

# **Effect of financial literacy on portfolio diversification at the Nairobi securities exchange market, Kenya**

**Eveline Mwangi<sup>1</sup> and Zipporah Onsomu<sup>1</sup>**

## **Abstract**

This study sought to establish the effect of financial literacy on portfolio diversification at the Nairobi Securities Exchange. The study adopted a cross sectional survey research design. The population of the study constituted all individual investors who traded in stocks at the Nairobi Securities Exchange between June and July 2017. Primary data was used and a sample of 200 investors was considered for the study. Data was analyzed using regression analysis. The findings depicted that there was a significant effect of financial literacy on portfolio diversification among investors at the Nairobi securities exchange. However, age, education and income level which were control variables had insignificant influence on portfolio diversification. The study further recommends the need for the relevant government agencies to facilitate formulation of policies and programs to educate and train people on financial literacy.

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<sup>1</sup> Department of Finance and Accounting, University of Nairobi, Kenya

## **1 Introduction**

Portfolio diversification refers to the investment in two or more assets at the same time. This concept was introduced by Markowitz (1952) whereby he suggested that increased diversification reduces risk among the investors. Ivkovic, Sialm and Weisbenner (2008) argued that a portfolio with three or more stocks is considered to be diversified while a concentrated portfolio had one or two stocks. The level of diversification differs based on the investor demographics for example financial literacy, age, education, gender and income. Kumar (2009) in a study conducted among US investors found that race, religion, political ideology, age, and gender influenced portfolio choices. A previous study by Goetzmann and Kumar (2008) depicted that investors U.S investors held concentrated portfolios and their behavior was influenced by age, income, occupation and trading frequency. Several studies have been conducted with respect to financial literacy and portfolio diversification. Al-Tamimi (2009) studied how financial literacy affects investment decision making among UAE investors. A sample of 290 investors was used in the study. It was found out that being financially literate had an influence on how people invested significantly. Demographic variables also influence how investors choose their securities to invest in and the extent of risk they can tolerate (Janor et al., 2016).

Mouna and Jarboui (2015) conducted a study to observe the securities market in Tunisia on the basis of financial literacy and portfolio diversification. The paper focused on deficiency in financial know-how as a major explanation of poor portfolio diversification. A multivariate analysis was used to help in the examination of how financial literacy and portfolio diversification relate. The results suggest that investors' experience, financial literacy level, age, their use of the availability heuristic, familiarity bias and portfolio size, significantly affect portfolio diversification.

Studies have also been conducted in the Kenyan context. The study by Wachira and Kihiu (2012) attempted to establish how financial know-how affects the extent to which people access financially-related services in Kenya. The study used the 2009 National Financial Access survey data. The approach used was the multinomial logit in explaining the extent of access. It was found out that financial know-how is still low in Kenya. It was also found out that the extent to which people access financial-related services is not related to their financial know-how but on a number of demographic variables: income levels, distance from banks, age, marital status, gender, household size and level of education.

## **2 Nairobi Securities Exchange Market**

Nairobi Securities Exchange (NSE) was established in (1954). It was formed by market participants through registration as a voluntary association to enhance facilitation and mobilize resources to boost financial investments (NSE, 2017). To ensure increased participation, it was made to be self-regulating by the Government. Towards the end of 1980, the need to liberalize and privatize arose to help develop the economy of Kenya through improved resource allocation (Kibuthu, 2005). The need to make the market stronger equally put pressure on the requirement for reformation regarding the institutions and policies. The market therefore introduced strict measures when firms want to go public and more specifically to improve resource utilization (Ngugi, 2003).

In facilitating portfolio diversification, companies listed at the NSE are classified into different sectors. Financial literacy is however vital in market participants during portfolio formation. It should be noted however that when people are financially literate, they are likely to benefit themselves as well as the financial institutions (Mundy & Masok, 2011). A financially literate economy would therefore accelerate the growth and development of the NSE.

## **3 Research Problem**

Individuals involved in investment activities believe that they can make sound decisions and have adequate reasoning capability. The reality is that, when making investment decisions they are affected by their emotions, particular assumptions, financial illiteracy and tendencies to think in a particular way (Iyer & Bhaskar, 2002). Investors who are financially literate are knowledgeable of financial securities and how the market operates including possible risk exposures (OECD, 2013). Financially literate individuals are aware of finance-related products including securities and other assets in the market and are therefore in a position to make adequate decisions in terms of portfolio diversification. Financially literate people are also expected to exhibit certain behaviours such as planning for retirement and participation in the securities exchange market (Lusardi & Mitchell, 2007). From a welfare perspective however, it is not about financial literacy but inability to undertake portfolio diversification and enjoy related benefits.

There is growing complexity of the trading activities in securities and other financial assets. This is because investors are getting more options creating the need for them to be literate and aware of these investment options (FSD Kenya, 2013). Finance-based literacy schedules helps to enhance awareness regarding the financial market, securities and the available services. A study by OECD (2008) shows that many Kenyans are now seeking finance-based advisory services. The outcome is that there is increased need for information and knowledge regarding

the growing financial market. Financial literacy therefore creates rationality in decision making especially with regard to portfolio diversification. As Kenyans increasingly seek financial information and knowledge, the choice to diversify portfolio or not depends on the related costs and benefits.

There are numerous studies regarding the concepts of financial literacy and portfolio diversification in investment decision making. Abdeldayem (2016) found out that financially-literate individuals are aware of instruments that help in savings and general investments as compared to financially-illiterate individuals. Sabri (2016) concluded that being financially literate influences investment decision making including portfolio diversification. Al-Tamini and Kalli (2009) also found out that financially-literate persons make investments decisions that are significantly different from those who are financially-illiterate. Beal and Delpachitra (2003) on the other hand assert that being financially knowledgeable helps people to independently decide on how to use their money especially on investments without having to rely on other peoples' opinions. In another study, Rooij et al. (2007) stated that financially-illiterate people relies heavily on other peoples' opinions and hence do not make reliable financial decisions. Mouna and Jarboui (2015) concluded that investors' experience, financial literacy level, age, familiarity bias and portfolio size significantly affect portfolio diversification. Wachira & Kihui (2012) found out that in Kenya people who are financially illiterate have the possibility of being financially excluded. On the contrary, some household investment decisions are not based on access to information but on the response of other players in the market (Bailey, Kumar & Ng, 2006). The argument is that in some areas, access to financial education and information is limited. Yet people in such areas still invest from a modern portfolio point of view.

The aforementioned studies have helped to identify the gap. The study by Mouna and Jarboui (2015) in Tunisia is relevant but different conclusion may be expected in Kenya due to differences in the nature of the economy, culture and the level of growth of the Nairobi Securities exchange market and other behavioural biases. The gap is therefore justified on the basis that households in Kenya do make decisions to invest whether from literate or illiterate point of view and those who are financially literate have a higher possibility of good financial returns. This argument is outlined in the studies by Wachira and Kihui (2012). However, some household investment decisions are not based on access to information but on the response of other players in the market (Bailey, Kumar & Ng, 2006). The current study is therefore meant to close this study gap by answering the question. 'What is the effect of financial literacy on portfolio diversification at the NSE?'

## 4 Research Methodology

This study employed a cross sectional survey research design. The population constituted all the investors involved in the trading of equity stocks and other securities at the Nairobi Securities Exchange in the month of June and July 2017. A random sample of 150 individual investors was considered for the study. Primary data was used and questionnaires were used. The questionnaire was structured in such a way that PART A comprises of bio data which constituted the control variables; PART B comprised of questions on financial literacy and PART C comprise of question on portfolio diversification. The questionnaire was administered through drop and pick later, self-administration or sending them to the investors through e-mails.

### 4.1 Data Analysis

The data collected was taken through a cleaning, validation, and editing to assert that they are accurate, uniform, consistent and complete. Statistical package for social science (SPSS) was used to generate inferential and descriptive statistics. Multiple regression analysis was used to help in the determination of the relationship between financial literacy and portfolio diversification. Testing of Multicollinearity of the regression models was done to assess whether the correlation between independent variables is statistically significant. To help in the determination of the effect of financial literacy on portfolio diversification, the following regression model was used:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Portfolio Diversification (Dependent variable).

a = Constant

$\beta_1$ ,  $\beta_2$  and  $\beta_3$  = Coefficient of Independent variables

$X_1$  = Financial Literacy

$X_2$  = Age of the investor

$X_3$  = Level of education of the investor

$X_4$  = Income level of the investor

$\varepsilon$  = Error term.

The t-test was employed to ascertain the significance of the regression coefficients while F-test was used to test the suitability of the regression model.

### 4.2 Operationalization of Study Variables

Table 4.1: Operationalization of Study Variables

Variable	Indicators	Operational Definition	Scale	Supporting Literature
<b>Portfolio diversification</b>	Number of companies invested in.	Number of firms invested.	Ratio	Markowitz (1952) Montgomery and Singh (1984) Ahuja (2011)
<b>Financial literacy</b>	Level of financial literacy	Scores	Ratio	Abdeldayem, (2016) Huston, 2010 Rooij, Lusardi and Alessie. (2007) Wachira and Kihui (2012)
<b>Control variables</b>	Age	Age groupings	Ratio	Westerholm and Ollila (2001)
	Education level	Qualification level	Ratio	Mouna and Jarbouï (2015)
	Income level	Income ranges	Ratio	Agbada and Odejimi (2013)

Source: Research Data (2017)

## 5 Results

The data was analyzed using SPSS and the findings are discussed below:

### 5.1 Descriptive Statistics

#### 5.1.1 Demographics

The demographics included age, level of education and income level which were used as the control variables. Table 5.1 shows that majority of the correspondents were aged between 26-35 years followed by those aged between 46-55 and then over 55 years. The least group was aged between 36-45 years. Regarding the level of education, majority of the respondents were post graduates, followed by graduates and lastly the others. From these results it can be inferred that the bulk of respondents had relevant education level needed to respond to questions on financial decision making including portfolio decision making. In terms of income majority of the respondents earned above Kshs 51,000 followed by category of Kshs 11,000 – 20,000. The least number of respondents were from the category of 21,000 – 30,000 as shown in Table 5.1 below:

Table 5.1: Demographics

Age of the Investor	Frequency	Percent
18-25 Years	21	14.0
26-35 Years	54	36.0
36-45 Years	20	13.3
46-55 Years	34	22.7
Over 55 Years	21	14.0
<b>Education Level</b>		
Certificate	17	11.3
Diploma	29	19.3
Graduate	47	31.3
Post graduate	50	33.3
Others	7	4.7
<b>Income Level</b>		
Ksh.11000-20000	36	24.0
Ksh.21000-30000	3	2.0
Ksh.31000-40000	20	13.3
Ksh.41000-50000	19	12.7
Above Ksh. 51000	72	48.0
<b>Total</b>	<b>150</b>	<b>100.0</b>

Source: Research Data (2017)

### 5.1.2 Financial Literacy

Financial literacy has the mean of 0.4381 with a standard deviation of 1.14390. The lower standard deviation shows that the spread between the highest and the lowest values is low. The level of skewness is 2.343 while kurtosis level is 3.806 as shown in Table 5.2 below:

Table 5.2: Financial Literacy

N	Valid	150
	Missing	0
Mean		.4381
Std. Deviation		1.14390
Skewness		2.343
Std. Error of Skewness		.198
Kurtosis		3.806
Std. Error of Kurtosis		.394

Source: Research Data (2017)

### 5.1.3 Portfolio Diversification

The mean of portfolio diversification is 2.1667 with a standard deviation of 8.6. Table 5.3 depicts that the skewness value is 4.224 indicating that the data is

positively skewed. The kurtosis value is 17.614 implying high Peakedness of the data.

Table 5.3: Portfolio Diversification

N	Valid	150
	Missing	0
Mean		2.1667
Std. Deviation		8.60031
Skewness		4.224
Std. Error of Skewness		.198
Kurtosis		17.614
Std. Error of Kurtosis		.394

Source: Research Data (2017)

Regarding the securities holding per sector, Table 5.4 shows that the respondents held shares in the different sectors. The Agricultural sector had the highest number of investors at 21.23%. This can be explained by the fact that the sector has been in existence for a very long time and is well known by most investors. This was followed by energy and petroleum sector with 14.15%. It also shows that 13.54% of the respondents had shares in telecommunication and technology sector. The sectors that had the least shareholding were real estate investment trust and Investment with a percentage of 0.31 and 0.61 respectively. The unit trusts under real estate investment trusts is fairly a new concept and hence the few shareholding among the respondents. The analysis is given in the Table 5.4.

Table 5.4: Securities Held per Sector

Sector	Number of Investors	Percentage
Agriculture	69	21.23
Commercial And Services	32	9.85
Banking	21	6.46
Insurance	40	12.31
Investment	2	0.61
Manufacturing	25	7.69
Construction and Allied	27	8.31
Energy and Petroleum	46	14.15
Investment Services	18	5.54
Telecommunication and Technology	44	13.54
Real Estate Investment Trust	1	0.31
<b>Total</b>	<b>325</b>	<b>100</b>

Source: Research Data (2017)



## 5.2 Regression Analysis

To determine how financial literacy affects portfolio diversification, a regression analysis was conducted regarding the independent variables financial literacy, education, age and income level against the dependent variable portfolio diversification. The results of the analysis are as given in Table 5.5, 5.6, 5.7, 5.8 and 5.9.

Table 5.5 shows that the adjusted  $R^2$  of 0.321 means that 32.1% of the variations in portfolio diversification can be explained by variations in financial literacy, education level, age and income level of investors. This means that 67.9% of the variations in portfolio diversification is explained by variations in other variables not included in the current study. The coefficient of correlation (R) is 0.583 indicating a moderately strong relationship. The analysis is represented in the Table 5.5 below:

Table 5.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.583 <sup>a</sup>	.339	.321	7.08597

a. Predictors: (Constant), Financial Literacy, Education, Age, Income Level

b. Dependent Variable: Portfolio Diversification

Source: Research Data (2017)

In the analysis of variance, the Table 5.6 shows a p-value of less than 5% implying that the model is statistically significant. As such, financial literacy, education level, age and income level of investors reliably predict portfolio diversification as shown below:

Table 5.6: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3740.235	4	935.059	18.623	.000 <sup>b</sup>
	Residual	7280.599	145	50.211		
	Total	11020.833	149			

a. Dependent Variable: Portfolio Diversification

b. Predictors: (Constant), Financial literacy, education, age, income level

Source: Research Data (2017)

Table 5.7 shows the regression equation which is as shown below:

$$Y = 0.782 + 4.23X_1 - 0.282X_2 - 0.164X_3 + 0.232X_4$$

From the equation the study found that holding age, education level, income level and financial literacy constant, the portfolio diversification index (dependent)

would be 0.782. The findings indicate that there is a positive relationship between financial literacy and portfolio diversification. This means that an improved financial literacy leads to high level of portfolio diversification while reduced financial literacy leads lower portfolio diversification practices. This relationship is significant with a p-value of <5%.

The study also found out that age of the investors is inversely related with portfolio diversification and the relationship is not significant with a p-value of >5%. This means that age of the investor does not reliably predict portfolio diversification. In terms of education, the relationship between education level of investors and portfolio diversification is inverse meaning that at higher education level, there is less portfolio diversification practices. The relationship is however not significant with a p-value of >5%.

Finally, the study indicates that the relationship between income level of investors and portfolio diversification are positively related whereby at higher income levels, investors practice more portfolio diversification while investors at low income levels do not practice portfolio diversification. This relationship is however not significant with a p-value of >5%.

Table 5.7: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
Constant	.782	1.912		.409	.683	-2.996	4.561		
Financial Literacy	4.230	.552	.563	7.667	.000	3.139	5.320	.846	1.182
Age	-.282	.522	-.043	-.540	.590	-1.313	.749	.729	1.373
Education	-.164	.670	-.021	-.244	.807	-1.487	1.160	.640	1.562
Income level	.232	.466	.044	.497	.620	-.690	1.154	.574	1.743

Source: Research Data (2017)

Table 5.8 shows the strength of the relationship between the variables. It indicates that there is a moderately high positive correlation between portfolio diversification and financial literacy given by 0.581. This relationship is also significant  $p < 5\%$ . On the other hand, the correlation coefficient between portfolio diversification and age, education level and income level of the investor is low at -0.169, -0.002 and 0.122 respectively. The relationship between age and portfolio diversification is significant (p-value <0.05) as shown below:

Table 5.8: Coefficient of correlation

		<b>Portfolio Diversification</b>	<b>Age</b>	<b>Education</b>	<b>Income Level</b>	<b>Financial Literacy</b>
Pearson Correlation	Portfolio Diversification	1.000	-.169	-.002	.122	.581
	Age	-.169	1.000	.366	.388	-.241
	Education	-.002	.366	1.000	.578	.016
	Income Level	.122	.388	.578	1.000	.188
	Financial Literacy	.581	-.241	.016	.188	1.000
Sig. (1-tailed)	Portfolio Diversification	.	.020	.492	.069	.000
	Age	.020	.	.000	.000	.001
	Education	.492	.000	.	.000	.422
	Income Level	.069	.000	.000	.	.011
	Financial Literacy	.000	.001	.422	.011	.
N	Portfolio Diversification	150	150	150	150	150
	Age	150	150	150	150	150
	Education	150	150	150	150	150
	Income Level	150	150	150	150	150
	Financial Literacy	150	150	150	150	150

Source: Research Data (2017)

## 6 Discussion of Findings

The objective of the study was to establish the effect of financial literacy on portfolio diversification at the Nairobi Securities Exchange Market. The study found out there is a significant positive relationship between financial literacy and portfolio diversification. This means that an improved financial literacy leads to high level of portfolio diversification while reduced financial literacy leads to lower portfolio diversification practices. These findings are consistent with the study by Mouna and Jarboui (2015). They found that investors' financial literacy significantly affected portfolio diversification. The study is also consistent with the findings by Sabri (2016). The study concluded that the decisions to buy or sell securities in the securities exchange market depends on how financially literate an individual is. The study is however contrary to findings by Bailey, Kumar and Ng (2006) where household investment decisions were not based on access to information but on the response of other players in the market.

Regarding the age of investors, the study found out an inverse relationship between age of the investors and portfolio diversification. It means that older investors hold more diversified portfolio than younger investors. The relationship is however not significant. This means that age of the investor does not reliably predict portfolio diversification. This finding is however not consistent with the study by Obamuyi (2013) where demographics were found to significantly influence the decisions to invest in Nigeria. In terms of education, the relationship was found to be inverse but insignificant. This finding is consistent with findings by Bailey, Kumar and Ng (2006) where household investment decisions were not based on access to information but on the response of other players in the market.

Finally, the study indicates that the income level of investors and portfolio diversification is positively related. This means that at higher income levels, investors practice more portfolio diversification while investors at low income levels do not practice portfolio diversification. This relationship is however not significant. This implies that levels of income does not reliably influence portfolio diversification related decisions. The finding is inconsistent with the results by Al-Tamimi and Bin Kalli (2009) where financial literacy level affected by income level.

## **7 Conclusion**

The objective of the study was to establish the effect of financial literacy on portfolio diversification at the Nairobi Securities Exchange Market. From the findings, the study concludes that financial literacy affects portfolio diversification among investors at the Nairobi securities exchange. The study further concludes that there is a moderately strong and positive correlation between financial literacy and portfolio diversification. This means that improved financial literacy would lead to high level of portfolio diversification while a lower financial literacy would mean lower possibilities of portfolio diversification. This finding implies that lack of financial literacy explains lack of portfolio diversification by individual investors in Kenya.

The study also concludes that age of the investors and portfolio diversification are negatively correlated. The correlation is however weak but significant. This means that younger investors practice more portfolio diversification as compared to the older investors among the listed companies in Kenya. The correlation coefficient between portfolio diversification and education level on the other hand is also weak and negative but not significant. This means that the level of education is not a determinant factor in portfolio diversification. Further, the study concluded that there is a weak positive correlation between portfolio diversification and income level of investors. This relationship is equally not significant. This also implies that investor's decision to diversify their portfolio does not depend on their levels of income.

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## APPENDIX: QUESTIONNAIRE

Please provide information on the following questions. Information collected from each questionnaire will be used for academic purposes only and the responses will be treated with utmost confidentiality.

### PART A: BIO DATA

*Instruction: tick in the spaces provided.*

<b>Variable</b>	<b>Investors' Grouping</b>	
<b>1.Age</b>	18-25 years	
	26-35 years	
	36-45 years	
	46-55 years	
	More than 55 years	
<b>2.Education</b>	Certificate	
	Diploma	
	Graduate	
	Post Graduate	
	Any other	
<b>3.Income Level</b>	11,000-20,000	
	21,000-30,000	
	31,000-40,000	
	41,000-50,000	
	Above 51,000	

**PART B: FINANCIAL LITERACY**

The following statements represent financial literacy related questions. Please indicate your level of agreement to each of the following items as related to financial literacy using the scale of 1-5 where 1= Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree & 5 = Strongly agree	To what extent?				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Before I buy something I carefully consider whether I can afford it	1	2	3	4	5
2. I tend to live for today and let tomorrow take care of itself					
3. I find it more satisfying to spend money than to save it for the long term					
4. I pay my bills on time					
5. I am prepared to risk some of my own money when saving or making an investment					
6. I keep a close personal watch on my financial affairs					
7. I set long term financial goals and strive to achieve them					
8. Money is there to be spent					
9. If you buy stock from firm B ,you own part of firm B					
10. If you buy a bond of firm B, you are liable for firm B's debts					
11. Considering a long time period (for example 10 or 20 years), bonds give higher returns than stocks					
12. When an investor spreads his money among different assets, the risk of losing money is the same					
13. Normally, bonds displays the highest fluctuations over time as compared to Saving accounts and stocks					
14. When interest rate falls, bond prices fall					
15. Sh.1million last year is of different value from sh.1million today.					
16. Mutual funds can invest in several assets, for example invest in both stocks and bonds					
17. Buying a company stock usually provides a safer return than a stock mutual fund.					
18. Insurance companies offer retirement products					
19. Stocks provide stable and predictable returns					
20. A stock market results in an increase in the price of stocks					