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Residential Mortgage Portfolio, Firm Characteristics and Performance of Commercial Banks in Kenya

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Abstract

The purpose of this study was to investigate the relationship between residential mortgage portfolio, product innovation, firm characteristics and performance of commercial banks in Kenya. Two of the specific objectives were to establish the effect of the relationship between residential mortgage portfolio and bank performance, and to determine the moderating effect of firm characteristics on the relationship between residential mortgage portfolio and bank performance. The study was anchored on the Modern Portfolio Theory (main anchoring), Agency Theory and Asymmetric Information Theory. It was guided by the positivism philosophy and principles and adopted correlational descriptive research design. The study collected and utilized panel data from the annual residential mortgage surveys conducted by the central bank of Kenya (CBK) on commercial banks covering a 13-year period from 2006 to 2018. Secondary data was collected from the financial statements of commercial banks and Kenya Bankers Association database. Data was analyzed using descriptive and inferential statistics. Hypotheses were tested through the panel regression models and the Baron and Kenny (1986) model. The results revealed that residential mortgage portfolio attributes, namely: portfolio quality and mortgage interest return, significantly influence bank performance. For firm characteristics, firm age influences the relationship between portfolio quality together with mortgage interest return and performance but does not moderate the relationship with portfolio size. The study recommended that bank managers should pay attention to the institutional environment and firm characteristics in designing their mortgage loan portfolios. And for performance of commercial banks to improve, mortgage portfolio contribution through portfolio quality and interest return should be ensured through sound credit management practices. Future studies should consider the use of residential mortgage portfolio as a composite variable based on tested methodologies for more insight on bank performance. .

Keywords: Residential mortgage portfolio, Product innovation, Firm characteristics, Commercial banks.

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Introduction

The loan portfolio of commercial banks is normally one of the largest assets on their balance sheet and the predominant source of income. Residential mortgage loans typically constitute a large portion of this portfolio and are one of the key assets in determining bank performance (Martins et al., 2014). The share of commercial banks' loan book in residential mortgages has grown in most countries and is high by historical comparison (Kearns & Woods, 2006). The strong growth in residential mortgage loans can be attributed to broadened Mortgage contracts and product innovation, among other factors (Gyntelberg et al., 2007). The volume and quality of mortgage loan portfolio held by banks is influenced by firm characteristics such as size, age and ownership (Haas et al., 2010). Gasper (2015) opines that as banks increase their investment in mortgage loans, any widespread shock that hits the property market can have a material impact on their performance. The turbulence observed in international financial systems post 2007 originating from mortgage markets illustrate the close relationship between the real estate sector and soundness of the financial sector (Koetter & Poghosyan, 2008).

Financial institutions hold diversified portfolio of loans in different categories with the objective of generating desired returns to their shareholders and to minimize the risk of default, aligned to the modern portfolio theory (Markowitz, 1952). Bank managers must therefore aim to invest the funds available to the organization in loan portfolios that balance the trade-off between optimum return and minimum risk in order to deliver value to the owners of the business. Agency theory (Jensen & Meckling, 1976) suggest that divorce of ownership and control in a firm often leads to conflict of interests between agents or managers and their principals who are shareholders of the organisation. Bank managers, as agents, are involved in decisions on which loan products to invest in and the type of product innovations to undertake in order to maximize returns for their principals, the shareholders. Financial intermediation suffers from asymmetric information between borrowers and lenders, which is common in mortgage transactions, and can exist in the form of moral hazard and adverse selection. The phenomenon of information asymmetry has had a strong impact on the willingness of lenders to issue loans and borrowers to take up credit and can influence the default risk the originating institution is prepared to take as well as the product characteristics of the loan being advanced by the bank (Cao, 2005, Ebert, 2001).

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The mortgage market plays a crucial role in a country's economy due to its linkage with most macroeconomic variables and also as a determinant of stock market and banking sector performance (Kalra et al., 2000). Renaud (2004) posits that when the mortgage market is functioning well, it can act as a stimulant to economic growth and can positively impact the national economy through construction sector employment, efficient real estate development, capital market development, easier labour mobility, lower macroeconomic volatility and more efficient resource allocation. It can also generate a strong influence on investments, savings and consumption choices of households and businesses (Kalra et al., 2000). For individual households, buying a house normally involves a large financial outlay and usually requires long-term mortgage financing (Garriga & Hedlund, 2020). Residential mortgage markets are therefore an important contributor to household wealth accumulation and retirement strategy. Capital required for start-up businesses in many countries come from mortgage finance, since housing assets can be used as collateral for economic investment. Homeowners can also borrow against housing wealth through mortgage equity withdrawals (Chiquier & Lea, 2009).

Firm characteristics or individual attributes which are unique to a bank can influence its loan origination as well as performance. They include ownership, size, lending capacity and age (Haas et al., 2010; Carter et al., 1998). Such characteristics can impact bank performance, as they influence banking efficiency, quality of the loan portfolio, operating expenses and share of liquid and fixed assets. Bank ownership types are normally classified by researchers as domestic and foreign-owned banks to reflect differences arising from performance and risk-taking behaviour. Firm size is also a contributor to the loan portfolio of commercial banks, as big banks enjoy a comparative advantage in originating more loans since they can take advantage of economies of scale in assessing loan applications (Haas et al., 2010). Lending capacity also defines a bank's ability to originate mortgage loans. Black et al. (2010) described a bank's lending capacity as its ability to finance loans with its core deposits. Local banks normally use retail deposits to fund information-intensive loans. Deposits are however limited, which means that banks who want to continue funding new mortgages may need to switch from retail deposits to external debt. Older banks are better established and possess the knowledge and infrastructure for mortgage origination. Carter et al. (1998) posits that older firms have longer operating histories and face less uncertainty in their performance.

The paper is anchored on Modern Portfolio Theory (Markowitz,1952). The theory asserts that investors seek to maximize utility and that individuals are risk averse and interested in optimal portfolios. A useful

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definition of the theory has been provided by Mangram (2013) who suggested that modern portfolio theory (MPT) is viewed as an investment framework for selecting asset portfolios by looking at how they contribute to the maximization of expected portfolio returns as well as the simultaneous minimization of portfolio risk. Portfolio management is necessary in lending institutions due to the need to optimize the benefits of diversification and at the same time mitigate the potential negative effects of concentration of risk in one industry, sector or borrower. Banks often pool together a large portfolio of loans with lower perceived risk of default in order to achieve the expected return (Heffernan, 2005). Fikru (2009) posits that commercial banks hold diversified loan portfolios in several categories such as real estate loans, agricultural loans, manufacturing loans, trade loans and personal/household loans. Such loans, being the major source of revenue, drive bank performance, though they are also associated with default and other inherent risks, which may result in non-performing loans.

Residential mortgage loans are usually a volatile component of the bank's loan portfolio and have a high potential to impact commercial bank performance (Davis & Zhu, 2009). Loan portfolio is also a major source of risk for financial institutions and can impact their safety and soundness. The composition of a bank's loan portfolio and its impact on performance is normally a debate between concentration and diversification strategies employed by the firm. Traditional banking theory supports loan portfolio diversification as it reduces the risk of bank failure and results in lower financial intermediation costs (Martins et al., 2014). Corporate finance theory however supports concentration strategy as banks can exploit the benefits of enhanced expertise and monitoring knowledge in a single or few sectors (Atahu, 2014). Concentration in residential mortgage loans by commercial banks, enhanced by use of product innovation, had reached a level that could result in undesirable impact on performance in the event of a significant downturn, as happened during the 2008 financial crisis (Igan & Pinheiro, 2010).

Residential mortgage loans have grown rapidly in the loan book of Kenyan commercial banks in recent years, both in value and number of loans, due to the growth in housing demand. Though this offers enormous opportunity for banks who issue mortgages to grow their loan book and improve their performance, the banking sector is at risk of over exposure to this asset. The ratio of mortgage NPLs to gross mortgage loans has been growing and had risen above the industry ratio by 2018, which demonstrates the increasing credit risk associated with the growth in mortgage loans, hence impact on bank performance. The mortgage industry in Kenya is also dominated by the large commercial banks, with 76.1 per cent of the

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loans being originated by 6 banking institutions in 2018, 5 of which were from the large peer group (CBK bank annual supervision report, 2018). This may be indicative of high risk for medium and small banks or barriers to entry (Ngigi et al., 2021; Odhiambo, 2015). The housing gap in Kenya is estimated at about 200,000 units per year (Giti et al., 2020). Expanding the mortgage portfolio of financial institutions can significantly contribute to bridging the housing gap that exist in the country. A World Bank survey conducted by Walley (2011) found potential for growth in the residential mortgage market in Kenya to Ksh 800 billion, which is about 13 times the existing size. Such growth could increase the ratio of mortgage debt to GDP from the existing 2.5 percent to 32.5 percent, which compares favorably to South Africa.

Previous studies have put significant attention on the interaction between banking institutions and the mortgage market prior to and post the 2008 mortgage triggered financial crisis. Allen et al. (1995), Martin et al. (2014) and Gasper (2015) confirm the existence of significant and positive relationship between the mortgage loan portfolio and performance of individual banking institutions. Atahau (2014), Black et al. (2010) and Haas et al. (2010) discuss how individual bank characteristics impact bank performance and concur on the significance of these variables to the composition of bank loan portfolios. Majority of these studies however focus on mature mortgage markets in the US and Europe, and lately Asia, and therefore their results may not directly be applicable in emerging markets in Africa. A number of these studies are also cross country studies based largely on macroeconomic data, with less extant work based on firm level micro-data, and examined variables, time periods and target markets differ greatly.

Most studies have also included only one or two of the individual characteristics of banking institutions, though these factors can contribute significantly to the growth of the mortgage portfolio and impact performance of the bank. There is conflicting outcomes in some of the studies as well. Odhiambo (2015) found that the relationship between real estate finance and the financial performance of banks listed on the Nairobi securities exchange is not significant. Abdulrehman & Nyamute (2018) found a significant relationship between mortgage financing and financial performance of commercial banks in Kenya. Government owned banks were found to generate a lower volume of NPL and are more profitable in Indonesia (Atahau, 2014), contrary to evidence in other markets (Iannotta et al., 2007). There is therefore lack of consensus on the impact of the variables in scope for this study on the performance of banks across a number of countries. A study conducted in an emerging market, where there is tremendous growth potential in mortgage loans, show that mortgage finance models in developed economies may not be wholly

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adoptable in emerging markets, where the linkage to capital markets is still weak and mortgages are largely funded by deposit liabilities, and recommend innovative products suited to the local markets (Akinwunmi, 2009). These contextual variations need verification through an in-depth empirical study on Kenya.

In Kenya, mainstream academic research appears not to have given much consideration to the role of residential mortgage loan portfolio on the performance of banking institutions. Odhiambo (2015) based his study on a narrow sample of nine commercial banks listed on the NSE and concluded that real estate finance has no effect on the financial performance of commercial banks in Kenya. Other studies on banking sector in Kenya have looked at the general determinants of financial performance (Ongore & Kusa, 2013) and financial performance from a credit risk perspective (Ogilo, 2012). This study focuses on residential mortgage portfolio, firm characteristics and their impact on the performance of commercial banks in Kenya in order to fill the research gap which still exist.

This study therefore attempted to resolve the following research question: What is the relationship among residential mortgage portfolio, firm characteristics and performance of commercial banks in Kenya?
To address the above research question, the study tested the following null hypotheses:

H_1: The relationship between residential mortgage portfolio and performance of commercial banks in Kenya is not significant. As residential mortgage portfolio was a non-composite variable, the following sub-hypotheses were tested:

- H_{1a}: The relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significant.
- H_{1b}: The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significant.
- H_{1c}: The relationship between mortgage interest return and performance of commercial banks in Kenya is not significant.

H_2: The relationship between residential mortgage portfolio and performance of commercial banks in Kenya is not significantly moderated by firm characteristics. The following sub-hypotheses were tested:

- H_{2a}: The relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significantly moderated by firm size.

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H_{2b}: The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm size.

H_{2c}: The relationship between mortgage interest return and performance of commercial banks in Kenya is not significantly moderated by firm size.

H_{2d}: The relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significantly moderated by firm lending capacity.

H_{2e}: The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm lending capacity.

H_{2f}: The relationship between mortgage interest return and performance of commercial banks in Kenya is not significantly moderated by firm lending capacity.

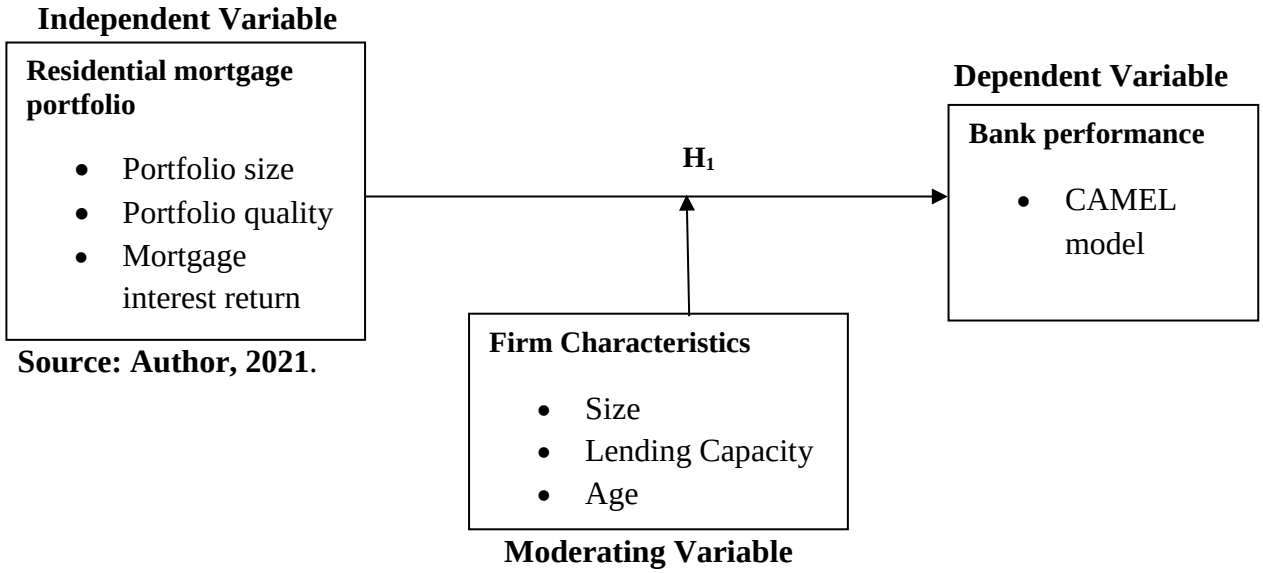
H_{2g}: The relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significantly moderated by firm age.

H_{2h}: The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm age.

H_{2i}: The relationship between mortgage interest return and performance of commercial banks in Kenya is not significantly moderated by firm age.

The hypothetical relationships were as presented in Figure 1.

Figure 1: Conceptual Model.



Source: Author, 2021.

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Methodology

Residential mortgage portfolio was divided into three sub-variables: portfolio size (the ratio of outstanding residential mortgage loans to total loans), portfolio quality (residential mortgage non-performing loans as a ratio of gross residential mortgage loans) and mortgage interest return (residential mortgage net interest margin (NIM)). Residential mortgage portfolio attributes were operationalized as non-composite variables in accordance with studies by Chen (2015), Martins et al. (2014), Misra and Aspal, (2013) and Allen et al. (1995). Firm characteristics was also decomposed into three sub-variables: Size (measured as the natural logarithm of total assets), Age (measured as the natural logarithm of the number of years the bank has been in operation) and lending capacity (the ratio of total loans to core deposits), aligned to previous studies by Chen (2015); Adusei (2011); Black et al. (2010); Sarkisyan et al. (2009) and Carter et al. (1998). Performance measure was based on a composite CAMEL model, consisting of five attributes namely capital adequacy, asset quality, management capacity, earnings and liquidity. The composite CAMEL model measure was adopted from Kabir and Dey (2012) and Ondigo (2016).

This was a census study and the focus population was therefore all the licensed banks and mortgage finance companies which were operating in Kenya during the study period. Choice of banking institutions was guided by the fact that they are the main originators of mortgages in the formal sector. The first survey conducted by CBK, in collaboration with the World Bank, collected baseline data on residential mortgages for the period 2006 to 2010, with CBK annual surveys continuing thereafter. This informed the choice of 2006 to 2018, a period of 13 years, as the study period. The study generated descriptive statistics to provide a bird's eye view of the general data applied in the study and panel data diagnostic tests, which included Hausman test to check for model suitability. Pearson's correlation analysis was done to ascertain the degree of the linear relationship among the variables. Panel regression models was applied to determine the nature and magnitude of the relationships between the study variables and to test the relationships that were hypothesized. The predicting models tested were stated as below:

$$CAM_{it} = \alpha + \beta_1 PS_{it} + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PQ_{it} + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 IR_{it} + \varepsilon_{it}$$

Where:

CAM_{it} = Performance of bank i at time t, measured by CAMEL composite ratio of performance that was measured as a geometric mean of the CAMEL attributes

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α = Intercept or constant
β_1 = regression coefficients
PS =Portfolio size measured by the weight of outstanding residential mortgage loans in bank total loans
PQ = Portfolio quality, represented by the ratio of non-performing residential mortgage loans to gross mortgage loans
IR = Interest return, measured as mortgage net interest margin
ε = The error term that accounts for the unexplained variations

The study applied panel regression models to assess the moderating impact of firm characteristics (size, lending capacity and age) on the relationship between residential mortgage portfolio attributes and firm performance based on the methodology proposed by Baron and Kenny (1986). The models assessed were as follows:

$$CAM_{it} = \alpha + \beta_1 PS_{it} + \beta_2 SIZE_{it} + \beta_3 (PS_{it} * SIZE_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PS_{it} + \beta_2 LC_{it} + \beta_3 (PS_{it} * LC_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PS_{it} + \beta_2 AGE_{it} + \beta_3 (PS_{it} * AGE_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PQ_{it} + \beta_2 SIZE_{it} + \beta_3 (PQ_{it} * SIZE_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PQ_{it} + \beta_2 LC_{it} + \beta_3 (PQ_{it} * LC_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 PQ_{it} + \beta_2 AGE_{it} + \beta_3 (PQ_{it} * AGE_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 IR_{it} + \beta_2 SIZE_{it} + \beta_3 (IR_{it} * SIZE_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 IR_{it} + \beta_2 LC_{it} + \beta_3 (IR_{it} * LC_{it}) + \varepsilon_{it}$$

$$CAM_{it} = \alpha + \beta_1 IR_{it} + \beta_2 AGE_{it} + \beta_3 (IR_{it} * AGE_{it}) + \varepsilon_{it}$$

Where:
$SIZE$ = Firm size as measured by logarithm of total assets
LC = Lending capacity, as measured by the ratio of total loans to core deposits
AGE = Firm age measured by logarithm of years in existence
$\beta_1 - \beta_3$ = regression coefficients
CAM_{it}; α; PS; PQ; IR and ε as defined in objective 1 above

Residential Mortgage Portfolio and Performance

In estimation, the dependent variable was CAMEL whereas the mortgage portfolio dimensions (portfolio size, portfolio quality and portfolio interest return) were used as the independent variables. The model selection statistics were considered and as can be observed (Table 1 below), both random-effects and fixed-effects models were employed in estimating the predicting models. This was based on the Hausman model selection statistics. Model 1 tested sub-hypothesis H_{1a} while model 2 tested sub-hypothesis H_{1b} and model

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3 tested sub-hypothesis H_{1c}. The first two models (model 1 and 2) were estimated via random-effects model (Model 1; Hausman Chi2=1.55, Prob>chi2=0.2129; and model 2; Hausman Chi2=0.80, Prob>chi2=0.3716) whereas the third model was estimated via fixed-effects model (Hausman Chi2=4.45, Prob>chi2=0.0350). From the model fitness statistics, the overall model (model 1) was not significant (since overall p-value of 0.4193 was more than 0.05). On the other hand, the overall model(s) (model 2 and 3) were found to be significant (since overall p-values of 0.0000 and 0.0207 respectively were less than 0.05). This meant that the data fitted these models well. The overall R-squared for the three models (model 1; R2=0.0051, model 2; R2=0.0981 and model 3, R2=0.0039) were all small values, however, this is expected mostly in panel data regression (Orayo & Mose, 2016). The findings are as shown in Table 1.

Table 1: Panel Regression Analysis between Residential Mortgage Portfolio and Performance of Commercial Banks

Robust Models	**Model 1- (PS & CAMEL)**		**Model 2- (PQ & CAMEL)**		**Model 3- (IR & CAMEL)**	
Variable	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**
Portfolio Size (PS)	0.2886 (0.81)	0.419	-	-	-	-
Portfolio Quality (PQ)	-	-	1.5856 (4.71)	0.000	-	-
Interest Return (IR)	-	-	-	-	0.0556 (2.41)	0.021
Constant	-1.8354 (-40.35)	0.000	-1.8814 (-46.96)	0.000	-2.067 (-24.05)	0.000
Model selection statistics	Hausman Chi2=1.55 Prob>chi2=0.2129		Hausman Chi2=0.80 Prob>chi2=0.3716		Hausman Chi2=4.45 Prob>chi2=0.0350	
Model Fitness statistics	Random-effects GLS regression Number of obs = 369 R-squared: 0.0051 Wald chi2(1) = 0.65 Prob>chi2= 0.4193		Random-effects GLS regression Number of obs = 367 R-squared: 0.0981 Wald chi2(1) = 22.14 Prob>chi2= 0.0000		Fixed-effects (within) regression Number of obs = 344 R-squared: 0.0039 F (1,38) = 5.83 Prob > F= 0.0207	

t-statistic – Values in parenthesis

In testing the first sub-hypothesis, the study assessed the relationship between mortgage portfolio size and performance. As presented in Table 1 above, in the first model (Model 1), the findings show that the positive relationship between mortgage portfolio size and performance of commercial banks is not statistically significant (β= 0.2886, p>0.05). The following is the resulting estimated model:

$$CAM_{it} = -1.8354 + 0.2886PS_{it}$$

The result infers that a unit increase in mortgage portfolio size leads to a non-significant increase in

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performance by 28.9 percent, holding other factors constant. Based on the finding, the study failed to reject the first sub-hypothesis (H_{1a}) which stated that *the relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significant.*

To assess the second sub-hypothesis, the study examined the relationship between portfolio quality and performance of commercial banks in Kenya. In the second model (Model 2), the findings show that the positive relationship between mortgage portfolio quality and performance of commercial banks is statistically significant (β= 1.5856, $p<0.05$). The following is the resulting estimated model;

$$CAM_{it} = \text{-}1.8814 + 1.5856\text{PQ}it$$

The finding implies that a unit rise in mortgage portfolio quality leads to a significant increase in performance by 158.5 per cent holding other factors constant. Based on the finding, the study rejected the second sub-hypothesis (H_{1b}), which stated that *the relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significant.*

Further, to assess the third sub-hypothesis, the study analyzed the relationship between mortgage interest return and performance of commercial banks in Kenya. In the third model (Model 3) the findings show that the positive relationship between mortgage portfolio interest return and performance of commercial banks is statistically significant (β= 0.0556, $p<0.05$). The following is the resulting estimated model:

$$CAM_{it} = \text{-}2.0666 + 0.0556IRit$$

The finding implies that a percentage rise in mortgage portfolio interest return leads to a significant increase in performance by 5.6 percent, holding other factors constant. Based on the finding, the study rejected the third sub-hypothesis (H_{1c}) which stated that *the relationship between mortgage portfolio interest return and performance of commercial banks in Kenya is not significant.*

Residential Mortgage Portfolio, Firm Characteristics and Performance

To test for the moderating effect, a hierarchical three step linear regression analysis was conducted as suggested by Baron and Kenny (1986). Step one tested the effect of residential mortgage portfolio attributes on the dependent variable (CAMEL score); step two tested the effect of residential mortgage portfolio components and firm characteristics variables on the dependent variable (CAMEL score); and in step three, the interaction terms were introduced in the equation and its impact evaluated while controlling for the effect of residential mortgage portfolio and firm characteristics. The interaction term was computed as the product of the standardized scores of residential mortgage portfolio and firm characteristics. This involved

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transformation by standardizing the interaction terms through centering approach thereby creating one interaction variable (residential mortgage portfolio attribute * firm characteristic components). The centering of mean was important as it minimized the possibility of multicollinearity problems in the panel data.

In order to counteract the multicollinearity problem, the continuous variables were standardized or instead converted into z-scores with the mean of zero and the standard deviation of one (1). The standardized variables for mortgage portfolio size (PS), mortgage portfolio quality (PQ) and mortgage interest return (IR), and the firm characteristics (SIZE, AGE, LC) generated new multiplicative variables. This generated the interaction terms mortgage portfolio size (PS), mortgage portfolio quality (PQ) and mortgage interest return (IR) as: PS*SIZE, PQ*SIZE, IR*SIZE, PS*AGE, PQ*AGE, IR*AGE, PS*LC, PQ*LC and IR*LC. This represents interaction between residential mortgage portfolio attributes and firm characteristics components.

Residential Mortgage Portfolio Size, Firm characteristics and Performance

The study examined the moderation effect of firm size, lending capacity and age on the relationship between mortgage portfolio size and performance of commercial banks in Kenya. The study assessed the first, fourth and seventh sub-hypotheses (H_{2a}, H_{2d}, *and* H_{2g}) under mortgage portfolio size.

From the results, the Hausman model selection statistics were considered from where both random-effects and fixed-effects models were utilized in estimating the predicting models. The three models (model 1, 3, and 6) were estimated via random-effects regression ($p>0.05$) whereas the 2nd, 4th, 5th and 7th models were estimated via fixed-effects regression ($p<0.05$). The findings are as presented in Table 2.1.1 below.

Table 2.1.1 below indicate that overall, some models were statistically significant since the respective p-values (model 2, 4, 5 and 7) were less than 0.05 despite the explanatory powers being low. Step one tested the significance of the relationship between residential mortgage portfolio size and the dependent variable (CAMEL), which was not confirmed. This is because the p-value ($p=0.419$) was more than 0.05 level. Based on the Baron and Kenny (1986) approach for moderation, there is no essence of further testing since the causal effect of the predictor variable was not established. The study therefore concluded that the *relationship between mortgage portfolio size and performance of commercial banks in Kenya is not*

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significantly moderated by firm size; the relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significantly moderated by firm lending capacity and lastly the relationship between mortgage portfolio size and performance of commercial banks in Kenya is not significantly moderated by firm age. The study therefore failed to reject sub-hypotheses: H_{2a}, H_{2d} and H_{2g}.

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Table 2.1.1: Panel Regression Analysis between Mortgage Portfolio size, Firm Characteristic Components and Performance

	Step 1		Step 2						Step 3					
Variables	**Model 1 – (PS & CAMEL)**		**Model 2 – (PS, FS & CAMEL)**		**Model 3 – (PS, LC & CAMEL)**		**Model 4 – (PS, AGE & CAMEL)**		**Model 5- (PS, FS, PS*FS & CAMEL**		**Model 6- (PS, LC, PS*LC & CAMEL)**		**Model 7- (PS, AGE, PS*AGE & CAMEL)**	
CAMEL	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**
Portfolio Size (PS)	0.2887 (0.81)	0.419	0.2624 (0.34)	0.732	0.2301 (0.68)	0.494	0.0736 (0.10)	0.918	0.8333 (0.57)	0.571	0.4732 (0.32)	0.751	-0.1663 (-0.07)	0.945
Firm Size (FS)	-	-	0.1523 (2.66)	0.012	-	-	-	-	0.1579 (2.31)	0.026	-	-	-	-
Lending Capacity (LC)	-	-	-	-	0.0544 (0.69)	0.492	-	-	-	-	0.0769 (0.50)	0.617	-	-
Age	-	-	-	-	-	-	0.02 (1.11)	0.267	-	-	-	-	0.4415 (3.74)	0.001
PS*FS	-	-	-	-	-	-	-	-	-0.0589 (-0.35)	0.730	-	-	-	-
PS*LC	-	-	-	-	-	-	-	-	-	-	-0.2255 (-0.19)	0.852	-	-
PS*AGE	-	-	-	-	-	-	-	-	-	-	-	-	0.0786 (0.10)	0.924
Constant	-1.8354 (-40.35)	0.000	-3.4478 (-5.79)	0.000	-1.8776 (-23.17)	0.000	0.90 (64.65)	0.000	-3.5020 (-5.05)	0.000	-1.8984 (-12.14)	0.000	-3.2602 (-9.18)	0.000
Model selection statistics	Hausman Chi2=1.55 Prob>chi2=0.2129		Hausman Chi2=32.40 Prob>chi2=0.0000		Hausman Chi2=2.53 Prob>chi2=0.2823		Hausman Chi (2)=25.6 Prob>chi2=0.0000		Hausman Chi2=32.82 Prob>chi2=0.0000		Hausman Chi2=3.92 Prob>chi2=0.2698		Hausman Chi2=24.4 Prob>chi2=0.0000	
Model Fitness statistics	Random-effects GLS regression Number of obs = 369 R-squared:0.0051 Wald chi2(1)= 0.65 Prob>chi2= 0.4193		Fixed-effects (within) regression Number of obs = 365 R-squared:0.0003 F(2,38) = 3.70 Prob > F= 0.0340		Random-effects GLS regression Number of obs=369 R-squared:0.0091 Wald chi2(2)= 1.28 Prob>chi2= 0.5261		Fixed-effects (within) regression Number of obs = 362 R-squared: 0.0158 F(2,39) = 10.11 Prob > F= 0.0003		Fixed-effects (within) regression Number of obs = 365 R-squared: 0.0003 F(3,38) = 3.04 Prob > F= 0.0404		Random-effects GLS regression Number of obs = 369 R-squared: 0.0094 Wald chi2(3)= 1.39 Prob>chi2= 0.7074		Fixed-effects (within) regression Number of obs = 362 R-squared: 0.0157 within = 0.1233 F(3,39) = 6.88 Prob > F= 0.0008	

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Residential Mortgage Portfolio Quality, Firm Characteristics and Performance

The study also examined the moderation effect of firm size, lending capacity and firm age on the relationship between mortgage portfolio quality and performance of commercial banks in Kenya. The study assessed the second, fifth and eighth null sub-hypotheses (*H2b, H2e, and H2h*) under mortgage portfolio quality.

As indicated in the findings, the Hausman model selection statistics were considered from where both random-effects and fixed-effects models were used in the regression of the predicting models. The three models (model 1, 3, and 6) were estimated via random-effects regressions ($p>0.05$) whereas the 2nd, 4th, 5th and 7th models were estimated via fixed-effects regressions ($p<0.05$). Overall, all models were statistically significant since the respective p-values were less than 0.05 despite their explanatory powers being low.

In the first step, the study tested the significance of the relationship between residential mortgage portfolio quality and the dependent variable (CAMEL) and the relationship was confirmed as positive and significant. This is because the p-value ($\beta=1.5856$, $R2=0.0981$, $p=0.000$) was less than 0.05. The study thus proceeded to step two from where the relationship between residential mortgage portfolio quality and firm characteristic attributes were tested on performance before inclusion of the interaction term.

From the findings, the percentage of variance in performance of 4.45% in model 2 ($R2=0.0445$, $F=30.76$ and $p<0.05$); 9.85% in model 3 ($R2=0.0981$, Wald chi2 (2) $=22.93$, and $p<0.05$) and 5.33% in model 4 ($R2=0.0533$, $F=20.26$, and $p<0.05$) was accounted for by residential mortgage portfolio quality and firm characteristics. Overall, the model revealed a statistically significant relationship between performance of commercial banks (dependent variable), moderating variables (firm size, lending capacity and firm age) and residential mortgage portfolio (independent variable).

In the third and last step, the study introduced the interaction terms to the equations while controlling for the variables of residential mortgage portfolio quality and firm characteristics. Despite the fact that the overall significance was confirmed (see models 5, 6, 7), at individual level, all interaction terms were reported to have non-significant coefficients: mortgage portfolio quality and firm size ($p=0.621$); residential mortgage portfolio quality versus lending capacity ($p=0.642$) and residential mortgage portfolio quality and

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firm age (p=0.401).

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Table 2.1.2: Panel Regression Analysis between Mortgage Portfolio Quality, Firm Characteristic Components and Performance

	Step 1		Step 2						Step 3					
Variables	**Model 1 – (PQ & CAMEL)**		**Model 2 – (PQ, FS & CAMEL)**		**Model 3 – (PQ, LC & CAMEL)**		**Model 4 – (PQ, AGE & CAMEL)**		**Model 5-(PQ, FS, PQ*FS & CAMEL)**		**Model 6- (PQ, LC, PQ*LC & CAMEL)**		**Model 7- (PQ, AGE, PQ*AGE & CAMEL**	
CAMEL	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**
Portfolio Quality (PQ)	1.5856 (4.71)	0.000	1.4097 (5.80)	0.000	1.5607 (4.76)	0.000	1.3181 (3.70)	0.001	-0.0169 (-0.01)	0.996	1.9819 (2.09)	0.037	-0.9831 (-0.35)	0.730
Firm Size (FS)	-	-	0.0865 (2.79)	0.006	-	-	-	-	0.0782 (1.29)	0.206	-	-	-	-
Lending Capacity (LC)	-	-	-	-	0.0221 (0.31)	0.760	-	-	-	-	0.0867 (0.47)	0.641	-	-
Age	-	-	-	-	-	-	0.3124 (3.68)	0.001	-	-	-	-	0.3215 (3.65)	0.001
PQ*FS	-	-	-	-	-	-	-	-	0.1409 (0.50)	0.621	-	-	-	-
PQ*LC	-	-	-	-	-	-	-	-	-	-	-0.4276 (-0.47)	0.642	-	-
PQ*AGE	-	-	-	-	-	-	-	-	-	-	-	-	0.7636 (0.85)	0.401
Constant	-1.8814 (-46.96)	0.000	-2.8025 (-8.75)	0.000	-1.9003 (-23.74)	0.000	-2.8986 (-10.83)	0.000	-2.7184 (-4.34)	0.000	-1.9543 (-11.62)	0.000	-2.9342 (-10.54)	0.000
Model selection statistics	Hausman Chi2=0.80 Prob>chi2=0.3716		Hausman Chi2=16.89 Prob>chi2=0.0.0002		Hausman Chi2=2.09 Prob>chi2=0.3517		Hausman Chi2=11.36 Prob>chi2=0.0034		Hausman Chi2=15.25 Prob>chi2=0.0016		Hausman Chi2=5.97 Prob>chi2=0.1132		Hausman Chi2=13.37 Prob>chi2=0.0039	
Model Fitness statistics	Random-effects GLS regression Number of obs = 367 R-squared: 0.0981 Wald chi2(1) = 22.14 Prob>chi2= 0.0000		Fixed-effects (within) regression Number of obs =363 R-squared: 0.0445 F(2,322) = 30.76 Prob > F= 0.0000		Random-effects GLS regression Number of obs=367 R-squared: 0.0985 Wald chi2(2)= 22.93 Prob>chi2= 0.0000		Fixed-effects (within) regression Number of obs = 360 R-squared: 0.0533 F(2,39) = 20.26 Prob > F= 0.0000		Fixed-effects (within) regression Number of obs = 363 R-squared: 0.0484 F(3,38) = 10.03 Prob > F= 0.0001		Random-effects GLS regression Number of obs = 367 R-squared: 0.0979 Wald chi2(3)= 19.02 Prob>chi2= 0.0003		Fixed-effects (within) regression Number of obs = 360 R-squared: 0.0486 F(3,39) = 13.04 Prob > F= 0.0000	

t-statistic – Values in parenthesis

Source: Research Findings 2021

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Based on these results, the study concluded that residential mortgage portfolio quality had no statistical significant effect across the seven models. This includes the respective interactions. In other words, the null hypothesis that there was no significant influence of firm characteristics on the relationship between residential mortgage portfolio quality and performance of commercial banks in Kenya is not rejected.

From the above analysis, the study failed to reject the following null sub-hypothesis: H_{2b}: *The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm size*, H_{2e}: *The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm lending capacity*, and H_{2h}: *The relationship between mortgage portfolio quality and performance of commercial banks in Kenya is not significantly moderated by firm age*.

Residential Mortgage Interest Return, Firm Characteristics and Performance

The study further examined the moderation effect of firm size, lending capacity and firm age on the relationship between mortgage portfolio interest return and performance of commercial banks in Kenya. The study assessed the third, sixth and ninth null sub-hypotheses (H_{2c}, H_{2f}, *and* H_{2i}) under mortgage portfolio interest return.

The Hausman model selection statistics were considered from where both random-effects and fixed-effects models were used in the regression of the predicting models. Almost all models (model 1, 2, 4, 5, 6 and 7) were estimated via fixed-effects regression ($p<0.05$) whereas only the third model was estimated via random-effects regressions ($p>0.05$). The findings are as presented in Table 2.1.3. The findings show that, overall, almost all models were statistically significant (model 1, 2, 4, 5 and 7) since the respective p-values were less than 0.05 despite their explanatory powers being low.

In the first step, the study tested the significance of the relationship between residential mortgage portfolio interest return and the dependent variable (CAMEL). The relationship was confirmed as positive and significant ($\beta=0.0556$, $R2=0.0039$, $p=0.021$). The study thus proceeded to step two from where the relationship between residential mortgage portfolio quality and firm characteristics were tested on performance before inclusion of the interaction terms.

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From the findings, the percentage of variance in performance of 0.02% in model 2 (R2=0.0002, F=9.14 and p<0.05); 0.92% in model 3 (R2=0.0092, Wald chi2 (2) =4.5, and p>0.05), and 1.92% in model 4 (R2=0.0192, F=9.14, and p<0.05) was accounted for by residential mortgage portfolio interest return and firm characteristics (FS, LC and AGE). The models revealed a statistically significant relationship between performance of commercial banks (dependent variable), moderating variables (firm size, lending capacity and firm age) and residential mortgage portfolio IR (independent variable) except in the third model which was not significant.

In the third and last step; the study introduced the interaction terms to the predicting model equations and the corresponding impact evaluated while controlling for the variables of residential mortgage portfolio interest return and firm characteristics. As can be observed in the subsequent models, the percentage of variance of performance, that is 0.11% in model 5 (R2=0.0011, F=6.65 and p<0.05); 1.08% in model 6 (R2=0.0108, F=2.09, and p>0.05), and 1.53% in model 7 (R2=0.0153, F=6.29 and p<0.05) was accounted for by residential mortgage portfolio interest return and firm characteristics (FS, LC and AGE). Except for lending capacity (see model 6), the rest of the models revealed a statistically significant overall relationship between performance of commercial banks (dependent variable), residential mortgage interest return (independent variable), moderating variables (firm size and firm age) and interaction terms (IR*FS and IR*AGE).

Despite significance illustrated via F and Wald chi tests (see models 5 and 7), at individual level, the interaction in model 6, IR*LC (β=-0.0871, p=0.329) was reported to have a non-significant effect on performance. Based on these results, the study concluded that interaction terms in models 5 and 6 had no statistical significant effect. In other words, the null hypothesis that there was no significant moderating influence of firm characteristics (firm size and lending capacity) on the relationship between residential mortgage portfolio interest return and performance of commercial banks in Kenya is not rejected. The study therefore concluded that the interaction terms for models 5 and 6 were not statistically significant indicating that firm characteristics (firm size and lending capacity) had no moderating effect on the relationship between residential mortgage portfolio interest return and performance of the commercial banks in Kenya. On the other hand, the interaction terms for model 7, IR*AGE (β=0.0503, p=0.026) was statistically significant, indicating that firm characteristics (firm age) had a moderating effect on the relationship between residential mortgage portfolio interest return and performance of the commercial

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banks in Kenya.

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Table 2.1.2: Panel Regression Analysis between Mortgage Interest Return, Firm Characteristic Components and Performance

	Step 1		Step 2						Step 3					
Variables	**Model 1 – (IR & CAMEL)**		**Model 2 – (IR, FS & CAMEL)**		**Model 3 – (IR, LC & CAMEL)**		**Model 4 –(IR, AGE & CAMEL)**		**Model 5-(IR, FS, IR*FS & CAMEL)**		**Model 6-(IR, LC, IR*LC & CAMEL)**		**Model 7- (IR, AGE, IR*AGE & CAMEL)**	
CAMEL	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**	**β**	**P-Value**
Interest Return (IR)	.0556 (2.41)	0.021	-0.0117 (-0.70)	0.486	0.0307 (2.04)	0.041	0.0171 (0.69)	0.494	-0.1270 (-1.01)	0.320	0.1182 (1.46)	0.152	-0.1334 (-2.09)	0.043
Firm size (FS)	-	-	0.1993 (4.27)	0.000	-	-	-	-	0.1511 (2.03)	0.050	-	-	-	-
Lending capacity (LC)	-	-	-	-	0.0588 (0.70)	0.483	-	-	-	-	0.4114 (1.07)	0.290	-	-
AGE	-	-	-	-	-	-	0.3529 (4.18)	0.000	-	-	-	-	0.1915 (1.76)	0.087
IR*FS	-	-	-	-	-	-	-	-	0.0115 (0.91)	0.368	-	-	-	-
IR*LC	-	-	-	-	-	-	-	-	-	-	-0.0871 (-0.99)	0.329	-	-
IR*AGE	-	-	-	-	-	-	-	-	-	-	-	-	0.0503 (2.32)	0.026
Constants	-2.0666 (-24.05)	0.000	-3.9038 (-8.12)	0.000	-1.9940 (-18.02)	0.000	-3.0471 (-10.87)	0.000	-3.4455 (-4.71)	0.000	-2.3607 (-7.07)	0.000	-2.5997 (-8.32)	0.000
Model selection statistics	Hausman Chi2=4.45 Prob>chi2=0.0350		Hausman Chi2=49.96 Prob>chi2=0.0000		Hausman Chi2=4.84 Prob>chi2=0.0888		Hausman Chi2=16.57 Prob>chi2=0.0003		Hausman Chi2=51.77 Prob>chi2=0.0000		Hausman Chi2=8.26 Prob>chi2=0.0409		Hausman Chi2=24.66 Prob>chi2=0.0000	
Model Fitness statistics	Fixed-effects (within) regression Number of obs = 344 R-squared: 0.0039 F(1,38) = 5.83 Prob > F= 0.0207		Fixed-effects (within) regression Number of obs = 341 R-squared: 0.0002 F(2,37) = 9.14 Prob > F= 0.0006		Random-effects GLS regression Number of obs=344 R-squared: 0.0092 Wald chi2(2)= 4.50 Prob>chi2= 0.1056		Fixed-effects (within) regression Number of obs = 339 R-squared: 0.0192 F(2,38) = 9.14 Prob > F= 0.0006		Fixed-effects (within) regression Number of obs = 341 R-squared: 0.0011 F(3,37) = 6.65 Prob > F= 0.0011		Fixed-effects (within) regression Number of obs =344 R-squared: 0.0108 F(3,38) = 2.09 Prob > F= 0.1183		Fixed-effects (within) regression Number of obs = 339 R-squared: 0.0153 F(3,38) = 6.29 Prob > F= 0.0014	

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Based on the findings, the study concluded that the third and sixth null sub-hypotheses (H_{2c}, *and* H_{2f}) under mortgage portfolio interest return; stating stated that; (H_{2c}) *the relationship between mortgage interest return and performance of commercial banks in Kenya is not significantly moderated by firm size, as well as, (H_{2f}): The relationship between mortgage interest return and performance ofcommercial banks in Kenya is not significantly moderated by firm lendingcapacity* are not rejected. However, the ninth sub null sub-hypothesis (H_{2i}) stating that *the relationship between mortgage interest return and performance of commercial banks in Kenya is not significantly moderated by firm age* was rejected.

Findings and Discussion

The first specific objective of the study was to establish the relationship between residential mortgage portfolio and performance of commercial banks in Kenya. Residential mortgage portfolio affected the performance of banks through mortgage portfolio size, mortgage portfolio quality and mortgage interest return. The study hypothesized that the relationship between residential mortgage portfolio attributes and performance is not significant. Detailed results are presented in Table 1. The findings showed that mortgage portfolio size has a positive and statistically insignificant relationship with bank performance whereas mortgage portfolio quality and interest return both have a positive and statistically significant relationship with performance. This suggests that portfolio size has no impact on the performance of commercial banks in Kenya, whereas improvement in mortgage portfolio quality and mortgage interest return generates a positive and significant impact on bank performance.

On portfolio size, the finding is consistent with a previous research by Odhiambo (2015) who looked at the impact of property on the performance of commercial banks listed on the NSE and concluded that there was no significant impact. The finding however contradicts a study by Abdulrehman & Nyamute (2018) who looked at the effect of mortgage financing on the financial performance of commercial banks in Kenya and

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established a significant relationship. Studies by Martins et al. (2016) and Allen et al. (1995) established a significant relationship between bank performance and mortgage portfolio size for banks that hold a sizeable portfolio of mortgage loans. In this study, the descriptive statistics established that commercial banks in Kenya hold an average of 9% of their total loans in the form of residential mortgages, which is relatively low compared to more developed markets and may explain the insignificant relationship between mortgage portfolio size and bank performance.

The finding on mortgage portfolio quality implies that improvements in portfolio quality results in better performance for banks. A higher portfolio quality is synonymous with good credit standards and, therefore, higher profitability. Igan and Pinheiro (2010) found a strong link between portfolio quality and performance of banks in a study of the determinants of delinquency on real estate loans and potential impact on banks' performance in the USA. Another possible explanation for the significant effect of mortgage portfolio quality on bank performance is found in Onchomba et al. (2018) who linked this to the risk and its impact on bank income. Accordingly, they state that loan portfolio quality represents the loan portfolio at risk of non-payment by clients and this affects bank income. An increase in loan portfolio quality will lead to an increase in income due to reduced mortgage losses. This has the effect of improving the performance of commercial banks. Hence, the study concluded that higher mortgage portfolio quality may serve to create a circle of positive performance for the banks in the short-run as well as the long-run.

The finding on mortgage interest return is consistent with Misra and Aspal (2013), Memmel (2014) and Abdulrehman & Nyamute (2018) who found a positive and significant relationship between interest income and bank performance. The positive impact of mortgage interest rates on performance suggests that banks in Kenya have mortgage net interest income that is positive.

The second specific objective of the study was to determine the effect of firm

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characteristics on the relationship between residential mortgage portfolio and performance of commercial banks in Kenya. The study hypothesized that the relationship between residential mortgage portfolio attributes and performance is not significantly moderated by firm characteristics. Baron and Kenny (1986) approach was applied to test the effect of moderation.

The findings show that bank age has a positive and statistically significant moderating effect on the relationship between mortgage interest return and bank performance. The result is consistent with previous studies by Adusei (2011) who found that profitability improved as a bank increases in years of operation as they have a deeper knowledge of their customer base, and also by Carter et al. (1998) who concluded that older firms have longer operating histories and face less uncertainty in their performance. The finding also established that lending capacity had a statistically non-significant moderating effect on the relationship between mortgage portfolio variables and bank performance. This finding contradicts previous studies by Black et al. (2010) who concluded that traditional banks, are largely funded by retail deposits and benefit from positive net interest return as cost of funds is mostly lower than borrowing rates, and Afrifa et al. (2019) who found that lending capacity results in better performance by banks. Chen (2015) also posits that many banks in emerging markets fund a significant percentage of their mortgage loans using customer deposits due to lack of securitization. A bank's lending capacity, driven by available deposits, can therefore drive the expansion of its mortgage loan portfolio and performance through higher interest returns.

Bank size did not have a statistically significant moderating effect on the relationship between mortgage portfolio variables and bank performance. Theoretically, increased size is presumed to confer benefits which can enhance profitability and lending capacity of banks thereby allowing them to offer more mortgages (Santos & Winton, 2019). The result contradicts previous studies by Haas et al. (2010) who found that bank demographics such as size is an important driver of bank loan portfolio composition and performance, and also

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by Nyabaga and Matanda (2020) who found firm size to be linked to increase in bank's loan portfolio size and profitability.

Conclusions and Recommendations

Based on the first null hypothesis (H_1) test, the study concluded that residential mortgage portfolio significantly affects performance of banks licensed and operating in Kenya. This implies that commercial banks that increase their residential mortgage portfolio are more likely to have better performance. Results of the study also confirmed that, of the components of residential mortgage portfolio, mortgage portfolio quality have the highest contribution to performance of commercial banks followed by mortgage interest return.

Portfolio size have no contribution to bank performance. This finding provides evidence that interest income with respect to the banks' residential mortgage portfolio hold a positive contribution to improving performance of banks. The effect on bank performance is strongest through mortgage portfolio quality, perhaps in part because the non-performing mortgage loans level is observed at an average of 5.4%, with significant increase noted in the latter period of the study. The finding therefore suggests that for improvement in performance of commercial banks to occur, the mortgage portfolio contributions through portfolio quality and interest return should be ensured through sound credit management practices.

On the second null hypothesis (H_2), the study concluded that firm size as bank characteristic does not moderate the relationship between bank performance on the one hand and mortgage portfolio size, mortgage portfolio quality and mortgage interest returns on the other hand. It can therefore be deduced that firm size does not have any influence on the association between performance and the residential mortgage portfolio attributes. Similarly, lending capacity was confirmed not to intervene the relationship between mortgage portfolio attributes and performance of commercial banks. In other words, the ability of the bank to originate more loans has no relationship between residential mortgage

portfolio and performance. Firm age however moderates the relationship between mortgage interest return and bank performance though it does not moderate the relationship between bank performance and both mortgage portfolio size and portfolio quality. This implies that older banks can improve their performance through better management of their interest regime.

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