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FINANCIAL STUDIES



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FINANCIAL LITERACY OF YOUNG BLACK AFRICAN ADULTS IN RURAL AND LOW-INCOME AREAS IN SOUTH AFRICA¹

Adam NDOU, PhD*

Abstract

This study determined the level of financial literacy of young black African adults in rural and low-income areas in South Africa. This study adopted a quantitative research approach and used a self-administered questionnaire to collect primary data among young black African adults in Fetakgomo Tubatse and Intsika Yethu local municipalities as these municipalities were considered the most rural and low-income areas in South Africa. Young black African adults' level of financial literacy was found to be moderate in terms of financial knowledge and decision-making, but low in financial behaviour and financial attitude. Furthermore, young black African adults performed well concerning Financial decision-making. However, the overall level of Financial literacy amongst young black African adults was low. This has implications for the financial management of young black African adults. This study recommended strategies to improve the financial literacy of young black African adults in Fetakgomo Tubatse and Intsika Yethu municipalities.

Keywords: financial education, financial knowledge, quantitative analysis.

JEL Classification: D14; G51; G53

* This study is based on the PhD's thesis entitled "The Influence of Parental Financial Socialisation on Financial Literacy of young black African Adults in Rural and Low-income area in South Africa" by the corresponding author.

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1. Introduction

Poor financial management is widespread amongst young people, evident in their inability to perform simple calculations and their lack of understanding of basic financial concepts. Moreover, knowledge of more complex concepts, such as the difference between bonds and stocks, the workings of mutual funds, and basic asset pricing, is even scarcer among this cohort (Lusardi, 2015). This leads to young adults managing their finances ineffectively, incurring excessive debts, and experiencing financial problems (Robb & Woodyard, 2011; French & McKillop, 2016). Young adults have been found to be less financially capable of setting aside emergency funds and retirement savings than older cohorts (Fan & Park, 2021). Studies (Lusardi et al., 2010; Hudson et al., 2017) have shown that young black African adults lack financial knowledge and are not fully equipped to deal with financial challenges and responsibilities in their transition to adulthood. Young black African adults in rural and low-income areas in South Africa are financially vulnerable, struggling to keep up with their debt repayments and have low levels of knowledge regarding issues like bad debt and are more likely to experience financial problems (Antoni, 2014; Finmark, 2019; BusinessTech, 2021). Financial literacy can remedy this situation because if young black African adults are financially literate, they will be able to manage their finances effectively. Financial literacy is about empowering individuals to take better and appropriate financial decisions. While many developed countries have expanded efforts to investigate financial literacy, there is a paucity of literature on the financial literacy of young adults. Studies on young adults' financial literacy globally focused on the level of financial literacy of students and professionals (Flores, 2014; Breitbach & Walstad, 2016; Arceo-Gomez & Villagomez, 2017; Ergun, 2018; Millen & Stacey, 2022; Shyamala & Mahesh, 2022; Batizani & Questishat, 2022). There are also notable studies that investigated financial literacy in South Africa however also these studies focused on students (Symanowitz, 2006; Louw, 2009; Shambare & Rugimbana, 2012; Botha, 2013; Louw, Fouche & Oberholzer, 2013; Ramavhea, Fouche & van der Walt, 2017; Smit, 2021). This unintentionally excluded young adults who are not employed and also those who are not in universities or colleges. The situation is worse in developing countries, especially in rural and low-income areas and black communities (Matemane, 2018). There is no study that the researcher is aware of that focused

on financial literacy of young black African adults in rural and low-income areas in South Africa. This makes it important to investigate financial literacy of young black African adults in rural and low-income areas in South Africa. The purpose of this study is to determine the level of financial literacy of young black African adults in rural and low-income areas in South Africa. Financial literacy was measured through financial knowledge, financial behaviour, financial attitude, and financial decision-making. Therefore, the hypothesis for this study was formulated as follows:

H1: young black African adults are financial literate.

The remainder of this article is structured as follows: Sections 2 provides literature review. Section 3 explores research and methodology of the study. Section 4 covers analysis and findings the study. Section 5 provides conclusions.

2. Literature Review

2.1. Theoretical Framework

This study adopted theories from the traditional finance, namely, life-cycle savings hypothesis and behavioural finance, namely, theory of planned behaviour. Traditional finance theory assumes that consumers are fully informed and can make rational choices in their long-term financial planning to maximize their utilities. While behavioural finance theory, which was borrowed from the field of psychology to explain human behaviour, specifically financial behaviour, indicate that the behaviours of individuals in theory differ from their behaviours in practice.

2.1.1. Life-cycle Savings Hypothesis

Modigliani and Brumberg (1954) introduced the life-cycle hypothesis of saving as an extension of the permanent income hypothesis. The life-cycle hypothesis suggests that people try to maintain a relatively stable level of consumption over their lifetime. This behaviour is observed when those who are younger borrow to meet consumption needs, those who are middle-aged save a relatively large proportion of their earnings, and those who are older spend down their assets when their income is reduced in retirement. A strict interpretation of the life-cycle hypothesis suggests that people will spend all of their assets before the end of their life. However, this may not be exactly the case, as people reduce their consumption as they

age. The aim is to retain assets to provide for unexpected increases in both longevity and healthcare expenses (DeVaney, 2016). Lusardi and Mitchell (2014) developed a life cycle saving model that addresses the role of financial literacy. This model predicts that financial literacy is endogenously determined over the life cycle. Thus, consumers invest in financial knowledge to the point where their marginal time and money costs of doing so are equal to their marginal benefits. They concluded that consumers who receive financial education would increase their ability to manage their money and perform better financially than their counterparts who do not receive financial education.

2.1.2. Theory of planned behaviour

The theory of planned behaviour was proposed by Ajzen (1991) as an extension of the theory of reasoned action, to which the component of perceived control to determine behaviour intention and behaviour was added. The theory of planned behaviour focuses on factors that determine individuals' actual behavioural choices. According to this theory, three factors influence behavioural intention, namely the positive or negative valence of attitudes about the target behaviour, subjective norms, and perceived behavioural control. In turn, behavioural intention influences actual behaviour. An attitude towards a behaviour is recognised as a person's positive or negative evaluation of a relevant behaviour and is composed of a person's salient beliefs regarding the perceived outcomes of performing a behaviour (Ajzen, 1991). The theory of planned behaviour has been supported in empirical studies. Shim et al. (2010) found that all three components of the theory of planned behaviour - financial attitude, perceived behavioural control, and subjective norms - were significantly related to financial behaviour. Xiao et al. (2011) employed the theory of planned behaviour to investigate young adults' risky credit card behaviour and the role of parents in the financial behaviour of young adults. Shim et al. (2009) employed the theory of planned behaviour to determine the antecedents and consequences of financial well-being in young adulthood. They concluded that young adults perceived behavioural control, along with attitudes and parental subjective norms, were broadly related to various aspects of financial well-being and financial behaviours.

2.2. Financial literacy

There is no consensus in literature on the meaning and measurement of financial literacy. Researchers have defined financial literacy differently, and some use it interchangeably with terms such as financial capability, economic literacy, debt literacy, financial education, and financial knowledge (Huston, 2010; Remund, 2010; Arceo-Gomez & Villagomez, 2017; Matemane, 2018).

It is clear in literature that scholars have not yet agreed on the definition of financial literacy, which poses a challenge in conducting and comparing research in this domain. Garman and Fogue (1988) assert that financial literacy encompasses knowing the facts and having the vocabulary to manage one's finances successfully. Hogarth (2002), however, argues that the term means different things to different people. For some, it includes understanding economics and how household decisions are affected by economic conditions and circumstances; for others, it means basic abilities in money management, budgeting, saving, investing, and insuring. Lusardi (2008) defines financial literacy as knowledge of basic financial concepts, such as the working of compound interest, the difference between nominal and real values, and the basics of risk diversification. Remund (2010) reviewed financial literacy studies and provided a conceptual definition of financial literacy: a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound long-range financial planning, while mindful of life events and changing economic conditions. Warmath and Zimmerman (2019) argue that financial literacy is the combination of the skill to gather the necessary advice and information needed for a financial decision and the ability to build useful stores of financial knowledge from the experience to apply to future decisions. The process of becoming financially literate is long and complex, and requires a combination of financial knowledge, skills, and attitude. To measure financial literacy effectively all four domains of financial literacy must be included. This study measured financial literacy through financial knowledge, financial behaviour, financial attitude, and financial decision-making.

Financial knowledge is information that is learned, organised, and represented and stored in memory. Individuals can retrieve, use, and update their financial knowledge to reason in order to make financial decisions (Wang, 2009). Thus, financial knowledge is an

understanding of important personal financial concepts like budgeting and saving. Delavande, Rohwedder, and Willis (2008) posit that financial knowledge is a particular type of capital acquired in life by learning to soundly manage income, expenditure, and savings. Knowledgeable individuals can process financial information regarding, for example, mutual funds effortlessly, as an initial categorisation is accessible with which to process the information (Ramalho & Forte, 2019). Mitchell and Lusardi (2015) found that one-third of wealth inequality can be explained by a financial knowledge gap. Furthermore, lower financial knowledge has been linked to a higher tendency to engage in risky financial practices amongst college students. It is thus clear that financial knowledge levels explain variations in financial practices (Robb & Woodyard, 2011). A lack of financial knowledge has been associated with behaviours that lead to financial mistakes such as over-borrowing, mortgages with a high interest rate, and limited saving and investment (Lusardi, 2008). Financial knowledge is likely to have a positive effect on young adults' awareness of money behaviours such as the recording of expenses and a saving attitude (Supanantarok , Lensink, & Hansen, 2017). According to Letkiewicz and Fox (2014), financial literacy is associated with asset accumulation, an increase in net worth, and saving.

Financial behaviour is a human behaviour that is related to money management (Xiao, 2008). Financial behaviour refers to individual financial outcomes that are observable and manifest through two interrelated behaviour types. The first is a pattern of actions over time, such as earning, saving, spending, and gifting. The second type of financial behaviour is actions related to important financial turning points and decision-making. These actions are thus related to events, rather than immediate financial transactions, e.g., setting up a retirement savings account (Gudmunson & Danes, 2011). Financial stressors such as debts and income shocks have been associated with negative financial behaviours (Fan, 2017). Saving behaviour is necessary to accumulate wealth, protect young adults from financial crises, and to increase their economic well-being. Individuals who worry about debt repayment and their ability to deal with financial emergencies are associated with lower levels of savings, financial literacy, and, ultimately, lower financial well-being. Debt reduction is associated with higher levels of saving and financial well-being (Danes & Yang, 2014). Financial behaviour appears to have consequences not only for individuals' finances, but also their health. Financial behaviour

is the key antecedent in predicting financial well-being (Rahman et al., 2021). Accordingly, Chavali, Mohan, and Ahmed (2021) found that financial behaviour has a significant impact on financial well-being.

Financial attitude refers to one's beliefs and values related to various personal finance concepts, such as whether one believes it is important to save money. Therefore, financial attitude is deemed an important element of financial literacy (OECD, 2016). Young adults should display positive attitudes towards money, credit, budgeting, saving, insurance, and tracking monthly expenses as is aligned to good general money management (Robb & Woodyard, 2011). Financial attitude is established through economic and non-economic beliefs held by the decision-maker regarding the outcome of a certain behaviour; therefore, beliefs are also a key factor in the personal decision-making process (Ajzen, 1991). Young adults may display either positive or negative attitudes towards their current financial situation, money, and credit. Studies have found that individuals being positive about the current state of their finances is linked with better financial outcomes, because the individuals will put in more effort to remedy the situation and act positively towards money. However, a negative attitude towards credit is associated with lower credit card debt (Robb & Woodyard, 2011).

Financial decision-making is an important element of financial literacy and achieving sustainable financial well-being. Thus, young black African adults need to make sound financial decisions to avoid financial problems and to effectively manage finances wealth (Sirsch et al., 2020). Financial decision-making determines how much money is saved, how individuals financial resources are invested, what investment products are utilized, how much risk is taken, and therefore how much return can be achieved. These actions, in turn, directly lead to differences in individuals' wealth (Xu & Yao, 2022). Individuals' financial decisions are influenced by various settings, conditions, and changes over time. Financial decision arrangements may vary by the types of financial decisions, e.g., small vs large purchases, bill payment, savings, investing, and financial planning (Kim, Gutter & Spangler, 2017). Young black African adults in rural and low-income areas in South Africa should take financial decision-making seriously to ensure that they maintain and sustain their financial well-being in adulthood.

3. Research and methodology

The current study adopted the quantitative research approach to investigate the level of financial literacy of young black African adults in rural and low-income area in South Africa. The specific study area where data was collected is Fetakgomo Tubatse and Intsika Yethu local municipalities as they are considered the most rural and low-income area in South Africa as per the categorisation by the StatsSA (2016). Therefore, the target population is young black young black African adults between the age of 18 and 35 in Fetakgomo Tubatse and Intsika Yethu municipalities. This study used self-administered questionnaire which were distributed to respondents' homes to collect data. This questionnaire was designed with the research objective in mind and was also piloted and also sent to experts in the field of financial literacy to review and suggest any changes to ensure that it will measure what it intends to measure. Questionnaire was in a Likert scale format.

This study used several sampling methods to ensure that a representative sample size is selected. These methods are purposive sampling, cluster sampling, and random sampling (Babbie, 2013). Purposive sampling was used to select Fetakgomo Tubatse and Intsika Yethu municipalities. Cluster sampling was used to divide and group each municipality into wards, villages, and households. Random sampling was used to sample 50% of wards for each municipality, 19 wards were sampled for Fetakgomo Tubatse and 10 wards for Intsika Yethu. Thereafter, random sampling was used again to sample villages, households, and young black African adults, who were visited at their homes but if the young African adult is not available the next household was visited. This procedure was followed until the sample size is reached. The sample size for this study was calculated and set at 500. This was done through Yamane (1967) formula to calculate sample size. This sample size was also good enough to conduct Exploratory Factor Analysis (EFA). A total of 423 young black African adults completed the questionnaires, giving a response rate of 94% which was good and acceptable.

Data was analysed through EFA and descriptive statistics. However, before data was analysed, construct validity and reliability were conducted. Construct validity was assessed through EFA by performing a Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. The acceptable value of KMO which is suitable and

adequate for EFA is 0.50 and above. While Bartlett’s test of sphericity is significant for EFA if the significance value is ($p < 0.05$). This study retained a minimum factor loading of .30 for interpretation. Cronbach alpha was used to measure reliability, as is the most widely used reliability measure of internal consistency (VanderStoep & Johnson, 2009). Cronbach alpha with a score of 0.60 and more were accepted and considered to be reliable (Cohen, Manion & Morrison, 2018). EFA summarised data and grouped variables that are correlated together and ensure that data is ready for further analysis. Descriptive statistics tested the hypothesis of the study.

4. Analysis and discussions

To assess the suitability of data to conduct EFA, KMO and Bartlett’s test of sphericity was used in this study. Table 1 shows the results of the KMO and Bartlett’s test of sphericity.

Table 1

KMO and Bartlett’s Test

Factors	Kaiser-Meyer-Olkin	Bartlett’s Test of Sphericity		
	Measure of Sampling Adequacy	Chi-Square	df	Sig.
Financial knowledge	0.734	845.654	9	0.000
Financial behaviour	0.766	3216.564	46	0.000
Financial attitude	0.624	336.487	13	0.000
Financial decision-making	0.867	2567.345	16	0.000

Source: SPSS

Table 1 showed that the KMO for all factors ranged from 0.624 to 0.867, above 0.60. The p-value of Bartlett’s test for all factors ($p=0.000$) is smaller than 0.05, which is significant. This result is an indication that the correlation structure of the construct is adequate to conduct a factor analysis on the items and that all factors are regarded as valid and reliable. Therefore, EFA can be conducted.

Table 2 shows the results of the EFA, reliability by depicting Cronbach’s alphas, and descriptive statistics for the constructs and factors of the study.

Table 2
Validity, reliability, and descriptive statistics results

Factors	EFA factor loadings			CA	Descriptive statistics	
	Items	Highest	Lowest	α	μ	SD
Financial knowledge	6	0.965	0.546	0.946	3.46	1.24
Financial behaviour	7	0.846	0.334	0.860	3.14	1.17
Financial attitude	8	0.836	0.655	0.923	3.13	1.26
Financial decision-making	5	0.934	0.678	0.945	3.90	1.39

Source: SPSS

Table 2 indicated that four factors were extracted by the EFA, with all items loaded onto the factors as expected, with loadings of above 0.30. The overall factor loadings range from 0.334 to 0.965. The Cronbach's alpha coefficients were above 0.6 and were acceptable and considered reliable. The descriptive statistics provided the means and standard deviation. Regarding the means, majority of respondents agreed with the statements measuring financial decision-making (3.90), financial knowledge (3.46), financial behaviour (3.14), financial attitude (3.13). The standard deviations of all factors are high showing that the respondents' responses varied. However, financial decision-making had the highest standard deviation of 1.39 indicating that the responses varied mostly about this factor's statements. Therefore, data was prepared and ready for further analysis. Thus, the hypothesis for this study can be tested.

H1: Young black African adults are financially literate.

Descriptive statistics was used to test this hypothesis. A five-point Likert scale was used (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly agree*), and the responses were grouped into three groups (*Strongly disagree + Disagree = Disagree*; *Neutral*; *Agree + Strongly agree = Agree*). The results were used to determine the score for each component of *Financial literacy*, namely *Financial knowledge*, *Financial behaviour*, *Financial attitude*, and *Financial decision-making*. The percentages achieved for *Agree* were considered the score for that component. Table 3 shows the scores for the components of *Financial literacy*.

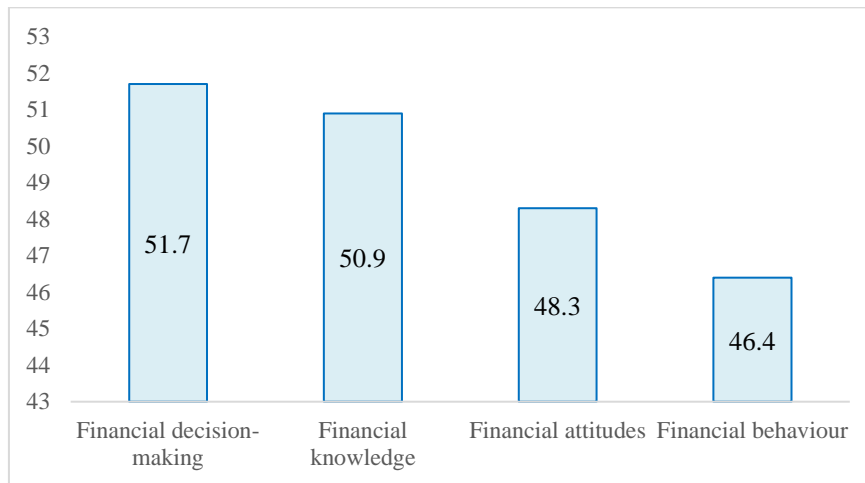
Table 3
Scores for components of *Financial literacy*

Component	Disagree %	Neutral %	Agree %
Financial knowledge	36.7	12.4	50.9
Financial behaviour	43.3	10.2	46.4
Financial attitude	39.5	12.2	48.3
Financial decision-making	28.0	20.3	51.7

Source: SPSS

The majority of respondents agreed (50.9%) with the statements relating to *Financial knowledge*. Most respondents agreed (46.4%) with the statements for *Financial behaviour*. A high number of respondents agreed (48.3%) with the statements for *Financial attitude*, while the majority of respondents agreed (51.7%) with statements for *Financial decision-making*. The percentages of *Agree* were treated as scores and used to calculate *Financial literacy*. Figure 1 indicates the summary of scores for each component of *Financial literacy*.

Figure 1
Summary of *Financial literacy* scores



Source: SPSS

Figure 1 indicated that respondents scored 50.9% on *Financial knowledge*, 46.4% on *Financial behaviour*, 48.3% on *Financial attitude*, and 51.7% on *Financial decision-making*. This shows that respondents scored high on *Financial decision-making* and *Financial knowledge*,

and low on *Financial behaviour* and *Financial attitude*. Thus, respondents were good at financial decision-making and were financially knowledgeable. These scores were used to calculate the overall level of *Financial literacy*. Table 4 illustrates the overall level of *Financial literacy*, which was determined by averaging the score for all components.

Table 4

Overall Financial literacy

Components	Score %
Financial knowledge	50.9
Financial behaviour	46.4
Financial attitude	48.3
Financial decision-making	51.7
Overall Financial literacy	49.3

Source: SPSS

The overall *Financial literacy* of respondents was 49.3%. The score on *Financial literacy* was categorised into *Low financial literacy* ($= \leq 49\%$); *Moderate financial literacy* ($= 50\%–64\%$); and *High financial literacy* ($= \geq 65\%$) (Nomlala, 2019). This meant that the level of financial literacy amongst young black African adults in Fetakgomo Tubatse and Intsika Yethu local municipality is low. The hypothesis decision is shown in Table 5.

Table 5

Hypothesis decision for *Financial literacy*

Hypothesis	Results
H1: Young black African adults are financially literate.	Rejected

Source: Author's compilation

Therefore, based on Table 5, hypothesis H1 was rejected. This meant that young black African adults in Fetakgomo Tubatse and Intsika Yethu are financially illiterate. This result is consistent with that of other studies that found low levels of financial literacy among young adults (Lusardi et al., 2010; Lusardi & Mitchell, 2011; Cameron et al., 2013; Flores, 2014; Breitbach & Walstad, 2016; Arceo-Gomez & Villagomez, 2017). Lusardi and Mitchell (2011) found that, globally, individuals in low-income areas have a low level of financial literacy. However, the present study's result contradicts Nomlala (2019), who found that young adults (students) are financially capable, with a score

of 89.5%. Similarly, Antoni and Saayman (2021) found that young professionals showed above average (61% to 80%) financial literacy levels. Other studies found medium and high levels of financial literacy (Lahav et al., 2017; Ergum, 2018; Putri & Wijaya, 2020). Buckland (2010) showed that many low-income Canadian adults were financially literate. The possible reason why this study's results differ from others might be due to its focus on young black African adults living in rural and low-income areas, while other studies focused on young professionals and students from various races. Thus, studies in financial literacy have produced mixed and contradictory results, and there is a need to probe financial literacy further, especially in developing countries.

5. Conclusions

The objective of this study was to determine the overall level of financial literacy of young black African adults. This was done by investigating financial literacy through the domains of financial knowledge, financial behaviour, financial attitude, and financial decision-making. The results indicated the level of *Financial literacy* in terms of *Financial knowledge* (50.9%), *Financial behaviour* (46.4%), *Financial attitude* (48.3%), and *Financial decision-making* (51.7%). Young black African adults' level of financial literacy was found to be moderate in terms of financial knowledge and decision-making, but low in financial behaviour and financial attitude. Furthermore, young black African adults performed well with regard to *Financial decision-making*. This study contributed to existing knowledge by showing that the overall level of *Financial literacy* amongst young black African adults was 49.3%, which is low. This study's results also contribute to the body of knowledge by showing the development of the life cycle saving hypothesis and theory of planned behaviour by providing an understanding of financial literacy. This study produced mixed results, on one hand, it is consistent with those studies that found low levels of financial literacy among young adults, while on the other hand inconsistent with those that found medium and high levels of financial literacy. Therefore, this study recommends that more studies be conducted on financial literacy, especially in rural and low-income areas in developing countries. Furthermore, it is recommended that government, Non-profit organisations, and financial institutions design financial literacy programs aimed at young black African adults in rural

and low-income areas in South Africa in order to improve their level of financial literacy so that they are able to manage their finances effectively to achieve and maintain financial well-being.

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CONSTANT CORRELATION MODEL FOR OPTIMAL PORTFOLIO FORMATION AND EXPECTED SHORTFALL RISK MEASUREMENT: EMPIRICAL EVIDENCE FROM INDONESIAN STOCK MARKET

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Abstract

Stock investment is one option of investment choice with risks. Investors can reduce their risk by combining several stocks and then forming a portfolio. One method to form an optimal portfolio is by using the Constant Correlation Model (CCM) method. The CCM method focuses on the correlation between stocks and the Excess Return to Standard Deviation (ERS) value. Calculation of risk in the portfolio can use the Expected Shortfall (ES) method. ES is defined as a loss with a value exceeding VaR. ES is considered appropriate for measuring portfolio risk compared to VaR because it fulfils the subadditivity property. The subadditivity shows the advantage of portfolio formation. The object of this research is to form an optimal portfolio using the CCM method and ES risk measure on the Indonesian Stock Market Indices, that is IDX30 index. The daily return of IDX30 Index is analysed for the period January 2021 - December 2022. The formed portfolio contains 3 stocks, namely BMRI with a weight of 46.263%, KLBF of 39.255%, and MDKA of 14.482%. The Expected Shortfall value at a trust level of 95% is 5.408% for the next week.

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1. Introduction

Investments are a form of planning to anticipate future circumstances. Tandelilin (2010) explained that investments are an activity of using current money to gain profits in the future. Those who make investments are known as investors. Investors can invest in various things, such as stocks. A stock can be described as an investment document that shows ownership of the company that released it (Adnyana, 2020). BEI (2023) noted that Indonesia has about 42 types of stock indexes. The stock index can help investors in investing. The purpose of a stock index is to show the movement of stock prices that fit certain characteristics. One of the indexes that Indonesia has is the IDX30.

Investors can diversify their funds into several stocks at once to minimize the possibility of risk. Stock diversification is done by combining several stocks into a portfolio. A portfolio is a set of investment instruments that are arranged to achieve an investment purpose (Priyadi, Wijaya, & Ready, 2021). A stock portfolio can be formed using the Constant Correlation Model (CCM) method. The CCM method focuses on the correlation between stocks. It uses the Excess Return to Standard Deviation (ERS) value to form a portfolio.

Generally, risk of a portfolio is determined by calculating the Value at Risk (VaR). However, VaR has a shortcoming to be considered appropriate in measuring portfolio risk, which is the subadditivity. The subadditivity reflects that there are benefits of portfolio formation. The Expected Shortfall (ES) method is used as an alternative for the shortage of VaR. Typically, Expected Shortfall is defined as a risk that has a value that exceeds the Value at Risk.

The research of Saepudin, Yasin, and Santoso (2017) talked about risk analysis with VaR and ES on a single stock. The result of the research showed that ES has a higher value than VaR. Furthermore, research by Nugroho and Nurcahyo (2019) talked about portfolio formation with the Constant Correlation Model on the Bisnis27 index. From that research, there are four stocks that form the portfolio. Then, research by Salsabilla, Maruddani, and Rusgiyono (2023) talked about Mean-Value at Risk optimization model to form an optimal

portfolio on stocks listed in IDX30 index. From that research, there are three stocks that form the portfolio. In this research, the Constant Correlation Model method is used to obtain the optimal stock portfolio and calculation of the risk by Expected Shortfall on stocks listed in IDX30 index. This method is used to form an optimal portfolio as a consideration in investing funds along with the possible risk that may occur.

2. Literature Review

2.1 Stock Characteristics

Return is the result of doing an investment (Maruddani & Purbowati, 2009). Calculation of return can use the equation (1) (Jorion, 2007).

$$R_{i(t)} = \ln \left[\frac{P_{(t)}}{P_{(t-1)}} \right] \quad (1)$$

with $R_{i(t)}$ is the return of the i -th stock in period t , $P_{(t)}$ is the closing price at time t , and $P_{(t-1)}$ is the closing price at time $(t-1)$.

According to Tandellilin (2010), the expected return is the average of the return value. Calculation of expected return can use the equation (2).

$$E(R_i) = \frac{\sum_{t=1}^n R_{i(t)}}{n} \quad (2)$$

with $E(R_i)$ is the expected return of the i -th stock, $R_{i(t)}$ is the return of the i -th stock in period t , and n is the number of stock periods.

The investor not only considers the return on the investment but also its risk. Risk is the difference that may occur between actual return received and expected return (Tandellilin, 2010). Calculation of risk can use the equation (3).

$$s_i = \sqrt{\frac{\sum_{t=1}^n (R_{i(t)} - E(R_i))^2}{n - 1}} \quad (3)$$

with s_i is the standard deviation of the i -th stock, $R_{i(t)}$ is return of the i -th stock in period t , $E(R_i)$ is the expected return of the i -th stock, and n is the number of stock periods.

For the CCM method, the return of stock data is normally distributed. In general, the Kolmogorov-Smirnov test can be used to ensure that the data is normally distributed. The Kolmogorov-Smirnov test is a hypothesis testing method to test the distribution suitability, such as the normal distribution (Oppong & Agbedra, 2016). The hypotheses are as follows:

H₀: Data is normally distributed.

H₁: Data is not normally distributed.

Significance level: α

Test statistics:

$$D = \sup_x |F(x) - F_0(x)|$$

Test criteria:

H₀ rejected if $D > D^*(\alpha)$ atau p-value $< \alpha$. $D^*(\alpha)$ is the critical value obtained from the Kolmogorov-Smirnov table.

A multivariate normality test is used to test whether two or more variables jointly are normally distributed. According to Johnson and Wichern (2007), this test is performed with the Mahalanobis distance value. According to Maruddani (2019), Kolmogorov-Smirnov test can be used for multivariate normality testing. The hypotheses are as follows:

H₀: Data is normally distributed multivariate

H₁: Data is not normally distributed multivariate

Significance level: α

Test statistics:

$$D = \sup_{d_t^2} |S(d_t^2) - \chi_p^2|$$

Test criteria:

H₀ rejected if $D > D^*(\alpha)$ atau p-value $< \alpha$. $D^*(\alpha)$ is the critical value obtained from the Kolmogorov-Smirnov table.

2.2 Constant Correlation Model (CCM) Portfolio

In 1987, Elton and Gruber started to develop the Constant Correlation Model method to form a portfolio. For the CCM method, Elton and Gruber (2014) state that each pair of stocks has the same correlation. According to Elton and Gruber (2014), on the Constant

Correlation Model method, all stocks are ranked based on Excess Return to Standard Deviation (ERS). The ranking is done starting from the stock with the largest to the smallest ERS value. Furthermore, stocks with negative ERS value are excluded from the portfolio formation candidates. The calculation of stock ERS can use the equation (4).

$$ERS_i = \frac{(E(R_i) - R_f)}{s_i} \quad (4)$$

with ERS_i is ERS of the i -th stock, $E(R_i)$ is expected return of the i -th stock, R_f is risk free rate, and s_i is standard deviation of the i -th stock.

Portfolio formation with CCM will contain stocks with high ERS. Determining a high ERS value requires a constraint called the Cut-off Rate (C^*). The C^* value is obtained through the correlation coefficient value. The correlation coefficient (r) is used to determine how much the relationship between two variables is. The correlation coefficient is between -1 and 1. The calculation of the correlation coefficient can use Pearson Product Moment with the equation (5) (Sugiyono, 2015).

$$r_{ij} = \frac{n \sum_{t=1}^n R_{i(t)} R_{j(t)} - (\sum_{t=1}^n R_{i(t)}) (\sum_{t=1}^n R_{j(t)})}{\left[\sqrt{n \sum_{t=1}^n R_{i(t)}^2 - (\sum_{t=1}^n R_{i(t)})^2} \right] \left[\sqrt{n \sum_{t=1}^n R_{j(t)}^2 - (\sum_{t=1}^n R_{j(t)})^2} \right]} \quad (5)$$

with r_{ij} is correlation coefficient of stock i with j for $i \neq j$, n is number of stock periods, $R_{i(t)}$ is return of the i -th stock in period t , and $R_{j(t)}$ is return of the j -th stock in period t .

The calculation of the constant correlation value which is the average of the stock returns correlations can use the equation (6) (Nugroho & Nurcahyo, 2019).

$$r = \frac{\sum_{i=1}^N \sum_{j=1}^N r_{ij}}{\left(\frac{N(N-1)}{2} \right)} \quad (6)$$

with r is constant correlation, r_{ij} is correlation coefficient of stock i with j for $i \neq j$, and N is number of stocks.

After obtaining the constant correlation value, the Cut-off (C_i) value of the stock is calculated to determine the C^* value. The calculation of C_i value is using the equation (7).

$$C_i = \frac{r}{1 - r + (ir)} \sum_{i=1}^N \frac{(E(R_i) - R_f)}{s_i} \quad (7)$$

with C_i is cut-off value of the i -th stock, r is constant correlation, i is the order of stocks from the highest to the lowest ERS, $E(R_i)$ is expected return of the i -th stock, R_f is risk free rate, and s_i is standard deviation of the i -th stock.

The C^* value is the C_i value where the last ERS value is still greater than the C_i value or determined based on the highest C_i value. If $ERS_i > C^*$, the stock will be included in the optimal portfolio.

According to Elton and Gruber (2014), the weight of each stock that forms the optimal portfolio with the Constant Correlation Model method can be calculated using the equation (8).

$$w_i = \frac{z_i}{\sum_{i=1}^N z_i} \quad (8)$$

with:

$$z_i = \frac{1}{(1 - r)s_i} \left(\frac{(E(R_i) - R_f)}{s_i} - C^* \right) \quad (9)$$

w_i is weight of the i -th stock, r is constant correlation, $E(R_i)$ is expected return of the i -th stock, R_f is risk free rate, and s_i is standard deviation of the i -th stock.

According to Tsay (2002), portfolio return calculation is using the equation (10).

$$R_{p(t)} = \sum_{i=1}^N (w_i \cdot R_{i(t)}) \quad (10)$$

The calculation of portfolio expected return is with the equation (11).

$$E(R_p) = \sum_{i=1}^N (w_i \cdot E(R_i)) \quad (11)$$

2.3 Portfolio Risk

In 1977, Boyle introduced a method to measure risk called Monte Carlo simulation. The calculation of VaR with Monte Carlo simulation assumes returns are normally distributed. In addition, this simulation can also be used to determine losses that exceed VaR.

According to Alijoyo, Wijaya, and Jacob (2019), the number of repetitions for Monte Carlo simulation can be determined using the error value (ε) with the equation (12).

$$K = \left(\frac{3\sigma}{\varepsilon}\right)^2 \quad (12)$$

with ε is error value, σ is the standard deviation of all stocks, and K is the number of repetitions.

Calculate the standard deviation (σ) value can use the equation (13).

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (X_i - \mu)^2}{N}} \quad (13)$$

with X_i is sum of the i-th stock returns, μ is average return of all stocks, and N is the number of stocks.

Next is to determine the acceptable absolute error value. Absolute error value $\leq \alpha$ then it can be calculated with the equation (14).

$$\varepsilon = \frac{\mu}{\left(\frac{1}{\alpha}\right)} \quad (14)$$

The calculation steps of VaR and ES using Monte Carlo on the portfolio are as follows:

1. Determine the parameter values for the variables (in this case, stock returns). Portfolio-forming stock returns are assumed to follow a multivariate normal distribution, so the parameters needed are the average portfolio-forming stock returns and the covariance variance matrix.
2. Simulate the return values by randomly generating multivariate normally distributed stock returns with the parameters obtained in step (1).
3. The return value of each stock at time t ($R_{i(t)}$) which is generated in step (2) is used to calculate the expected return and standard deviation of the portfolio.
4. Calculate the $(1-\alpha)$ quantile value of the portfolio return obtained in step (3), denoted by R^* .

5. Calculate the VaR value at the confidence level $(1-\alpha)$ in time t and initial investment of V_0 .
6. Calculate the ES value at the confidence level $(1-\alpha)$ in time t and initial investment of V_0 .
7. Repeat step (2) to step (6) for K times so that K values of VaR and ES will be obtained.
8. Calculate the average of VaR and ES at the confidence level $(1-\alpha)$ obtained from step (7) to stabilize the VaR and ES values because the VaR and ES values generated by each simulation are different.

Value at Risk (VaR) is the maximum loss obtained with a certain confidence level and over a certain period of time when the market is stable (Jorion, 2007). The calculation of VaR at the confidence level $(1-\alpha)$ in the time period t and the initial capital of V_0 can use the equation (15).

$$VaR_{(1-\alpha)}(t) = V_0 R^* \sqrt{t} \quad (15)$$

Value at Risk has a shortcoming to be considered appropriate in determining portfolio risk, namely the subadditivity. The subadditivity shows that the risk in a portfolio with two assets will be smaller or equal to the risk of each asset. Expected Shortfall (ES) comes as an alternative for that shortcoming. According to Denuit, Dhaene, Goovaerts, and Kaas (2005), ES satisfies the subadditivity property to measure portfolio risk. The subadditivity reflects the fact that there should be benefits of diversification. Diversifying a loss will reduce the risk. Each risk random variable X_1 and X_2 applies:

$$ES(X_1 + X_2) \leq ES(X_1) + ES(X_2) \quad (16)$$

According to Rahmawati, Rusgiyono, Hoyyi, and Maruddani (2019), Expected Shortfall (ES) at the confidence level $(1-\alpha)$ in the time period t and the initial capital of V_0 can use the equation (17):

$$ES_{(1-\alpha)}(t) = V_0 \left(\mu + \sigma \frac{\phi(VaR_{(1-\alpha)})}{\alpha} \right) \sqrt{t} \quad (17)$$

3. Methods

The data is collected from Yahoo Finance, the Bank of Indonesia, and the Indonesia Stock Exchange. The variables used are

the weekly closing prices of 21 stocks that are consistently listed on IDX30 for the period January 01, 2021 - December 30, 2022, and the Indonesian interest rate for the period January 2021 - December 2022. The analysis of data was done with Microsoft Excel and R software.

The steps in the analysis are as follows:

1. Input weekly closing prices data for 21 stocks that are consistently listed on IDX30 for the period January 01, 2021 – December 30, 2022, and SBI data for the period January 2021 – December 2022.
2. Calculate the return, expected return, and standard deviation of each stock.
3. Select stocks with positive expected return values, normally distributed returns, and low correlation.
4. Calculate the R_f and ERS value. Then sort the ERS value of each stock from largest to smallest and exclude stocks with negative ERS value.
5. Calculate the average value of stock returns correlation.
6. Calculate the C_i value of each stock and determine the *Cut Off Rate* (C^*) value.
7. Determine the candidate stocks that will form the portfolio with a value of $ERS > C^*$.
8. Calculate the z_i value of each stock. Then calculate the total of all z_i value.
9. Calculate the weight value of each stock that form the portfolio.
10. Perform multivariate normality test on the return data of stocks that form the portfolio.
11. Simulate the return of portfolio forming stock by generating random numbers.
12. Calculate the expected return and standard deviation of the portfolio.
13. Calculate the quantile value $(1-\alpha)$ of the portfolio return.
14. Calculate the VaR value at confidence level $(1-\alpha)$ in time t and initial investment of V_0 .
15. Calculate the ES value at confidence level $(1-\alpha)$ in time t and initial investment of V_0 .
16. Repeat step (11) to step (15) for K times.
17. Calculate the average of VaR and ES at the confidence level $(1-\alpha)$ to stabilize the values.

4. Results and Discussions

In this research, the highest expected return value is owned by ADRO stock of 0.00969 with a standard deviation of 0.05839. The lowest expected return value is owned by SMGR stock of -0.00602 with a standard deviation of 0.04501. The selected stocks are those with a positive expected return value. Based on the calculation results with the R program, it is known that 13 stocks have a positive expected return value, namely ADRO, BBCA, BBNI, BBRI, BMRI, ICBP, KLBF, MDKA, PGAS, PTBA, TBIG, TLKM, and TOWR. The overall expected return and standard deviation of each stock can be seen in Table 1.

Table 1

Expected return and standard deviation value of stocks

Stock Code	$E(R_i)$	s_i
ADRO	0.00969	0.05839
ANTM	-0.00260	0.07085
ASII	-0.00061	0.04051
BBCA	0.00197	0.02628
BBNI	0.00348	0.04274
BBRI	0.00138	0.03527
BMRI	0.00411	0.03469
CPIN	-0.00124	0.03946
ICBP	0.00049	0.02738
INDF	-0.00007	0.02691
INKP	-0.00259	0.06039
KLBF	0.00329	0.03156
MDKA	0.00428	0.05681
PGAS	0.00110	0.05365
PTBA	0.00259	0.04692
SMGR	-0.00602	0.04501
TBIG	0.00337	0.05118
TLKM	0.00097	0.02956
TOWR	0.00131	0.03901
UNTR	-0.00026	0.04663
UNVR	-0.00410	0.05434

Source: R programming output

The normality test is performed on stocks that have a positive expected return value. Based on the processing with R obtained at the significance level $\alpha = 5\%$, the stock returns of ADRO, BBCA, BBNI, BBRI, BMRI, ICBP, KLBF, MDKA, PGAS, PTBA, TLKM, and TOWR accept H_0 because these stocks have a p-value $> \alpha$ (0.05) which means that the stocks are normally distributed. Meanwhile, TBIG stock returns are not normally distributed because of the p-value $< \alpha$ (0.05).

Based on the calculation of R, the weekly risk-free rate (R_f) value is 0.0007232 or 0.07232%. The ERS value of each stock is shown in Table 2. Next, the ERS value of each stock is sorted from highest to lowest. Stocks that have a negative ERS value are excluded as candidates to form a portfolio.

Table 2
ERS value of stocks

Stock	ERS
BMRI	0.09754
ICBP	-0.00840
KLBF	0.08120
MDKA	0.06260
PGAS	0.00699
TLKM	0.00837
TOWR	0.01502

Source: R programming output

Table 3
Calculation of cut-off stocks

Ranking	Stock	ERS	C_i
1	BMRI	0.09754	0.01330
2	KLBF	0.08120	0.02145
3	MDKA	0.06260	0.02586
4	TOWR	0.01502	0.02481
5	TLKM	0.00837	0.02336
6	PGAS	0.00699	0.02203

Source: R programming output

Based on Table 2, the highest ERS value is owned by BMRI stock. After the ranking, the calculation of the cut-off for each stock and cut-off rate is done. Based on the calculation of R, the value of constant

correlation is 0.13635. Next, the cut-off (C_i) of each stock is calculated. The (C_i) value of each stock can be seen in Table 3.

Based on Table 3, it is known that the highest C_i value to be used as the C^* value is owned by MDKA stock of 0.02586. The stocks with ERS value smaller than C^* will be excluded as the candidate to form the portfolio. The comparison between ERS and C^* can be seen in Table 4. Based on Table 4, it is known that there are three stocks with ERS value greater than C^* and are used as portfolio formers, namely BMRI, KLBF, and MDKA.

Table 4
The Comparison between ERS with cut-off rate

Stock	ERS		C^*
BMRI	0.09754	>	0.02586
KLBF	0.08120	>	0.02586
MDKA	0.06260	>	0.02586
TOWR	0.01502	<	0.02586
TLKM	0.00837	<	0.02586
PGAS	0.00699	<	0.02586

Source: R programming output

Based on the calculation of R, the weight (w_i) value for each stock can be seen in Table 5. Table 5 shows that the weight for each stock is 46.263% of the initial investment capital for BMRI stock, 39.255% of the initial investment capital for KLBF stock, and 14.482% of the initial investment capital for MDKA stock.

Table 5
Weight value of stocks

Stock	z_i	w_i
BMRI	2.39246	0.46263
KLBF	2.03004	0.39255
MDKA	0.74894	0.14482

Source: R programming output

A multivariate normality test was conducted on BMRI, KLBF, and MDKA stock return with the Kolmogorov Smirnov test. Based on the calculation of R, the p-value (0.493) > α (0.05) is obtained. At a significance level of $\alpha = 5\%$, it can be concluded that the stocks return that form the portfolio are normally distributed multivariate.

The calculation of VaR and ES value can be done with Monte Carlo simulation. Based on the calculation of R, the number of repetitions that will be used in the calculation of VaR and ES in this research is 45 times and then the average value of VaR and ES is calculated. At a confidence level of 95% and a period of one week with the calculation of R, it is obtained the value of VaR = 0.04621 and ES = 0.05408. Based on that result, it shows that at the 95% confidence level, the VaR value is 4.621% while the ES is 5.408% for the next week. The ES value is greater than the VaR value, so it means that the loss that will occur exceeds the VaR value by 5.408% for the next week. If an investor with an initial capital of 100,000,000.00 IDR, the loss that the investor will receive in the next week is 4,621,000.00 IDR and there is still a possibility of a loss exceeding this value which is 5,408,000.00 IDR. The ES value is more appropriate than the VaR value in the context of a portfolio so that the maximum loss that will be received is 5,408,000.00 IDR for the next week prediction.

This research forms an optimal portfolio of IDX30 stocks using the Constant Correlation Model (CCM) in the latest Indonesian stock market condition and estimates its future risk using Expected Shortfall (ES). It contributes to the empirical literature on portfolio formation by providing a practical guide for investors to form optimal portfolios. In the research of Nugroho and Nurcahyo (2019) who formed a portfolio with the Constant Correlation Model on the Bisnis27 index produced 4 portfolio-forming stocks, namely BBKA, AKRA, PTBA, and BDMN. In this research, the Constant Correlation Model optimal portfolio formation is carried out on a different index, namely IDX30 and produced 3 forming stocks, namely BMRI, KLBF, and MDKA. Research by Salsabilla et al. (2023) formed an optimal portfolio with Mean-VaR optimization applied to 23 stocks that were consistently listed on the IDX30 for the 2020 period and produced three forming stocks, namely CPIN, ERAA, and TLKM. Based on that research, it is also obtained that the VaR value of the portfolio is 3.992% for the next day. In this research, portfolio formation applied to 21 stocks listed on the IDX30 for the 2021 – 2022 period and obtained a portfolio VaR value of 4.621% for the next week. Research by Saepudin et al. (2017) shows that the ES value of Unilever Indonesia stock at 3.942% is greater than the VaR value at 3.425% for the next day. In this research, the ES value of the portfolio at 5.408% is greater than the VaR value at 4.621% for the next week. In the concept of risk, especially portfolios,

it is more appropriate to use the Expected Shortfall value to estimate the loss that will occur because it fulfills the subadditivity.

5. Conclusion

The purpose of the research is to form an optimal portfolio of IDX30 stocks using the latest data and the Constant Correlation Model (CCM). The research then uses Monte Carlo simulation to predict the future risk of the portfolio using Expected Shortfall (ES). Portfolio formation using the Constant Correlation Model method applied to stocks that were consistently listed on the IDX30 for the period January 2021 - December 2022 produces 3 optimal portfolio-forming stocks, namely BMRI, KLBF, and MDKA. The amount of weight for each stock forming the optimal portfolio with the Constant Correlation Model method is for BMRI stock by 46.263%, KLBF stock by 39.255%, and MDKA stock by 14.482%. The calculation of risk value in the Constant Correlation Model optimal portfolio with Expected Shortfall at the 95% confidence level is obtained at 5.408% of the initial capital for the next week. This shows that the loss that will occur exceeds the VaR value of 4.621% for the next week.

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INVESTOR ATTENTION AND EXCHANGE TRADED FUND RETURNS IN SOUTH AFRICA: THE ROLE OF INVESTORS' INTERNET SEARCH ACTIVITY

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Abstract

In recent years, exchange-traded fund (ETF) markets have grown exponentially due to their rising popularity amongst retail investors with a preference for passive investments. However, the effect of this rising popularity on the performance of ETF markets remains understudied. Therefore, the objective of this study is to explore the effect of investor attention on the returns of South African ETFs. To achieve this objective, a sample of 80 JSE-listed ETFs is examined using a panel regression approach for the period 2 January 2018 to 30 December 2022. The results obtained suggest that investor attention has a negative effect on ETF returns in line with the Investor Recognition Hypothesis. However, further analysis reveals that this negative effect is only significant for ETFs with domestic benchmarks and ETFs tracking equity benchmarks. Additional analysis also reveals that the negative effect of investor attention diminished after South Africa reported its first case of COVID-19. Noteworthy is that global investor attention also exhibits a significant effect on the returns of these funds. Overall, these findings indicate that investor attention contains information that is useful in explaining ETF price movements and, therefore, has important implications for various stakeholders.

Keywords: Google Search Volume Index, Investor Recognition Hypothesis

JEL Classification: G11; G12; G40

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1. Introduction

The Efficient Market Hypothesis of Fama (1970) proposes that markets are efficient when asset prices instantaneously incorporate new information. To achieve this instant reaction, market participants need to pay close attention to information and consider this information during their investment decision-making processes (Peng and Xiong, 2006). However, attention is a scarce resource particularly when it comes to investment decision making (Kahneman, 1973). This is because there exist large amounts of information that need to be processed by investors who have limited time and effort (Aouadi, et al., 2013). Given its influence on investment decision-making, investor attention affects various aspects of financial markets including returns (Chen, et al., 2022), liquidity (Cheng, et al., 2021), and volatility (Wang, et al., 2021). This study, however, concentrates on the influence of investor attention on asset returns, in particular, the Exchange Traded Fund (ETF) asset class.

An ETF is defined as an investment fund that attempts to track the performance of a specific benchmark by pooling various securities constituted in the underlying benchmark (Kunjal, 2022). In recent years, these funds have gained increasing popularity with the global ETF market growing by more than 500% over the last decade (Jhunjunwala and Sethi, 2022; Kunjal, et al., 2022). This exponential growth in the market stems from the various benefits offered by these funds, including low costs, tax efficiencies, trade flexibility, and increased transparency (Kallinterakis, et al., 2020). However, research on the influence of this increasing popularity on ETF markets remains scanty. There are only two studies, known to the author, which examine the influence of investor attention on ETF returns. Lee and Chen (2021) examine cross-border ETFs trading in the United States (U.S.) and find that local (that is, U.S.) investor attention has a consistent negative effect on returns. However, investor attention in the home country negatively impacts returns in the low and medium quantiles but positively impacts the returns in the high quantile. On the contrary, Lee, et al. (2021) find that local attention does not significantly impact single-country ETFs in the U.S. while home-country investor attention significantly impacts the returns in the low and medium quantiles. There is no study which related investor attention to non-U.S. ETFs. Therefore, the objective of this study is to investigate the effect of investor attention on the returns of South African ETFs given that the

market has experienced a growth of more than 200% over the last decade (Kunjal, et al., 2022).

This study contributes to existing literature in several ways. Akarsu and Sürer (2022) find that the direction in which investor attention influences returns, and the significance thereof, differs across countries. The only investor attention-related study, known to the author, which considers the South African market is conducted by Lyke and Ho (2021) although the study concentrates on attention towards Coronavirus rather than the financial market itself. Therefore, the first contribution of the current study is that it provides insight into the response of South African markets to investor attention, specifically, attention related to the financial market. In particular, the study focuses on ETF markets which are relatively understudied especially in non-U.S. markets since the only two investor attention-related studies survey U.S.-listed ETFs (conducted by Lee and Chen, 2021 and Lee, et al., 2021). Hence, the second contribution of this study is that it sheds light on the impact of investor attention on ETFs trading in emerging countries, in this case, ETFs listed on the Johannesburg Stock Exchange (JSE).

Yuan, et al. (2022) find that returns respond differently to local and non-local investor attention. On this basis, this study also considers the effect of global investor attention. Thus, the third contribution of this study is that it adds to current knowledge of how global investor attention impacts returns while the majority of the existing literature focuses solely on local investor attention. Despite the growing interest in international ETFs (that is, ETFs which offer international exposure), research on these funds remains scanty (Bahadar, et al., 2020). A further contribution of this study is that it adds to the literature on international ETFs by segmenting the analysis into ETFs tracking domestic and international benchmarks. Likewise, this study assesses the investor attention-return relationship across ETFs tracking different asset classes. An understanding of the effects across different benchmarking styles would assist investors in devising appropriate diversification strategies using ETFs which track different benchmarks.

This study is structured as follows: Section 2 outlines the data and methodology employed in this study while Section 3 presents and analyses the results. Section 4 concludes the study.

2. Literature review

In theory, there are two strands of opposing hypotheses that attempt to explain the association between investor attention and returns. On the one hand, the 'Investor Recognition Hypothesis' proposed by Merton (1987) asserts that investors trade in securities with which they are familiar. Therefore, neglected securities (or securities with less attention) would need to attract investors by offering them higher returns as compensation for taking large undiversified positions in the respective securities. Hence, the 'Investor Recognition Hypothesis' predicts a negative relationship between investor attention and returns. On the contrary, the 'Attention-Induced Price Pressure Hypothesis' of Barber and Odean (2008) implies that investors are net demanders of attention-grabbing stocks. As such, an increase in attention signifies a surge in demand which adds positive, temporary price pressure to a security. Thus, a positive relationship between investor attention and future returns is expected. Notably, Peng and Xiong (2006) posit that investors tend to exhibit category-learning behaviour whereby they focus on market- or sector-wide information rather than firm-specific information because of their limited attention. Moreover, when information is severely constrained, investors disregard firm-specific information and focus only on market- and sector-wide information. Several empirical studies have explored the relationship between investor attention and returns.

Recent empirical evidence of the association between investor attention and stock returns is inconsistent. On one hand, Chen (2017), Piñeiro-Chousa, et al. (2020), and Smales (2021a) find that investor attention and returns are negatively associated such that increased attention leads to reduced returns. On the other hand, Tan and Tas (2019), Swamy and Dharani (2019), and Yang, et al. (2021) report a positive association such that greater attention leads to greater returns. Remarkably, Kim, et al. (2019) and Osabuohien-Irabor (2021) discover that investor attention exhibits no significant effect on the stock returns in Norway and Nigeria, respectively. There is evidence that investor attention also impacts the returns in markets for other asset classes including bonds (Pham and Huynh, 2020; Pham and Cepni, 2022), cryptocurrency (Zhang and Wang, 2020; Smales, 2022), futures (Han, et al., 2017; Saxena and Chakraborty, 2020), and exchange-traded funds (ETFs) (Lee and Chen, 2021; Lee, et al., 2021). However, while the effect of investor attention on stock returns has been extensively

studied, the association is relatively understudied in other asset markets (Subramaniam and Chakraborty, 2020) especially the market for ETFs, thus, highlighting the need for further research on ETF markets.

Noteworthy is that there are only two studies, known to the author, which examine the influence of investor attention on ETF returns. Lee and Chen (2021) examine cross-border ETFs trading in the United States (U.S.) and find that local (that is, U.S.) investor attention has a consistent negative effect on returns. However, investor attention in the home country negatively impacts returns in the low and medium quantiles but positively impacts the returns in the high quantile. On the contrary, Lee, et al. (2021) find that local attention does not significantly impact single-country ETFs in the U.S. while home-country investor attention significantly impacts the returns in the low and medium quantiles. There is no study which related investor attention to non-U.S. ETFs.

3. Data and methodology

To achieve the objectives of this study, ETFs listed on the JSE at the end of December 2022 are surveyed, however, each ETF included in the sample needs to be trading for at least one year in order to ensure a sufficient number of observations for each fund. This leads to a sample of 80 JSE-listed ETFs after discarding six ETFs with missing data. The period under observation varies from 2 January 2018 to 30 December 2022. Daily closing prices for the ETFs are collected from the EquityRT database, and the daily returns are computed as follows:

$$Return_{i,t} = \frac{Price_{i,t} - Price_{i,t-1}}{Price_{i,t-1}} \times 100 \quad (1)$$

where $Return_{i,t}$ represents the return for ETF i on day t and $Price_{i,t}$ represents the closing price for ETF i on day t .

In this study, investor attention is measured using the Google Search Volume Index (GSVI) in line with recent studies by Lee, et al. (2021), Lin (2021), Akarsu and Sürer (2022), Smales (2022), and Koch and Dimpfl (2023). The GSVI reflects the number of searches for a particular keyword as a proportion of searches for all keywords in a specific location and time (Swamy and Dharani, 2019). Thus, the GSVI represents a novel and direct measure of investor attention as it directly

captures internet search activity whereby an investor searching for an asset indicates that the investor is paying attention to the asset (He, et al., 2022). This is particularly important in a world where most retail investors use search engines to collect information (Yang, et al., 2021). The GSVI is provided by Google Trends available at <https://trends.google.com/>.

It is important to note that Google Trends normalizes the search activity and scales the index between zero and 100, such that, a higher index value represents greater search activity and, thus, greater investor attention. However, Google Trends does not provide data on rarely searched keywords (Akarsu and Süer, 2022). Therefore, the keyword selected for this study is “ETF” because the use of ETF names or tickers may lead to an inaccurate reflection of the attention received by the fund. Furthermore, the seminal work of Peng and Xiong (2006) asserts that investors have limited attention and tend to focus on market-wide information, thus, the choice of the “ETF” keyword captures attention for the whole ETF market. To capture local investor attention towards the ETF market, the baseline analysis is restricted to the search conducted in South Africa. In the latter part of the analysis, global investor attention towards the ETF market is captured by examining worldwide searches for “ETF”. To ensure comparability across the funds, the GSVI is standardized in line with existing studies as follows (Swamy and Dharani, 2019; Swamy, et al., 2019):

$$Investor\ Attention_t = \frac{GSVI_t - \frac{1}{n} \sum_{i=1}^n GSVI_t}{\sigma_{GSVI}} \quad (2)$$

where $GSVI_t$ is the index value for searches related to ETF on day t , n represents the total number of daily observations, and σ_{GSVI} is the standard deviation of the daily index values over the full sample period.

The effect of investor attention on ETF returns is examined using a panel data approach because of its ability to mitigate issues related to heterogeneity, multicollinearity, and omission of variables (Al-Awadhi, et al., 2020). The baseline model is adapted from Tan and Tas (2019) as follows:

$$Return_{i,t} = \beta_0 + \beta_1 Return_{t-1} + \beta_2 Investor\ Attention_{t-1} + \sum_{k=1}^3 \gamma_k Control_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where $Return_{i,t}$ represents the return of ETF i on day t as defined in Equation (1) and $Investor\ Attention_t$ is the standardised GSVI on day t as defined in Equation (2). β_0 is a constant term while $\varepsilon_{i,t}$ is an error term. The three control variables included to control for alternative explanations of ETF returns are $LnVolume_{i,t-1}$ which is the log of the ETF's daily trading volume, $LnVolatility_{i,t-1}$ which is the log of the ETF's price volatility, and $LnMarket\ Capitalisation_{i,t}$ which is the log of the ETF's market capitalisation included to capture the ETF's size.

Further, to minimize issues relating to cross-sectional heterogeneity and the omission of ETF characteristics, Equation (3) is estimated using cross-sectional fixed or random effects. The appropriate panel estimation method is selected using the Hausman (1978) test which has a null hypothesis suggesting that the random effects model is preferred.

4. Results and analysis

4.1. Preliminary analysis

Table 1 summarizes the descriptive statistics for the daily return series (that is, $Return_{i,t}$) and the daily GSVI for searches related to "ETF" ($GSVI_t$). The average daily return for the surveyed ETFs is 0.045 per cent with a standard deviation of 1.753 per cent which implies that, for everyone per cent of risk, the ETFs generate a return of 0.026 per cent on average. The average GSVI is 28.014 suggesting that, on average, ETF-related search activities are relatively low compared to searches for all other keywords.

Table 1

Descriptive Statistics		
Statistic	$Return_{i,t}$	$GSVI_t$
Mean	0.045	28.014
Maximum	131.117	100.000
Minimum	-50.000	0.000
Std. Dev.	1.753	24.207
Skewness	10.296	0.613
Kurtosis	699.604	2.905
Jarque-Bera	1.77E+09	5507.409
Probability	0.000	0.000
Observations	87534	87534

Source: Author's own compilation

Table 2 provides the results of the stationarity tests for each variable. For all the variables, the null hypothesis of a unit root is rejected. Therefore, all the variables are stationary and can be used in the analysis.

Table 2

Stationarity Results

Variable	LLC	IPS	ADF	PP
$Return_{i,t}$	-93.004*	-140.368*	11928.2*	6888.60*
$Investor\ Attention_{i,t}$	-95.866*	-93.455*	7347.14*	6820.02*
$LnVolume_{i,t}$	-66.601*	-84.252*	6389.21*	9813.71*
$LnVolatility_{i,t}$	-70.889*	-91.283*	7095.03*	10241.0*
$LnMarket\ Capitalisation_{i,t}$	-6.428*	-2.697*	225.441*	565.773*

Notes: 1) LLC denotes the Levin, Lin and Chu test, IPS denotes the Im, Pesaran and Shin test, ADF denotes the Augmented Dickey-Fuller Fisher Chi-square test, and PP denotes the Phillips-Perron Fisher Chi-square test. 2) *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Source: Author's own compilation

4.2. Baseline analysis

Table 3 presents the results of the panel regression estimated using Equation (3).

Table 3

Baseline Panel Regression Results

Variable	Coefficient	T-statistic
Constant	6.722*	12.346
$Return_{i,t-1}$	-0.138*	-41.366
$Investor\ Attention_{i,t-1}$	-0.015**	-2.519
$LnVolume_{i,t-1}$	0.006**	1.995
$LnVolatility_{i,t-1}$	0.009***	1.807
$LnMarket\ Capitalisation_{i,t-1}$	-0.273*	-12.265
Hausman Test Stat.	204.296*	
Fixed Effects Included	Yes	

Notes: *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Source: Author's own compilation

The significant Hausman (1978) test statistic suggests that the optimal model is the fixed effects model, hence, Equation (3) is estimated using cross-sectional fixed effects. The results in Table 3

show that $Investor\ Attention_{i,t-1}$ exhibits a negative and statistically significant effect on $Return_{i,t}$. This implies that an increase (decrease) in investor attention leads to a decrease (increase) in ETF returns. This finding supports the Investor Recognition Hypothesis which claims that securities which attract low attention need to provide higher returns to compensate investors for taking undiversified positions (Chen, 2017). The negative effect is also consistent with Lee and Chen (2021) who report that local investor attention negatively impacts U.S.-listed ETF returns. Together, these findings suggest that ETFs in emerging and developed markets response similarly to local investor attention.

For completion, the results in Table 3 indicate that ETF returns are also significantly influenced by its past returns, trading volume, price volatility, and market capitalization. To be more specific, past returns negatively impact current returns indicating the presence of significant negative autocorrelation in the ETF returns. This negative autocorrelation may be attributed to positive feedback trading in South African ETFs as documented by Charteris, et al. (2014). ETF returns are also negatively impacted by its lagged market capitalization which captures the fund's size. Economies of scale enable larger funds to charge lower transaction costs and, thus, generate better performance (Grinblatt and Titman, 1989; Chu, 2011). On the contrary, ETF returns are positively influenced by lagged volume and volatility. Consistent with the Sequential Information Arrival Hypothesis, the study also finds that lagged trading volume positively influences current returns. The Sequential Information Arrival Hypothesis proposes a positive lead-lag relationship because information is disseminated to market participants sequentially and, therefore, price adjustments are not immediate (Copeland, 1976). The lagged price volatility captures the fund's risk component, thus, suggesting a positive risk-return relation whereby investors receive higher compensation for taking on higher risk. This aligns with the finding on investor attention whereby funds with low attention are considered riskier and need to provide greater compensation in the form of returns.

4.3. Robustness analysis

4.3.1. The role of benchmarking styles

Steyn (2019) notes that the pricing dynamics of ETFs tracking domestic and international benchmarks differ for several reasons. On this basis, the attention-returns relation is explored for ETFs tracking domestic and international benchmarks, and the results are provided

in Table 4. Table 4 shows that the negative effect of investor attention is still present, however, it is only significant for ETFs tracking domestic benchmarks. This finding is consistent with the local bias whereby investors pay greater attention to local assets, in this case, ETFs with local benchmarks (Huang, et al., 2016).

Table 4

Panel Regression Results for ETFs Tracking Domestic and International Benchmarks

Variable	ETFs with Domestic Benchmarks		ETFs with International Benchmarks	
	Coefficient	T-statistic	Coefficient	T-statistic
<i>Constant</i>	8.688*	10.583	4.999*	7.304
<i>Return_{i,t-1}</i>	-0.131*	-31.038	-0.157*	-28.616
<i>Investor Attention_{i,t-1}</i>	-0.023*	-2.853	-0.003	-0.327
<i>LnVolume_{i,t-1}</i>	0.005	1.486	0.005	0.870
<i>LnVolatility_{i,t-1}</i>	0.007	1.153	0.012	1.363
<i>LnMarket Capitalisation_{i,t-1}</i>	-0.357*	-10.537	-0.198*	-7.189
Hausman Test Stat.	148.856*		66.040*	
Fixed Effects Included	Yes		Yes	

Notes: *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Source: Author's own compilation

In addition, the attention-returns relation is explored for ETFs tracking different asset classes, and the results are present in Table 5. ETFs tracking money markets and multi-assets have been disregarded due to an insufficient number of ETFs to form an adequate panel for observation.

The results in Table 5 suggest that exhibits a significant, negative effect only on ETFs tracking equities and does not significantly influence ETFs tracking bonds, commodities, and property. This finding may be attributed to the familiarity bias whereby investors pay greater attention to broad asset classes with which they are familiar (in this case, equities) and less attention is paid to alternative asset classes such as commodities and real estate (Huberman, 2001).

Table 5
Panel Regression Results for ETFs with Different Asset Classes

Variable	Equities	Bonds	Commodities	Property
<i>Constant</i>	5.462*	22.109*	8.306*	-0.073
<i>Return_{i,t-1}</i>	-0.129*	-0.356*	-0.059*	-0.062*
<i>Investor Attention_{i,t-1}</i>	-0.018*	-0.004	0.022	-0.037
<i>LnVolume_{i,t-1}</i>	-0.001	0.013**	0.021**	0.005
<i>LnVolatility_{i,t-1}</i>	0.001	0.012	0.081*	-0.015
<i>LnMarket Capitalisation_{i,t-1}</i>	-0.220*	-0.918*	-0.314*	-
Hausman Test Stat.	101.760*	41.432*	19.856*	5.726
Fixed Effects Included	Yes	Yes	Yes	No

Notes: 1) Only the coefficient estimates are provided to improve the overall presentation of the table. 2) *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively. 3) *LnMarket Capitalisation_{i,t-1}* has been removed from the panel regression for properties to ensure that the number of funds in the panel exceed the number of coefficient estimates.

Source: Author's own compilation

4.3.2. The role of COVID-19

According to Kunjal (2023), the COVID-19 pandemic had a significant effect on the performance of JSE-listed ETFs. On this background, the effect of investor attention before and after the COVID-19 pandemic is examined.

To conduct this analysis, the full sample period is divided into pre- and post-COVID sub-samples where the pre-COVID sub-sample varies from 2 January 2018 till 4 March 2020 (the day before South Africa confirmed its first COVID-19 case) and the post-COVID sub-sample varies from 5 March 2020 (the day South Africa reported its first case of COVID-19) to 30 December 2022.

The results, which are presented in Table 6, indicate that investor attention exhibits a consistent negative effect on ETF returns. However, the magnitude and significance of the negative effect has diminished after South Africa reported its first COVID-19 case. This may be because some ETFs have benefitted from the increased attention brought about by the pandemic and its increased market uncertainty (Smales, 2021b).

Table 6
Panel Regression Results After Accounting for COVID-19

Variable	Pre-COVID		Post-COVID	
	Coefficient	T-statistic	Coefficient	T-statistic
Constant	5.910*	4.261	20.538*	15.870
Return _{<i>i,t-1</i>}	-0.175*	-32.681	-0.125*	-29.311
Investor Attention _{<i>i,t-1</i>}	-0.043*	-5.243	-0.019**	-2.297
LnVolume _{<i>i,t-1</i>}	0.001	0.217	0.001	0.226
LnVolatility _{<i>i,t-1</i>}	0.012**	1.994	-0.009	-1.194
LnMarket Capitalisation _{<i>i,t-1</i>}	-0.239*	-4.200	-0.838*	-15.859
Hausman Test Stat.	161.837*		276.070*	
Fixed Effects Included	Yes		Yes	

Notes: *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Source: Author's own compilation

4.3.3. The role of global investor attention

Yuan, et al. (2022) report that the effects of local and non-local investor attention are not uniform. In this regard, the effect of global investor attention is examined. Global search activity for the keyword (ETF) is obtained from Google Trends and local investor attention is replaced with global investor attention in Equation (3). The results, presented in Table 7, suggest that the global investor attention exhibits a significant, negative effect on ETF returns.

Table 7
Panel Regression Results with Global Investor Attention

Variable	Coefficient	T-statistic
Constant	6.955*	12.864
Return _{<i>i,t-1</i>}	-0.139*	-41.455
Investor Attention _{<i>i,t-1</i>}	-0.033*	-4.838
LnVolume _{<i>i,t-1</i>}	0.005	1.589
LnVolatility _{<i>i,t-1</i>}	0.009***	1.652
LnMarket Capitalisation _{<i>i,t-1</i>}	-0.282*	-12.747
Hausman Test Stat.	216.953*	
Fixed Effects Included	Yes	

Notes: *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Source: Author's own compilation

This finding is consistent with the results for local investor attention and aligns with the Investor Recognition Hypothesis of Merton (1987). However, global investor attention exhibits a greater effect on the returns. This finding is expected because domestic and foreign traders (when combined) should have a greater impact on market performance compared to only domestic traders.

Overall, this study contributes to existing literature by demonstrating that investor attention has a negative effect on ETF returns, however, this effect differs based on the ETFs' benchmarking styles and the asset classes tracked by the ETFs. The results also indicate the global investor attention significantly impacts the returns of these funds.

5. Conclusion

In recent years, ETF markets have grown exponentially due to their rising popularity amongst retail investors with a preference for passive investments. However, the effect of this rising popularity of the performance of ETF markets remains understudied. Therefore, the objective of this study is to explore the effect of investor attention on the returns of South African ETFs. To achieve this objective, a sample of 80 JSE-listed ETFs are examined using a panel regression approach for the period 2 January 2018 till 30 December 2022. The results obtained suggest that investor attention has a negative effect on ETF returns in line with the Investor Recognition Hypothesis. However, further analysis reveals that this negative effect is only significant for ETFs with domestic benchmarks and ETFs tracking equity benchmarks. Additional analysis also revealed that the negative effect of investor attention diminished after South Africa reported its first case of COVID-19. Noteworthy is that global investor attention also exhibits a significant effect of the returns of these funds.

Overall, these findings indicate that investor attention contains information that is useful in explaining ETF price movements. Hence, the findings of this study have important implications for various stakeholders. For investors, these findings should serve as guidance for the construction of portfolio adjustment strategies when there is a change in investor attention. For instance, investors can purchase ETFs with domestic benchmarks when investor attention decreases since it is likely to generate a positive return. Overall, the findings of this study indicate that investors need to carefully monitor retail

investor attention in order to detect the optimal time to invest and avoid negative returns. Similarly, these findings indicate that policy makers need to monitor the levels of investor attention in order to detect early signs of increased losses for retail investors and to guide the regulation of ETF markets. For fund managers, these findings suggest that investors are subject to local and familiarity biases, therefore, greater awareness needs to be created for funds taking international benchmarks as well as funds tracking bonds, commodities, and property.

The current study is not free of limitations. In particular, this study only employs one measure of investor attention, that is, the GSVI. In this regard, future studies can employ alternative keywords or different measures of investor attention including indirect measures. The current study of the South African ETF market only concentrates on returns. Future studies can assess different aspects of the ETF market including liquidity, volatility, and price discovery. In a similar manner, future studies can undertake a comparison of the effects of investor attention on different asset classes and different emerging capital markets.

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LENDING DECISION, SACCO SIZE AND LIQUIDITY OF FARMERS BASED DEPOSIT-TAKING SACCS IN KENYA

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Abstract

Kenyan farmers' Deposit-taking Savings and Credit Co-operatives (DT-SACCOs) have seen a drop in credit provision, from 9.6 % in 2022 to 5.2 % in 2023. Additionally, 52 % of these SACCOs have been declared illiquid due to imprudent lending practices. This has led to the closure or license revocation of 33 % of farmers-based DT-SACCOs. To address this issue, the study aimed to assess the moderating effect of SACCO size on the relationship between lending decisions and liquidity of farmers-based DT-SACCOs. The study employed an explanatory research design and utilized self-administered questionnaires. The study findings indicate that SACCO size significantly moderates the relationship between lending decisions and liquidity of farmers-based DT-SACCOs. As a recommendation, SACCOs should consider their size when making lending decisions, allowing larger SACCOs to manage more risk in loans to farmers, while smaller SACCOs may need to exercise more caution.

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JEL Classification: G21; P13; Q13; Q14

1. Introduction

A SACCO is a financial cooperative enterprise providing financial intermediation on behalf of members with the common goal of solving their financial, social and cultural needs in line with international cooperative principles. They play a great role in the provision of financial services to the unbanked and have financially included 12.69 % of the world population (World Council of Credit Unions [WOCCU], 2021). This has seen them mobilize \$2.2 trillion for investing in loan portfolios, government securities, shares and stocks making them a key investment vehicle (World Co-operative Monitor [WCM], 2022). Globally, lending is usually considered to be the SACCOs' core investment and takes a larger portion which accounts for 85 % of the total investments. Investments in government securities, shares and stocks account for 15 % (WOCCU, 2020). However, in the United States of America, in less than two years, more than 1,500 SACCOs collapsed. On the other hand, in Ireland and Germany, 210 SACCOs and 900 branches had been declared non-operational in less than one year (Coelho, et al., 2019). Notably, many of the affected institutions are farmers-based SACCOs that heavily rely on irregular and uncertain cash crop payments. In addition, short-term and long-term operations have been disrupted affecting the going concern of the ventures. This highlights the need for improved lending decisions to enhance the liquidity of these SACCOs. More emphasis has been channelled to African SACCOs which are considered an investment vehicle for the reduction of abject poverty that contributes to 48 % of the global poverty level (Amilola & Lerven, 2019)

SACCOs are a widely recognized global financial institution, with Africa accounting for 47 % and Asia for 39 % (WOCCU, 2021). They have significantly boosted financial inclusion, benefiting 44.5 million members through small, affordable loans. This has driven the loan portfolio to \$14.05 billion in 2022, up from \$12.7 billion in 2021 (WOCCU, 2022). However, complete loan portfolio recovery is not guaranteed, as a portion of loans is diverted to fraudulent financial activities like pyramid schemes, increasing credit risk (Maina, et al., 2020). Consequently, information asymmetry between lenders and

borrowers contributes to this heightened credit risk, with borrowers having more information about how they use the loans.

Borrowers often take advantage of lenders when they lack adequate information, leading to SACCOs extending loans to risky borrowers, thus increasing the overall risk. To mitigate these risks, it's been recommended that SACCOs should use credit reference bureaus to assess their borrowers' credit history (Maina et al., 2020).

In Africa, Kenya has excelled in SACCOs' performance, earning it recognition and an award for being a leader on the continent. It has also climbed the global rankings, reaching the 11th position (Gweyi, 2018). The sector encompasses both DT-SACCOs and Non-Deposit-Taking SACCOs. DT-SACCOs enjoy financial advantages and have been successful in expanding their services to members because they operate with an open bond. However, there has been a growing trend of these SACCOs closing, primarily due to imprudent lending decisions made by untrained staff, which often results in an unmanageable loan portfolio and investments in pyramid schemes. These decisions have led to 74 % of farmers-based DT-SACCOs facing liquidity challenges (Gachenga et al., 2022).

Despite SACCOs broadening their common bond to mobilize savings, asset-liability management remains a challenge. As a result, 52% of DT-SACCOs face illiquidity due to unmanageable loans and rising non-performing loans (SASRA, 2022). Additionally, non-remitted funds have increased to 5.04 billion, posing a threat to the 413 billion in members' savings, as 63 % of SACCOs don't maintain the mandated 5 % non-performing loan threshold. This issue remains perplexing despite government investments in oversight authorities to ensure DT-SACCOs comply with lending regulations and maintain liquidity. The challenge arises because DT-SACCOs lack access to a lender of last resort during liquidity crises, potentially leading to members losing their hard-earned money. Such situations may undermine confidence in this sub-sector, potentially triggering membership withdrawals and license revocation.

Diverse perspectives exist regarding the relationship between lending decision and liquidity in the existing literature. Some studies such as Githaka (2017) and Kamba et al (2016) suggest a positive relationship between lending decision and liquidity, indicating that prudent lending decisions positively impact the financial institution's liquidity. Conversely, Ndagijimana (2017) identified a negative relationship, indicating that excessive liquidity management may lead

to suboptimal lending decisions and lower overall liquidity. These disparities in the existing literature underscore the complexity of the lending decision-liquidity relationship, emphasizing the need for further research to gain a deeper understanding. It is worth noting that larger DT-SACCOs enjoy significant economies of scale, providing them with resources to enhance lending decisions compared to smaller ones (Sebhatu, 2012). Consequently, it's vital to investigate whether SACCO size significantly moderates the relationship between lending decisions and liquidity in farmers-based DT-SACCOs.

2. Literature Review

Information asymmetry theory was established by Akerlof, (1970) but intensively developed by De Meza and Webb, (1976). The theory states that there is an information imbalance between two parties where parties involved behave differently than they would if they had symmetric information. The theory assumes that lenders advance credit to borrowers without screening, thus increasing risk. However, current development in asymmetric theory revealed that risk in a firm differs with size, as small-sized SACCOs with low capital respond to moral hazard incentives by increasing loan portfolio risk, which in turn results in increased non-performing loans in comparison to large-sized SACCOs. Large-sized SACCOs with more capital create a competitive edge thus, employing competent staff who make prudent decisions thus improving SACCOs liquidity while reducing credit risk (Maina, Musangi, & Kinyariro, 2021). The theory postulates that the problem of information asymmetry results from borrowers' misleading information about their financial status. This makes it impossible to distinguish bad borrowers from good perspective borrowers. Therefore, misleading information availed to lenders has led to the overtime pilling of non-performing loans which has led to contingent illiquidity, financial distress and licenses being revoked in the DT-SACCOs.

An empirical review of study predictors was established. Ndambiri, et al., (2017) found that portfolio diversification, loan tenure and loans to shareholders have a positive nexus on the level of non-performing loans. Their study was to determine the effect of loan portfolios on non-performing loans in Kirinyaga. This was guided by modern portfolio theory, capital asset pricing model theory and arbitrage pricing theory. Descriptive and causal research designs were adopted where secondary data for 5 years from 2011 to 2014 was used

to collect data. The study revealed that long-term loans have a high rate of non-performance in comparison to short-term loans due to unforeseen eventualities. SACCOs were advised to diversify loans in different products to reduce non-performance. However, the study relied on portfolio diversification and loan tenure yet, there are other parameters such as natural lending and artificial lending. Henceforth, these parameters having not been studied leave the gap to determine whether they have an impact on SACCOs liquidity.

Githaka, (2017) in the study employed commercial loan theory, Baumol model of cash management, anticipated income theory, liquidity premium theory and free cash theory on the issue of financial factors affecting the liquidity of savings and credit co-operatives in Kirinyaga County. Measurements for financial factors comprised of liquidity management, net cash flow, credit lending and investment in non-core business. Cross-sectional descriptive research design and questionnaires were used to collect data. A purposive method was employed to determine respondents with the information required from 18 SACCOs. The data collected was analysed using inferential statistics. Multiple regression analysis revealed that credit lending, investment in non-core business, liquidity management and liquidity were statistically significant and concluded that SACCOs with sound lending procedures have low credit risk and advised SACCOs to have loan insurance to reduce loss of members' funds due to loan defaults. Additionally, the study was carried out in non-deposit-taking and deposit-taking SACCOs in Kirinyaga County. The current study will be on DT-SACCOs which are regulated by SASRA.

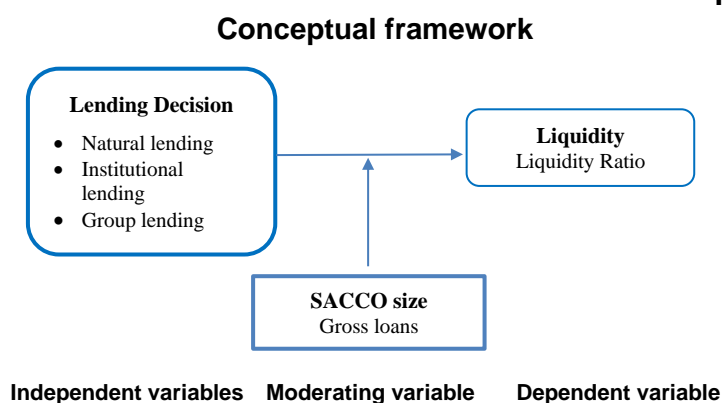
Ndagijimana, (2017) did a study to examine the effect of mobile lending on the financial performance of commercial banks in Kenya. Mobile lending measurements were mobile loans, loan applicants and lending rates. The study was anchored on agency theory, bank-focused theory, innovation diffusion theory and financial intermediation theory. Secondary data was collected from four commercial banks that offered mobile banking and analysed using inferential statistics. The study revealed that mobile loans had a negative relationship with the financial performance of commercial banks and advised commercial banks to implement mobile banking as it reduces cost and increases competitive advantage. From the findings, the study recommended commercial banks adopt mobile lending to help customers make transactions in their convenient time even in their rural areas. However, it is not clear how data was analysed and for which duration, this

creates suspicion of the results and the relationships in the study. Furthermore, Ndagijimana, (2017) carried out the research in commercial banks and not in SACCOs raising the need for a similar study to determine the effect in SACCOs.

Transaction cost theory anchored the study carried out to determine the relationship between short-term loans and the financial sustainability of Microfinance institutions in the Imenti North sub-county (Kamba, et al., 2016). Census method was carried out in eleven micro-finance institutions while purposive sampling helped to get respondents. Primary data by use of a questionnaire was analysed using Pearson correlation and descriptive statistics. From the correlation, the study found a significant nexus between short-term loans and financial sustainability and concluded that micro-finance should utilize credit reference bureau to check the credit reports of borrowers. Consequently, the study found that long-term loan increases poverty in comparison to short-term loans. The study recommended micro-finance to be innovative enough to ensure sustainability. According to Kamba, et al., (2016), the study was based on a purposive design which may be judgmental hence leading to a high level of bias, which makes it hard to make a decisive conclusion. Additionally, the study was carried out in Imenti North due to the high rise of micro-finance and not a social problem therefore the research findings cannot represent a clear picture of the effects of short-term loans and financial sustainability.

The study adopted an explanatory research design.

Figure 1



Source: Authors' presentation

3. Research Methodology

In determination of the sample size, farmers-based DT-SACCOs were clustered in 5 regions (Central, Rift valley, Nyanza, Western and Nairobi) that had farmers-based DT-SACCOs. The study population consisted of 49 finance managers and 49 credit managers of the 49 farmers-based DT-SACCOs. The sample size was determined using the Yamane formula, resulting in 78 respondents, of which 90 % completed the questionnaires. The secondary data collection sheet collected data for the year 2019 from the audited financial report of the SACCOs. The reliability of the questionnaires was confirmed, revealing a Cronbach Alpha Coefficient of 0.821, indicating the reliability of the questionnaire. The study utilized a hierarchical regression model to assess the moderating effect of SACCO size on the relationship between lending decisions and liquidity in farmers-based DT-SACCOs, with the assistance of the following equations:

$$Y = \beta_0 + \beta_1NL + \beta_2IL + \beta_3GL + \varepsilon \quad (1)$$

$$Y = \beta_0 + \beta_1NL + \beta_2IL + \beta_3GL + \beta_4SZ + \varepsilon \quad (2)$$

$$Y = \beta_0 + \beta_1NL + \beta_2IL + \beta_3GL + \beta_4SZ + \beta_5NL * SZ + \beta_6IL * SZ + \beta_7GL * SZ + \varepsilon \quad (3)$$

Where:

Y = liquidity (dependent variable),

β_0 = the constant, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ = coefficients

NL (*Natural lending*) IL (*Institutional lending*), GL (*Group lending*)

= the predictor variables

SZ (*SACCO size*) = the moderating variable

ε = error term

R change and R-squared change determined the strength of the moderator between lending decision and liquidity. Further, to determine significance, p-values were considered.

4. Results and Discussion

4.1. Lending Decision descriptive results

Lending decisions were assessed based on natural lending, institutional lending, and group lending parameters. The study utilized a five-point Likert scale questionnaire to gauge agreement levels, with

1 representing the lowest and 5 indicating the highest score. Descriptive results in Table 1 reveal that the construct with the highest score pertained to the impact of price fluctuations on members' loan repayments, with a mean of 4.3. Additionally, lending to members was highly preferred, scoring a mean of 4.22. Members also showed a preference for investment in long-term loans, with a mean of 4.12, and short-term loans, with a mean of 4.06. Medium-term loans were also favoured, receiving a mean score of 3.94. Furthermore, investment in lending to groups was relatively preferred, garnering a mean of 3.82. Members perceived lending to individuals as having a higher risk of default compared to lending to groups, with a mean of 3.70. It was also noted that the organization typically considered the credit history of borrowers before lending, with a mean of 3.84. Members perceived lending to groups as riskier, scoring a mean of 3.85. SACCOs insuring loans against defaulters received a mean of 3.81. Finally, it was observed that most borrowers were affiliated with groups, with a mean of 3.65, and a majority of borrowers were above 50 years of age, with a mean of 3.52.

Table 1

Lending decisions

Statements	Mean statistic	Std. Deviation Statistic
Investment in long-term loans is more preferred by the members	4.12	0.712
Investment in short-term loans is highly preferred by the members	4.06	0.718
Medium-term loans are more preferred by the members	3.94	0.771
Lending to members is highly preferred	4.22	0.710
Investment in lending to groups is highly preferred by the members	3.82	0.811
Lending to members has a high risk of default in comparison to groups	3.70	0.825
Before lending the organization usually considers the credit history of the borrower	3.84	0.831
Lending to groups is considered risky by members	3.85	0.860
SACCO ensures its loans towards loan defaulters	3.81	0.827
Price fluctuation has affected members' loans repayment	4.3	0.705

Statements	Mean statistic	Std. Deviation Statistic
Majority of borrowers are groups	3.65	0.821
Majority of borrowers are above 50 years of age	3.52	0.942

Source: Authors' calculations

The analysis in Table 1 highlights that the downward spiral of agricultural price fluctuations significantly impacts the loan portfolio. This may be a contributing factor to the 39 (80 %) of farmers-based DT-SACCOs that fail to meet the prescribed non-performing asset threshold of 5 % (SASRA, 2021), particularly because members heavily rely on agriculture as their primary source of income. Furthermore, the study revealed that SACCOs continue to focus on investing in their members, aligning with the Cooperative Act's principles. This underscores SACCOs' ongoing commitment to their primary role of providing loans to members, with a strong preference for long-term loans over short-term ones. This aligns with Ndambiri et al. (2017), who found that members typically prefer long-term loans despite the unpredictability of events and price movements in the agricultural sector.

Moreover, the study found that loan advanced to members has a high default rate in comparison to loan advanced to groups and institutions. However, 41.4 % of the respondents were of the view that SACCOs don't hedge loan portfolios and that they don't consider borrowers' credit history before advancing loans. This may increase the loan portfolio risk as SACCOs do not insure deposits like commercial banks which may be a time bomb. Consequently, findings on whether lending to groups is considered risky by members in comparison to groups revealed a divergent finding in the study carried out by Nderitu, (2018) who established that lending to members in the group increases the risk of default in comparison to the group which disagrees to study findings. Consequently, the study aligns with SASRA, (2021) by revealing that institutional lending has increased credit risk for SACCOs as 50 SACCOs were owed kshs 5.04 billion being non-remitted funds.

4.2. KMO and Bartlett's test of lending decision

Further analysis of the sample adequacy test was carried out to confirm whether the data collected was appropriate for factor

analysis. Test for multicollinearity was first carried out and revealed a correlation matrix determinant of 0.113 which is more than the identity matrix 0.00001 stipulating the absence of multicollinearity between variables. This led to further testing into whether factor analysis is appropriate in factor condensing. Kaiser Mayer Olkin and Bartlett test were considered. The computed value for the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.857. This was found to be an acceptable measure in agreement with (Saunders, et al., 2009). On the other hand, Bartlett's test of Sphericity was employed and indicated that the null hypothesis test; whether the correlation matrix was equal to the identity matrix, was highly significant with a P value of 0.000 ($P=0.000<0.05$) at approximated Chi-square of 238.860 and 66 degrees of freedom. Therefore, the null hypothesis was rejected, and the correlation matrix is not an identity matrix. Hence, factor analysis was further considered appropriate for the data set in the study. The study further conducted principal component analysis and varimax rotation as shown in Table 2.

Table 2
Principal component analysis results for lending decision

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.354	36.284	36.284	4.140	34.503	34.503
2	1.322	11.014	47.298	1.355	11.289	45.792
3	1.118	9.320	56.618	1.299	10.825	56.618
4	.920	7.670	64.288			
5	.814	6.784	71.072			
6	.717	5.974	77.046			
7	.653	5.443	82.488			
8	.566	4.718	87.207			
9	.469	3.912	91.118			
10	.455	3.790	94.908			
11	.374	3.120	98.029			
12	.237	1.971	100.000			

Source: Authors' calculations

As shown in Table 2 three factors (natural lending, institutional lending and group lending) were retained after conducting the principal component analysis and varimax rotation (orthogonal rotation) as they had an Eigenvalue greater than one and accounted for a total variance of 56.618 for observed variables. The retained factors were further used in the hierarchical regression model.

4.3. Lending Decision, SACCO Size and Liquidity

Hierarchical regression models were employed to establish the moderating effect of SACCO size on the relationship between lending decision and liquidity of farmers-based deposit-taking SACCOs. Consequently, the analysis helped to test the hypothesis that, there is no moderating effect of SACCO size on the relationship between lending decision and liquidity of farmers-based Deposit Taking SACCO. R² change was used to assess the moderating effect. The results are shown in Table 3.

Table 3

Hierarchical regression results

Predictors	Model 1			Model 2			Model 3		
	Beta	t-value	P Value	Beta	t-value	P Value	Beta	t-value	P Value
Constant	1.016	3.310	0.002	0.781	2.428	0.018	0.141	0.158	0.857
NL	0.185	2.511	0.015	0.158	2.149	0.035	0.448	2.097	0.040
IL	0.344	4.408	0.000	0.332	4.344	0.000	0.079	0.331	0.742
GL	0.244	3.650	0.001	0.231	3.514	0.001	0.398	2.049	0.045
SZ				0.118	2.019	0.048	0.347	1.135	0.261
NL*SZ							-0.089	-1.410	0.163
IL*SZ							0.066	0.993	0.325
GL*SZ							-0.047	-0.858	0.394
R ² Change	0.557			0.583			0.601		

Source: Authors' calculations

The results as shown in Table 3 depicts that an increase in one unit of natural lending, institutional lending and group lending would lead to an increase in SACCOs' liquidity. Introducing a moderator seems to improve parameter co-efficient, but introducing a moderator in institutional lending seems to weaken the co-efficient. The study further reveals that lending decision has a significant nexus on liquidity with (P value = 0.000) therefore rejecting the null hypothesis that, there

is no relationship between lending decision and liquidity of farmers-based DT-SACCOs. The study supports a study carried out by Onchomba, (2019) who established a significant nexus between lending portfolio and financial performance. Moreover, the study revealed that natural lending, institutional lending, and group lending have a significant nexus on SACCOs with (P value 0.015, 0.000, 0.001).

To test the moderating effect, SACCO size was employed where R^2 change tested the strength between predictor and response variables. Introducing the moderator in model 2, R^2 changed from 0.557 (55.7%) to .583 (58.3%). Thus, an increase in SACCO size strengthened the nexus and an increase in SACCO size will lead to a significant improvement in SACCOs' liquidity. This supports the work of Mbore (2021), and Maina, Kiai, & Kyalo (2021) who found that SACCO size has a positive moderating effect on cash management and financial sustainability of DT-SACCOs in Kenya.

5. Conclusion and recommendation

The study assessed the moderating effect of SACCO size on the relationship between lending decision and liquidity of farmers DT-SACCOs in Kenya. Based on the study findings, SACCO size portrayed a statistically significant moderating effect on the relationship between the independent variable and the response variable.

Based on the conducted study, some recommendations can be mentioned. In this sense, it is recommended that DT-SACCOs should consider their size when making lending decisions. Larger SACCOs may be able to take on more risk and make loans to farmers, while smaller SACCOs may need to be more cautious. SACCOs should strive to increase their size and membership base to improve their ability to manage liquidity and lending risk. SACCOs should consider implementing policies and procedures that help to mitigate lending risk, such as establishing clear criteria for loan approval, conducting thorough credit assessments, and monitoring loan performance closely. Overall, the recommendation was for SACCOs to carefully consider their size and lending policies in order to manage liquidity risk effectively and support the financial needs of their members.

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