation for debt literacy against age of employees

This finding confirms the hump-shaped relationship between age of respondent and financial literacy as documented by Brown and Graf (2013) for Switzerland and Lusardi and Tufano (2009), Lusardi and Mitchell (2014) and Lusardi et al. (2010) for America. For instance, Lusardi and Tufano (2009) found the young (<30 years) and the elderly (>65 years) had low levels of debt literacy. The declining slope of the debt literacy curve after 50 years supports the learning theory that there is terminal loss of intelligence due to weakening memory and recalling ability. Yet Bhushan and medury (2013) found financial literacy higher for those aged over 60, followed by those aged 51-60, and the lowest were those aged 20-30.

Moderating Effect of Age on the Relationship Between Debt Literacy and DSR

The MMR model in Equations 1 to 4 were adapted from Stone-Romero and Liakhovitski (2002). An interaction effect exists when the effect of the independent variable on the dependent variable differs significantly depending on the value of the moderator. The test for moderation relies on the variance in y_i that is explained by the product of $x_i \cdot z_i$ in the MMR model. The null hypothesis is that $b_3=0$ and has insignificant ($p>.05$) contribution to the dependent variable, y_i . Rejection of the null hypothesis [$H_0 : b_3 = 0, p > .05$] signals existence of a moderating effect (Field, 2013; Stone-Romero & Liakhovitski, 2002).

The MMR model used to test the moderating effect age of employees in the relationship between debt literacy and DSR was;

$$y_i = b_0 + b_1x_i + b_2z_i + b_3x_iz_i + \varepsilon$$

..... (1)

Where: y_i = Debt Service Ratio (DSR)

x_i = Aggregate debt literacy

z_i = Age of the employee (1 if less than 36 years; 2 if aged between 36-45 years, and 3 if aged over 45 years)

b_0 = Level of DSR in the absence of debt literacy, moderator variable and their interaction terms

b_1 = Intercepts for debt literacy

b_2 = Intercepts for the moderator variable

b_3 = Intercepts for the interaction term

ε_i = Error term

Baron and Kenny (1986) advises that it is desirable the moderator be uncorrelated with both variables (x_i and y_i) so that it can provide a clearly interpretable interaction term. This study found age of employees and debt literacy had weak, negative but significant correlation ($r=-.202, p=.001$) while it had weak, positive and significant correlation ($r=.210, p=.000$) with DSR. This means age of employees was not correlated with either debt literacy or DSR and hence absence of multicollinearity problem.

Table 1: MMR model summary of DSR against debt literacy

Model	R	R ²	Adj. R ²	SE	Change Statistics				
					ΔR ²	ΔF	df1	df2	ΔSig.F
1	.293	.086	.079	.14692	.086	13.536	2	289	.000
2	.423	.105	.096	.14559	.020	6.294	1	288	.013

*p<.05

MMR model 1 in Table 1 shows that R=.293, R²=.086 and F(2,289)=13.536, p=.000 implying the model is valid and explains DSR significantly. The value of R² indicates that 8.6% of the variance in the DSR can be accounted for by debt literacy and age of the employees. On the other hand, model 2 shows the results after the interaction term (x_iz_i) was added into the model. Table

4.76 also indicates that the inclusion of the interaction term resulted into R change of .020, F(1,288)=6.294, p=.013, showing significant moderating effect. Thus the study rejected the null hypothesis [$H_{05a}:b_3=0, p>.05$] that there is no moderating effect of age on the relationship between debt literacy and DSR of formal sector employees in Kenya.

Table 2: MMR model results of DSR against debt literacy

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0.584	2	.292	13.536	.000
	Residual	6.238	289	.022		
	Total	6.823	291			
2	Regression	0.718	3	.239	11.287	.000
	Residual	6.105	288	.021		
	Total	6.823	291			

*p<.05

The MMR Models 1 and 2 shown in Table 2 were found to be valid, $F(2,289)=13.536$, $p=.000$ and $F(3,288)=11.287$, $p=.000$ respectively. The models in Table 2 show the value of F-ratio were

significant ($p=.000$). These results show both models significantly predict DSR but model 1 was better.

Table 3:MMR model coefficients of DSR against debt literacy

Model		Beta	SE	Beta	T	Sig.	Tolerance	VIF
1	b_0	0.605	0.076		7.945	.000		
	x_1	-0.098	0.022	-0.250	-4.382	.000	.975	1.026
	z_1	0.025	0.012	0.118	2.073	.039	.975	1.026
2	b_0	0.698	0.084		8.299	.000		
	x_1	-0.133	0.026	-0.339	-5.079	.000	.698	1.433
	z_1	-0.044	0.030	-0.207	1.463	.145	.156	6.420
	x_1, z_1	0.011	0.005	0.352	2.509	.013	.158	6.331

* $p<.05$

Based on MMR model 2 beta values shown in Table 3, debt literacy (x_1) had negative but significant ($p=.000$) effect on DSR while age of the employees (z_1) had negative and insignificant ($p=.145$) effect on DSR. Since the coefficient of the interaction term (x_1z_1) was significant ($p=.013$), the study rejected the null hypothesis that [$H_{0a}:b_3=0$, $p>.05$] that there is no moderating effect of age on the relationship between debt literacy and DSR of formal sector employees in Kenya. Finally, substituting the standardized beta coefficients in the OLS MMR model ($y_1 = b_0 + b_1x_1 + b_2z_1 + \epsilon$), the following DSR equation was obtained;

$$DSR = -0.339DL + 0.352 \text{ age} * DL \dots \dots \dots (2)$$

Equation 2 implies that for one point improvement in debt literacy (DL) the score of DSR would decrease by 0.339 points keeping the effect of the interaction term constant which is higher than 0.250 points in model 1 hence presence of the moderating effect.

Moderating Effects of Age on the Relationship Between Debt Literacy and DIR

The MMR model used to test the moderating effect age of employees in the relationship between debt literacy and DIR was;

$$y_2 = b_0 + b_1x_1 + b_2z_1 + b_3x_1z_1 + \epsilon \dots \dots \dots (3)$$

Where: y_2 = Debt Income Ratio (DIR)

x_1 = Aggregate debt literacy

z_1 = Age of the employees (1 if less than 36 years; 2 if aged between 36-45 years, and 3 if aged over 45 years)

b_0 = Level of DIR in the absence of debt literacy, moderator variable and their interaction terms

b_1 = Intercepts for debt literacy

b_2 = Intercepts for the moderator variable

b_3 = Intercepts for the interaction term

ϵ_i = Error term

Baron and Kenny (1986) advises that it is desirable the moderator be uncorrelated with both variables (x_1 and y_2) so that it can provide a clearly interpretable interaction term. This study found age of employees and debt literacy had weak, negative but significant correlation ($r=-.202$, $p=.001$) while it had weak, positive and insignificant correlation with age ($r=.085$, $p=.147$) with DIR. This means age of employees was not correlated with either debt literacy or DIR and hence absence of multicollinearity problem.

Table 4: MMR model summary of DIR against debt literacy

Model	R	R ²	Adj. R ²	SE	Change Statistics				
					ΔR^2	ΔF	df1	df2	$\Delta \text{Sig.F}$
1	.263	.069	.063	5.26110	.069	10.763	2	289	.000
2	.304	.093	.083	5.20417	.023	7.357	1	288	.007

* $p<.05$

From Table 4, Model 1 indicate that $R=.263$, $R^2=.069$ and $F(2,289)=10.763$, $p=.000$ implying the model can predict DIR significantly. The value of R^2 indicates that 6.9% of the variance in the DSR can be accounted for by debt literacy and age of the employees. Model 2 in Table 4, shows the results after the interaction term (x_1z_1) was added into the model. Table 4 also

indicates that the inclusion of the interaction term resulted into an R^2 change of .023 and $F(1,288)=7.357$, $p=.007$, showing significant moderating effect. Thus, the study rejected the null hypothesis [$H_{05b}:b_3=0$, $p>.05$] that there is no moderating effect of age on the relationship between debt literacy and DIR of formal sector employees in Kenya.

Table 5: MMR model results of DIR against debt literacy

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	595.839	2	297.919	10.763	.000
	Residual	7999.274	289	27.679		
	Total	8595.113	291			
2	Regression	795.099	3	265.033	9.786	.000
	Residual	7800.014	288	27.083		
	Total	8595.113	291			

* $p<.05$

The MMR Model 1 and 2 shown in Table 5 were found to be valid $F(2,289)=10.763$, $p=.000$ and $F(3,288)=9.786$, $p=.000$. The models in Table 5 show the value of F-ratio were significant

($p<.05$). These results show both models significantly predict DIR but model 1 was better.

Table 6:MMR model coefficients of DIR against debt literacy

Model		Beta	SE	Beta	T	sig	Tolerance	VIF
1	b_0	20.440	2.725		7.501	.000		
	x_1	-3.712	0.803	-0.266	-4.622	.000	.975	1.026
2	z_1	-0.144	0.438	-0.019	-0.329	.742	.975	1.026
	b_0	24.050	3.006		8.000	.000		
	x_1	-5.070	0.939	-0.363	-5.399	.000	.698	1.433
	z_1	-2.841	1.085	-0.373	-2,619	.009	.156	6.420
	$x_1.z_1$	0.441	0.163	0.383	-2.712	.007	.158	6.331

* $p<.05$

Based on MMR model 2 beta values shown in Table 6, debt literacy (x_1) and age of the employees (z_1) had negative but significant ($p<.05$) effect on DIR. On the other hand, the interaction term (x_1z_1) had positive and significant ($p=.007$) effect on DIR. Since the coefficient of the interaction term was significant ($p<.05$), the study rejected the null hypothesis [$H_{05b}:b_3=0$, $p>.05$] that there is no moderating effect of age on the relationship between debt literacy and DIR of formal sector employees in Kenya.

Finally, substituting the standardized beta coefficients in the OLS

MMR model ($y_2 = b_0 + b_1x_1 + b_2z_1 + \varepsilon$), the following DIR equation was obtained;

$$DIR = - 0.363DL - 0.373Age + 0.383Age*DL \dots\dots\dots (4)$$

Equation 4 imply that for one point rise in debt literacy (DL) the score of DIR would decrease by 0.363 points by keeping the effect of age of the employees and the interaction term constant which

is higher than 0.266 points in model 1. In addition, aging of employees had significant contribution to DIR, meaning age of employees had a reducing effect on DIR. This findings are similar to those by Gathergood (2012) who while examining the relationship between self control, financial literacy and over-indebtedness found age groups negatively and significantly related to over-indebtedness. In line with several studies (e.g. Dick & Jaroszek, 2013; Lusardi & Tufano, 2009), young people emerged vulnerable, at least by DIR.

In summary, the high residual sum of squares in the OLS linear regression models in the SPSS generated results indicates that the study's variables do not explain much of the variation in the indebtedness of the respondents. Other factors therefore account for a higher proportion of the variation. This is also collaborated by the low values of R, R^2 and adjusted R^2 reported in this chapter. On the other hand, the standard errors are indeed very small, showing that the beta values of the sample and that of the population are materially similar. Further, the low VIF values (less than 2) and tolerance values of almost 1 in the linear regression models show there was no multicollinearity. Finally, all

the regression models employed in this chapter satisfied the linearity test. This means there was no violation to the assumption of statistical tests.

V. SUMMARY OF THE FINDINGS

The effect of age was positive and significant for DSR on one hand and negative and significant for DIR on the other. This meant DSR increases with aging of employees while DIR decreases with aging of employees. This meant age of the respondents had a moderating effect on the relationship between debt literacy and indebtedness. In addition, young people emerged vulnerable, at least by DIR.

VI. CONCLUSIONS OF THE STUDY

The specific objective was to assess the moderating effect of age of formal sector employees in Kenya on the relationship between debt literacy and indebtedness. Results of this study indicated that age of the employees significantly moderated the relationship between debt literacy and indebtedness. The results provide information that deepened the understanding of the life cycle and permanent income theories. Essentially the life cycle theory is centred on age of the individual while permanent income is based on future (life) expectations.

VII. RECOMMENDATIONS OF THE STUDY

This study found that respondents' debt literacy was wanting especially for the young and elderly. The young people also emerged vulnerable to indebtedness. Therefore, the government should roll out financial education programs in schools, colleges, universities and at work places to target the young and the retiring cohorts.

VIII. CONTRIBUTIONS OF THE STUDY FINDINGS

A major contribution of this study is the testing of the moderating effect of age of formal sector employees on the relationship between debt literacy and indebtedness. Although some studies have looked at the relationship between socioeconomic characteristics and either debt literacy or indebtedness, none had introduced any socioeconomic characteristic as a moderator. The findings of this study show that age of the formal sector employees has a moderating effect on the relationship between debt literacy and indebtedness. This study found that respondents' debt literacy was wanting. Therefore, the government should roll out financial education programs in schools, colleges, universities and at work places.

IX. SUGGESTIONS FOR FURTHER RESEARCH

Future research need to consider the moderating role of other socioeconomic characteristics on the relationship between debt literacy and indebtedness. While employees in the informal sector need also to be studied.

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APPENDICES

Appendix 1: Mean and ANOVA results for age and study variables

Sub-constructs	Young	Mid-age	Elderly	F	Sig.
* Disposable income	61,038	91,804	65,608	13.277	.000
* Loan outstanding	513,161	838,214	523,375	9.915	.000
* DSR	0.3144	0.3646	0.3707	4.315	.014
DIR	8.3449	9.2559	8.1836	1.032	.358
Development loan	4.10	4.04	3.81	1.021	.361
Car loan	1.66	1.77	1.36	2.496	.084
Consumption loan	1.72	1.85	1.75	0.620	.539
Education loan	3.24	3.13	3.00	0.332	.718
* Housing loan	2.08	2.67	2.36	7.107	.001
Multiple loan	1.78	1.95	1.90	1.013	.364
* Loan from Sacco	0.81	1.08	1.20	5.907	.003
Loan from Bank	0.55	0.56	0.33	2.745	.066
* HELB Loan	0.16	0.06	0.00	5.668	.004
Unsecured credit	1.59	1.87	1.55	2.007	.136
Secured Credit	0.07	0.11	0.03	1.831	.162
SACCO membership	1.11	1.15	1.03	2.500	.084
Debt restructuring	2.09	2.04	2.10	0.067	.935
* Debt advice	2.48	2.26	2.17	3.661	.027
Debt counselling	2.23	2.09	2.07	1.031	.358
Debt experiences	2.04	2.08	2.14	0.671	.512
Self-control	3.89	3.83	3.60	1.653	.193
Self-confidence	2.99	3.15	3.28	1.699	.185
Peer influence	4.21	4.11	4.43	1.998	.138
Borrowing behaviours	3.80	3.69	3.67	1.432	.241
Budgeting	2.97	3.16	3.06	1.115	.329
Budgetary control	3.29	3,23	3.27	0.088	.916

Planning	3.31	3.33	3.29	1.181	.308
Debt capability	3.17	3.19	3.21	0.033	.966
Numeracy skill test	3.61	3.47	3.30	1.110	.331
Self-assessment test	4.69	4.63	4.41	0.840	.433
* Debt education	3.23	3.17	2.68	5.024	.007
Debt training	2.91	2.62	2.51	2.765	.065
* Debt knowledge	3.55	3.35	3.08	5.756	.004
* Debt literacy	3.17	3.08	3.00	3.764	.024

* $p < .05$; $df = 2,289$

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