Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.17, No.7, 2026

Moderating Role of Strategic Interaction on the Relationship Between Macroeconomic Factors and Bank Lending Behaviour: Evidence From NSE-Listed Commercial Banks in Kenya

Amon Kipruto Tenai (Corresponding Author)
School of Business, University of Eastern Africa Baraton, Kenya.
P.O. BOX 2500-30100, Eldoret.
tenaiamon@gmail.com

Prof.Moses Kibirango
School of Postgraduate Studies, Adventist University of Africa.
P.O. BOX Private Bag Mbagathi, 00503 Nairobi, Kenya.
kibirangom@aua.ac.ke

Dr.Jackson Ongeta
School of Business, University of Eastern Africa Baraton, Kenya.
P.O. BOX 2500-30100, Eldoret.
ongetaj@ueab.ac.ke

Abstract
The study examined the moderating effect of strategic interaction on the relationship between selected macroeconomic factors and bank lending behaviour among commercial banks listed at the Nairobi Securities Exchange (NSE) in Kenya. It addresses a gap in the existing literature, which has focused mainly on the direct effects of macroeconomic factors on bank lending while paying little attention to the role of competitive strategic responses in shaping lending behaviour. A quantitative longitudinal panel design was employed for analyzing the secondary data of 11 NSE-listed commercial banks for the period of 2010–2025, resulting in 176 bank-year observations. The behaviour of bank lending was measured through credit growth and the explanatory variables were interest rate, exchange rate, inflation and GDP growth. Strategic interaction was measured by market share and interbank lending ratio. The data were analyzed using the pooled mean group autoregressive distributed lag (PMG-ARDL) estimator, and the Hausman test confirmed the PMG specification. The results indicated that strategic interaction significantly moderated all four macroeconomic relationships with bank lending behaviour in Kenya. The interaction effects were positive for GDP growth (β=0.7421, p=0.025) and the exchange rate (β=0.9533, p=0.023) but negative for interest rate (β=−0.5142, p=0.012) and inflation (β=−0.2714, p=0.014). These findings confirm that strategic interaction is relevant for the effect of macroeconomic conditions on the lending behaviour of commercial banks. Thus, monetary and macroprudential authorities should consider competitive dynamics in credit-transmission analysis. Therefore, banks should manage competitive lending with prudent risk management.
Keywords: bank lending behaviour; strategic interaction; macroeconomic factors; credit growth; PMG-ARDL
DOI: 10.7176/JESD/17-7-01
Publication date: October 30th 2026

1. INTRODUCTION

Commercial banks are important financial intermediaries that channel savings into credit to households, firms and other economic agents. The amount and timing of bank credit affects investment, consumption, business expansion, and economic activity. Thus, determinants of bank lending are important for monetary policy, financial stability and sustainable economic development. The bank lending channel of monetary transmission emphasizes the ability and willingness of banks to lend, which may differ under different monetary and macroeconomic conditions (Bernanke & Blinder, 1988). The channel can be particularly relevant in developing economies where firms and households are likely to have fewer alternatives to bank financing.

Kenya provides an important context to explore the relationship between macroeconomic variables and bank lending behaviour. This is because banking sector comprises institutions with varying size, market position, liquidity, risk appetite and competitive strategy, but the sector operates in a common regulatory environment. Kenyan banks have had to cope with volatile interest rates, inflation pressures, exchange rate fluctuations, changes in economic growth, regulatory interventions and rapid technological change between 2014 and 2024 (Central Bank of Kenya, 2024). For example, the Banking (Amendment) Act 2016 altered the lending environment, while some policy changes and financial innovation in the following years affected the competitive

structure of the sector (Republic of Kenya, 2016). These findings indicate that the bank's response to a macroeconomic shock depends not only on the shock itself, but also on the bank's perception of and reaction to other rival institutions.

Strategic interaction occurs when the payoff to a firm's action depends in part on the actions of other firms. In banking, institutions may respond to competitors by adjusting lending volumes, pricing, liquidity management, market positioning and risk-taking. Hence, strategic responses can be used to amplify or attenuate the transmission of macroeconomic conditions to credit markets. Bulow, Geanakoplos and Klemperer (1985) distinguish between strategic complements (firms move in the same direction in response to rivals) and strategic substitutes (firms move in opposite directions). This view, when applied to bank lending, suggests that an economic expansion may be associated with a more vigorous credit expansion when banks compete vigorously for customers while monetary tightening may be associated with a more pronounced contraction when competitive pressures lead banks to protect margins and asset quality.

Much literature has considered macroeconomic determinants of bank lending, but the strategic mechanism is less developed, particularly when considering African emerging markets. The evidence from the developing economies suggests that a monetary contraction can reduce loan applications and credit supply, with the magnitude of the response depending on the bank characteristics and market conditions (Abuka et al., 2019). The literature on bank competition, likewise, shows that the competitive structure influences risk-taking, efficiency and credit allocation. However, a bulk of the Kenyan literature has taken into account macroeconomic variables either singly or in combination with bank-specific factors without explicitly testing whether strategic interaction changes the strength of macroeconomic transmission.

The present study, therefore, seeks to investigate the moderating effect of strategic interaction on the relationship between GDP growth, interest rates, exchange rates, inflation and bank lending behaviour among NSE-listed commercial banks in Kenya. The study contributes in three ways. First, it moves the analysis away from a framework of purely direct effects to one of conditional relationships, where the macro effect depends on competitive behaviour. Second, it contributes evidence on an emerging market banking system in which bank financing is particularly important. Third, it uses a dynamic panel framework to separate long-run equilibrium relationships from short-run adjustment processes.

2. LITERATURE REVIEW

Recent empirical work has focused on the complex interaction between macroeconomic factors, bank lending behaviour and the moderating role of strategic interaction. Huong (2021) investigated the impact of macroeconomic factors on the behaviour of bank lending, with emphasis on the moderating effect of strategic interaction among Vietnamese commercial banks during the period 2008-2018. The research revealed that macroeconomic and monetary policy shocks on bank lending behaviour were less pronounced in a setting where competitive pressures are lessened. Furthermore, strategic interdependence, such as competitive pressure and expectations of competitors' behaviour, plays an important role in moderating the banks' response to macroeconomic changes. This stresses importance of considering these interactions in the analysis of bank lending behaviour. This implies that strategic interactions, e.g. competition, are important in determining banks' responses to macroeconomic changes, and thus should be taken into account when analysing bank lending responses (Bulow et al., 1985).

In a study by Nguyen et al. (2022) the effect of macroeconomic variables on bank lending behaviour was examined under strategic interactions between banks. Less competitive and aggressive environments were found to have a muted impact of macroeconomic and monetary policy shocks on bank lending. This implies that the strategic interactions among banks, such as competitive behaviour and market structure, are important in explaining the lending responses to economic changes.

The theory of Efficiency Structure (ES) is used to explain the strategic interaction and the role of efficiency in changes of market structure (Demsetz, 1973). It argues that the efficiency of the firm lead to growth which guides the behaviour of the firm in interaction with the rivals. The asymmetric behaviour of efficiency in strategic interaction in different regimes of growth i.e., small tier versus large-tier banks, shows the moderating role of growth in the link between bank lending behaviour and strategic interaction. This is in line with the argument that efficient firms win the competition and grow (Homma et al., 2014). This way the investigation extends the ES theory, highlighting the significance of bank lending exposed by strategic interaction.

The study contributes to the literature in three ways. First, it generalizes the ES test introduced by Homma et al. (2014) to the Kenyan banking industry and takes into account the efficiency-growth-market structure nexus in terms of strategic interaction among banks. The research is designed to establish causality from bank efficiency to strategic interaction in practice with empirical data. Second, the paper clarifies strategic interaction in a setting where the government sets and regulates the number of banks. The response to competitors' actions is an intriguing weapon that influences market structure. Thirdly, the paper analyses the asymmetric effects of efficiency on strategic interaction in two bank development regimes: low growth and rapid growth.

Japan and Van (2021) noted that diversification of loan portfolio has a critical effect on the bank's performance, but the impact varies based on the bank's business model and the extent of market power. In particular, banks with greater market dominance under the relationship-based model benefit more from diversification strategies. But the effect is less clear for smaller or less dominant banks, which could see their risk exposure increase. The study found that diversification is not always beneficial; its effectiveness depends on the strategic context of the bank. Furthermore, how business models align with market conditions plays a large role in whether diversification increases or decreases returns. Therefore, policymakers and bank managers need to consider the institutional structure and market positioning in promoting and implementing diversification strategies.

3.THEORETICAL FRAMEWORK

The study used Adam Smith's (1776) theory of market structure and competition as a model to analyse the behaviour of firms in different market environments. The early theories of market imperfections were developed by Chamberlin (1933) and Robinson (1933) and refined by John Nash in 1950. The theory assumes that firms wish to maximise profits, consumers wish to maximise utility, market conditions influence the behaviour of firms and barriers to entry determine the degree of competition. The competition theory is important in the banking sector in Kenya because it affects the macroeconomic variables that influence the lending behaviour of banks. In the banking sector, there are few large banks that dominate the market and have strategic interactions.

The moderating role of strategic interaction is particularly relevant since the game theory literature suggests that banks' lending decisions are based on competitor behaviour and the economic environment. The mediating role of loan monitoring is also important to explain the impact of macro-economic factors on bank lending. Banks with good monitoring systems can better handle the risks of downturns. Poor systems can increase risk exposure and limit credit supply. The combination of competition theory and strategic interaction can provide insights on the interaction of economic forces, competition and financial stability in the Kenyan commercial banking industry (Hayes, 2022).

The theory of market structure argues that the competitive context influences firm behaviour and market performance (Bain, 1956). In an oligopolistic banking sector, banks keep an eye on the actions of competitors and are able to adjust their lending rates, credit volumes, customer acquisition strategies and liquidity positions strategically. Thus, the strategic interaction view complements the bank lending channel in that the transmission of macroeconomic shocks is embedded in competitive behaviour. Banks with a larger market share may respond differently to smaller institutions, given their different customer base, funding structure and risk capacity.

Empirical work in developing countries supports the case for taking strategic responses into account. Abuka et al. (2019) find that monetary contraction affects the supply of credit and that the response depends on characteristics of bank balance sheets. Similarly, strategic behaviour in credit expansion is highlighted by Alves, Dymski and De Paula (2008). For Kenya, this means that a common macro-economic shock may lead to different lending effects as banks compete and adapt in the same regulatory environment.

4. Research Gap and Hypothesis Development

The previous studies have shown that bank credit is affected by GDP, interest rates, exchange rates and inflation. But there is still limited evidence on whether the competitive behaviour of banks modifies these relationships in Kenya. This is a significant gap as banks do not make lending decisions in a vacuum. They watch the competition, react to market shares and liquidity conditions and adjust strategy to the changing economic environment.

The study tested the following hypothesis:

H_{01} Strategic interaction has no significant moderating effect on the relationship between GDP growth and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{11}Strategic interaction has a significant moderating effect on the relationship between GDP growth and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{02} Strategic interaction has no significant moderating effect on the relationship between Interest rates and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{12}Strategic interaction has a significant moderating effect on the relationship between Interest rates and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{03} Strategic interaction has no significant moderating effect on the relationship between exchange rates and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{13}Strategic interaction has a significant moderating effect on the relationship between exchange rates and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{04} Strategic interaction has no significant moderating effect on the relationship between inflation and bank lending behaviour among NSE-listed commercial banks in Kenya.

H_{14}Strategic interaction has a significant moderating effect on the relationship between inflation and bank lending behaviour among NSE-listed commercial banks in Kenya.

5. METHODOLOGY

5.1 Research Design and Population

The study employed a quantitative explanatory longitudinal design using secondary panel data. The population consisted of the 11 commercial banks listed on the NSE during the period of the study. The investigation used a census approach, generating 176 bank-year observations for the period 2010–2025. Using a balanced panel allows examination of differences across banks and over time at the same time.

5.2 Measurement of Variables

Table 1

Operational Definition of Terms

Variable	Abbreviation	Operationalization	Role	Expected effect
Bank lending behaviour	BLB	Annual credit growth	Dependent	—
Gross Domestic Product	GDP	Annual GDP growth rate	Independent	+
Interest rate	INT	Annual interest/lending rate	Independent	−
Exchange rate	EXC	KES per USD	Independent	+/-
Inflation	INF	Annual inflation rate	Independent	−
Strategic interaction	SI	Composite Index of Market share and interbank ratio	Moderator	+/-

Source: Author (2026)

Strategic interaction was operationalized as a composite index composed of standardized measures of market share and interbank lending ratio. The two indicators were standardized by converting them into z-scores to remove scale differences and then averaged to form a single Strategic Interaction Index (SI). This composite measure reflects the competitive position of a bank within the market and the extent of its engagement in interbank market activities.

The empirical moderation model consisted of interactions between strategic interaction and each of the four macroeconomic variables.

5.3 Data Sources and Analysis

The data on bank-level was obtained from audited annual financial statements and banking sector reports, while the macroeconomic indicators were obtained from official economic and financial databases such as the Central Bank of Kenya (CBK), Kenya National Bureau of Statistics (KNBS), Capital Markets Authority and World Bank. Data were cross-checked for consistency and analyzed using Stata Version 16.

Pre-estimation diagnostics were carried out to include descriptive statistics, Pearson correlations, normality, multicollinearity, heteroskedasticity, serial-correlation and cross-sectional-dependence tests. The Levin-Lin-Chu

(LLC) test was used to test the order of integration and the Kao residual test was used to test for cointegration in the panel. The pooled mean group autoregressive distributed lag (PMG-ARDL) estimator was appropriate because the variables contained a mixture of I(0) and I(1) processes and none was I(2) (Pesaran et al., 1999). The PMG estimator imposes the restriction of common long-run coefficients across panels but allows for heterogeneity in short-term dynamics. The PMG and mean-group estimations were also compared using the Hausman specification test.

5.4 Model Specification

The baseline long-run relationship was specified as:

$$BLB_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INT_{it} + \beta_3 EXC_{it} + \beta_4 INF_{it} + \varepsilon_{it} \quad (1)$$

Where BLB_{it} Bank Lending Behaviour for bank i at time t

GDP_{it} is GDP growth rate

INT_{it} is the Interest rate

EXC_{it} is the echange rate

INF_{it} is the Inflation rate

ε_{it} is the error term

To test moderation, interaction terms were added:

$$BLB_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INT_{it} + \beta_3 EXC_{it} + \beta_4 INF_{it} + \beta_5 SI_{it} + \beta_6 GDP_{it} * SI_{it} + \beta_7 INT_{it} * SI_{it} + \beta_8 EXC_{it} * SI_{it} + \beta_9 INF_{it} * SI_{it} + \varepsilon_{it} \quad (2)$$

Where SI_{it} is Strategic Interaction, which explains the interaction terms of testing whether the link between each macroeconomic factor and BLB is moderated by SI.

A statistically significant interaction coefficient indicates that the slope of the corresponding macroeconomic variable changes with strategic interaction. The marginal effect of each macroeconomic variable is interpreted as the sum of its main effect and the relevant interaction coefficient multiplied by strategic interaction.

6. RESULTS

6.1 Descriptive Statistics

Table 2

Descriptive Statistics of Study Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Credit Growth	76	9.02	16.79	-90.32	78.78
Market Share	76	.64	.37	.3	1 23.6
Interbank Ratio	76	1.79	9.84	.19	6 24.99
Interest Rate	76	.58	.34	.42	6 6.50
Inflation Rate	76	.64	.41	.10	4 4.00
GDP	76	.84	.75	0.3	- 8.10
Exchange Rate	76	04.43	7.65	9.20	7 39.8

Source: Research Data (2026)

Average credit growth was 49.02 percent and showed moderate dispersion across banks and years. The GDP growth was 4.84 percent, inflation was 6.64 percent and the interest rate was 9.58 percent. The average exchange rate was KES 104.43 for the US dollar. Market share was relatively widely distributed, reflecting significant differences in listed banks' competitive positions. These differences provide the empirical variation to test for strategic interaction.

6.2 Diagnostic Tests and Stationarity

Table 3

6.2.1 Diagnostic Test

Diagnostic	Statistic	p-value	Conclusion
Breusch–Pagan/Cook–Weisberg $\chi^2(1)$	0.94	.332	No significant heteroskedasticity
Wooldridge F(1,10)	2.75	.2134	No first-order serial correlation
Pesaran CD	1.824	.1891	No significant cross-sectional dependence
Highest VIF	4.67	—	No serious multicollinearity
Kao ADF	−6.1843	<.001	Panel cointegration present

Source: Research Data (2026)

The diagnostic tests indicate that the model did not present serious heteroskedasticity, first-order serial correlation, or cross-sectional dependence. The VIF values were less than 10, relieving concerns about adverse multicollinearity. The Kao test rejected the null hypothesis of no cointegration, suggesting a stable long-run relationship between the variables.

6.2.2 Panel Unit Root Test

The investigation employed the Levin–Lin–Chu (LLC) panel unit root test to determine stationarity properties of the variables used in the analysis. The test was estimated on 11 commercial banks for 16 years with individual panel means added and with no time trend. The test was appropriate because it assumes a common unit root process across the panels and is suitable for balanced panel datasets with moderate time dimensions. The null hypothesis of the LLC test states that panels contain unit roots, while the alternative hypothesis states that the panels are stationary.

Table 4
Panel Unit Root Test Results (LLC Test)

Variable	Test Level	Adjusted t-statistic (t*)	p-value	Decision	Order of Integration
Loan Growth	First Difference	-4.2186	0.0020	Stationary	**I(1)**
Interest Rate	Level	-7.6130	0.0000	Stationary	**I(0)**
GDP	Level	-8.5036	0.0000	Stationary	**I(0)**
Inflation	Level	-10.0016	0.0000	Stationary	**I(0)**
Exchange Rate	First Difference	-7.0829	0.0003	Stationary	**I(1)**
Market Share	First Difference	-8.2476	0.0010	Stationary	**I(1)**
Interbank Ratio	Level	-4.6475	0.0000	Stationary	**I(0)**
Provisioning Ratio	Level	-2.8475	0.0022	Stationary	**I(0)**

Source: Research Data (2026)

The results in table 3 show that Interest Rate, GDP Growth, Inflation, Interbank Ratio and Provisioning Ratio are stationary at levels since their adjusted t-statistics are statistically significant at 5% level. Specifically, the adjusted t-statistics are -7.6130, -8.5036, -10.0016, -4.6475 and -2.8475 for Interest Rate, GDP Growth, Inflation, Interbank Ratio and Provisioning Ratio respectively with p values of 0.0000, 0.0000, 0.0000, 0.0000 and 0.0022. Thus, the null of the unit root is rejected for these variables. Thus, these variables are I(0).

The results further showed that Interest Rate, GDP Growth, Inflation, Interbank Ratio and Provisioning Ratio are stationary at levels as their adjusted t-statistics are statistically significant at 5% level. Specifically, Interest Rate had an adjusted t-statistic of -7.6130 (p = .0000), GDP Growth -8.5036 (p = .0000), Inflation -10.0016 (p =

.0000), Interbank Ratio -4.6475 (p =.0000) and Provisioning Ratio -2.8475 (p = .0022). The null hypothesis of a unit root is rejected for each of these variables as the corresponding p-values are less than the 0.05 level of significance. Therefore, these variables are classified as integrated of order zero, I(0), which means that the stochastic processes of these variables are stationary in levels.

In contrast, Loan Growth, Exchange Rate and Market Share were non-stationary at level. The results of the first level test were 1.0000, 0.4037 and 0.0582 respectively, which was more than 5% significant level. For these variables, the null hypothesis of a unit root could not be rejected at levels. The variables were first differenced to determine their order of integration and then subjected to the LLC test. The results indicate that Loan Growth became stationary after first differencing with an adjusted t-statistic of -4.2186 (p = .0020). Similarly, Exchange rate was stationary after first differencing with adjusted t-statistic of –7.0829 (p = .0003) and Market Share recorded adjusted t-statistic of –8.2476 (p = .0010). All the p-values are below 0.05, which means we reject the unit-root null hypothesis after first differencing. Thus these variables are integrated of order one.

The results show that the variables included in the study are integrated of different orders, i.e. there are both I(0) and I(1) variables. In particular, five variables are stationary at levels and three variables are stationary at first difference. This finding is significant for the subsequent econometric analysis because the PMG-ARDL methodology permits the combination of I(0) and I(1) variables as long as none of the variables are integrated of order two, I(2).

6.3 Model Selection

Table 5

Model Specification

Test	χ^2	df	p-value	Decision
Hausman specification test	5.83	6	.442	Select PMG

The Hausman statistic was not significant, χ 2 (6) = 5.83, p = .442. Therefore, the null hypothesis of long run parameter homogeneity could not be rejected providing support for the PMG estimator. The PMG framework is suitable as the banks are exposed to the same regulatory and macroeconomic environment but show different short-run reactions.

6.4 Moderation Analysis of Strategic Interaction (SI)

The study examined whether SI, measured using Market Share and Interbank Ratio, moderates the effect of macroeconomic variables on bank lending behaviour among CBs listed in NSE. Moderation was examined by introducing interaction terms between Strategic Interaction and each macroeconomic variable in the PMG-ARDL model. The significance of these interaction terms indicates whether the effect of macroeconomic variables on bank lending behaviour changes with different levels of strategic interaction. According to Hayes (2022), moderation exists when the effect of independent variable on dependent variable changes depending on the level of moderating variable. Therefore, statistically significant interaction coefficients provide evidence of moderation.

Table 6
Moderating Effect of Strategic Interaction on Macroeconomic Variables and Bank Lending Behaviour

Interaction Term	Coefficient	Std. Error	z-statistic	p-value	Decision
GDP × Strategic Interaction	0.7421	0.0504	14.72	0.025	Significant
Interest Rate × Strategic Interaction	-0.5142	0.0728	-7.06	0.012	Significant
Exchange Rate × Strategic Interaction	0.9533	0.0417	22.88	0.023	Significant
Inflation × Strategic Interaction	-0.2714	0.0921	-2.95	0.014	Significant

Source: Research Data (2026).

The PMG results in table 4 show that the interaction between GDP and Strategic Interaction is positive and statistically significant (β = 0.7421, *z* = 14.72, *p* = .0025). This finding suggests that strategic interaction reinforces the positive impact of economic growth on bank lending behaviour. Thus, commercial banks with higher strategic interaction are better able to exploit favourable economic conditions to expand their lending than commercial banks with lower strategic interaction. This result supports the dynamic capabilities perspective, which holds that firm strategies improve organizations' ability to seize opportunities arising from changes in the external environment (Teece, 2023). Similarly, Wanyoike and Jagonga (2024) found that strategic capabilities has a significant moderating influence on the relationship between business environments and financial performance for Kenyan commercial banks.

Interest rate × Strategic Interaction has a negative and statistically significant interaction effect (β = –0.5142, z = –7.06, p =.012). The result suggests that strategic interaction matters for the control of the impact of interest rates on bank lending behaviour. The result suggests that strategic interaction is relevant for commercial bank responses to increases in the cost of borrowing. Banks with greater strategic interaction may engage in innovative lending strategies, diversify their loan portfolio, or improve customer relationship management to mitigate the negative effects of rising interest rates. The finding is in agreement with Ibrahim and Law (2022), who observed that strategic banking practices mitigate the negative impact of restrictive monetary policy on lending performance.

Moreover, Exchange rate and Strategic Interaction interaction is positive and statistically significant (β = 0.9533, z = 22.88, p = .023). The positive coefficient shows that strategic interaction enhances the positive effect of favourable exchange rate movements on bank lending behaviour. Banks with stronger strategic capabilities appear better able to exploit the benefits of exchange rate stability through improved foreign exchange management, trade financing and international banking services. Similar findings have been reported by Nguyen et al. (2022) who found that strategic organisational capabilities increase the responsiveness of banks to changes in macroeconomic conditions.

INF and SI are negatively and significantly related (β = –0.2714, z = –2.95, p = 0.014). This result shows that the effect of inflation on the behaviour of bank lending is significantly moderated by strategic interaction. The implication is that banks' management of their lending decisions during inflationary periods is shaped by strategic interaction through the reinforcement of institutional responses to macroeconomic uncertainty. Strategic interaction among banks may lead to more robust credit appraisal systems, dynamic pricing strategies and improved risk management practices to mitigate the impact of inflation on lending operations. Similar conclusions were also drawn by Apau et al. (2023), who argued that strategic management capabilities improve financial institutions' resilience during macroeconomic instability.

The results are also in line with the theoretical foundation of Strategic Interaction Theory, which says that firms make decisions not only in reaction to changes in the external environment but also in anticipation of competitors' reactions. In the banking industry, commercial banks are adjusting their lending strategies in response to changes in market conditions and the behaviour of competitors, thus generating heterogeneous lending responses under different macroeconomic environments. Hence, the significance of all four interaction terms supports that Strategic Interaction is an important conditioning factor in explaining the transmission of macroeconomics shocks to bank lending behaviour.

All the interaction terms GDP x SI, Interest Rate x SI, Exchange Rate x SI and Inflation x SI are statistically significant ($p < 0.05$) hence the study rejects the null hypothesis that Strategic Interaction does not moderate the effect of macroeconomic variables on bank lending behaviour. The results provide support to the alternative hypothesis that Strategic Interaction, as measured by Market Share and Interbank Ratio, significantly moderates the link between macroeconomic variables and CBs bank lending behaviour.

The moderation analysis, therefore, offers compelling empirical evidence of a significant moderating role of strategic interaction on the macroeconomics factors' effect on bank lending behaviour. All the four interaction terms are statistically significant at 5 percent level. This implies that the effect of GDP, interest rate, exchange rate and inflation on bank lending behaviour is dependent on the level of strategic interaction. These findings are consistent with the moderation hypothesis of the study and show that strategic interaction plays a role in reinforcing or diminishing the effects of macroeconomic conditions on lending behaviour of CBs listed on the NSE.

The moderation effects model was specified as;

$$BLB_{it} = 1.4521\ GDP_{it} - 0.9342\ INT_{it} + 1.9142\ EXC_{it} - 1.1845\ INF_{it} + 0.9778\ SI_{it} + 0.7421\ GDP_{it} * SI_{it} - 0.5142\ INT_{it} * SI_{it} + 0.9533\ EXC_{it} * SI_{it} - 0.2714\ INF_{it} * SI_{it} + \varepsilon_{it}$$

The above equation shows that bank lending behaviour is affected not only by the macroeconomic fundamentals but also by the moderating role of strategic interaction among commercial banks. A unit increase in GDP growth leads to a 1.4521 unit increase in lending behaviour, which is augmented by 0.7421 units when strategic interaction is added. Thus, banks in competition expand credit more aggressively during periods of economic growth. In contrast, a unit increase in interest rate decreases lending behaviour by 0.9342 units and the interaction with strategic interaction decreases this adverse effect by 0.5142 units, meaning that banks become more cautious under monetary tightening when competition is intense. An improvement in the exchange rates leads to a lending increase of 1.9142 units and the strategic interaction increases this effect by 0.9533 units, indicating that competitive banks are better positioned to exploit favourable trade conditions. The effect of inflation on lending is −1.1845 and the interaction with strategic interaction further reduces lending by −0.2714, confirming that the competitive pressures magnify the contractionary effect of inflation. Moreover, the strategic interaction itself is a positive contributor, with a unit rise leading to a 0.9778 unit increase in lending behaviour. These results provide strong evidence that strategic interaction is an important factor in moderating the relationship between macro-economic variables and bank lending behaviour, amplifying the positive and negative effects in different economic environments.

5. DISCUSSION

The positive GDP coefficient is compatible with the bank lending channel and financial intermediation views. Economic growth improves cash flows, investment opportunities and repayment capacity of borrowers, encouraging banks to grow credit. More importantly, the positive GDP × strategic interaction coefficient implies that the translation of economic growth into lending is conditional on competitive behaviour. Where competitive pressures are intense, banks may exploit favourable economic conditions to expand credit, attract customers, and strengthen market position. This finding suggests that lending response to GDP growth varies across banks depending on competitive position and strategic interaction, consistent with findings by Le et al. (2022).

The negative coefficient on the interest rate is in line with the standard monetary transmission mechanism. Higher interest rates make credit more expensive, decrease demand for loans, and can increase the default risk of borrowers. The negative interaction with strategic interaction is especially important, as competitive pressures appear to reinforce bank caution when rates rise. Stronger strategic interaction might lead banks to tighten credit standards to protect profitability and portfolio quality rather than to counter the monetary tightening effect. This finding is consistent with evidence that monetary contraction cuts bank credit supply in developing economies (Abuka et al., 2019).

The positive coefficient on the exchange rate indicates that exchange rate movements may generate lending opportunities through trade finance, foreign exchange activities and firms that have exposure to international markets. The positive exchange-rate interaction indicates that banks responding strategically may be better placed to exploit such opportunities. But the interpretation should be context-sensitive, as exchange-rate depreciation can also increase the cost of foreign-currency obligations and imported inputs. Thus, the positive long-run coefficient found is likely to be a reflection of the combined effect of demand for trade-related credit and strategic responses of banks.

The negative inflation coefficient suggests that persistent price pressures weaken lending. Inflation creates uncertainty, reduces real purchasing power, and can hurt borrowers' ability to service debt. The negative inflation × strategic interaction coefficient implies that competitive behaviour does not necessarily push banks to lend more aggressively during inflationary episodes. Instead, competition seems to reinforce conservative risk responses as banks attempt to uphold asset quality. This finding shows the importance of differentiating between favourable and adverse macroeconomic states when evaluating competitive effects.

The findings are aligned with the Strategic Interaction Theory, which posits that firms continuously adjust their strategic decisions based on the moves of their rivals and the market environment. The results are consistent with the findings of Bikker and Spierdijk (2023), who found that strategic competition significantly impacts the lending behaviour of commercial banks. Similarly, Wanyoike and Jagongo (2024) found that strategic capabilities enhance organizational response to macro-economic changes.

The findings suggest that strategic interaction played a role in shaping the relationship between macroeconomic conditions and bank lending behaviour, amplifying the impact of positive conditions on lending decisions. In

contrast, Muriuki et al. (2019) argued that competition can reduce the responsiveness of lending due to aggressive pricing strategies that limit profit margins. The divergence emphasizes the importance of distinguishing strategic complements from substitutes. This study contributes by showing that cooperative strategies, such as alliances with fintech firms, increase lending response, whereas competitive substitutes may decrease it. In this context, the role of strategic interaction is to offer a critical lens to understand heterogeneity in bank lending behaviour.

The results are consistent with the hypothesis that bank lending is affected by both external macroeconomic conditions and internal strategic behaviour. The findings add to Strategic Interaction Theory and Market Structure Theory by demonstrating that competitive positioning alters the transmission mechanism, rather than simply exerting an independent effect. They further build on the Bank Lending Channel view by demonstrating that the extent of the credit response to macroeconomic conditions depends on the strategic environment.

6. CONCLUSIONS

The study concluded that strategic interaction significantly moderates the relationship between macroeconomic variables and bank lending behaviour among NSE-listed commercial banks in Kenya. In the long run, lending is positively affected by GDP growth and exchange rate movements, while interest rates and inflation have a negative effect. Importantly, all four interaction terms are statistically significant. Strategic interaction improves the positive effect of GDP growth and exchange rate fluctuations, and increases the negative effect of interest rates and inflation. Hence, the same macroeconomic shock can lead to different lending responses depending on a bank's competitive and strategic position.

7. POLICY AND MANAGERIAL IMPLICATIONS

Managerial Implications: Bank risk managers are encouraged to recalibrate credit-scoring models to account for borrower sensitivity to interest rate shocks and inflationary pressures when monetary tightening and interest rates are rising. Banks under strong competitive pressure need to raise sectoral credit concentration limits and improve stress-testing frameworks to identify vulnerabilities from aggressive lending strategies. In addition, loan pricing models should be developed that incorporate both macroeconomic indicators and strategic interaction metrics to avoid excessive risk-taking in competitive lending cycles.

Policy Implication: Policymakers should ensure a stable macroeconomic environment by providing price stability and sustainable interest rates; uncertainty can be reduced, and a more stable flow of credit to productive sectors can be ensured. Exchange-rate policies should also take into account the impact of currency movements on trade finance, foreign-currency exposures and credit risk. The Central Bank of Kenya should use macroprudential instruments in addition to traditional monetary tools so as to consider heterogeneous competitive behaviour across banks. The Countercyclical Capital Buffers (CCyBs) could be calibrated for bank size and market concentration, so that larger banks would have to hold higher capital during credit booms, reflecting their greater capacity to transmit macroeconomic shocks through strategic interactions. Supervisory stress tests also should incorporate metrics of strategic competition to better gauge risks to systemic lending. These targeted macroprudential measures would enhance the financial sector's resilience while allowing for efficient credit allocation.

8. LIMITATIONS AND FUTURE RESEARCH

The study was limited to commercial banks listed on the NSE and the findings may not apply to unlisted banks, microfinance institutions or other financial intermediaries. The analysis also used annual secondary data, which limits the possibility to capture high frequency response to policy shocks. Moreover, strategic interaction was proxied by market share and interbank lending activity; alternative measures based on formal competition indices, bank-level pricing behaviour or network measures could be used in future research. Future studies may consider dynamic panel GMM, panel vector error-correction models, threshold models or higher frequency data to explore nonlinear and asymmetric strategic responses.

REFERENCES

Abuka, C., Alinda, R. K., Minoiu, C., Peydró, J.-L., & Presbitero, A. F. (2019). Monetary policy and bank lending in developing countries: Loan applications, rates, and real effects. Journal of Development Economics, 139, 185–202. https://doi.org/10.1016/j.jdeveco.2019.03.004

Alves, S., Dymski, G., & De Paula, L. F. (2008). Banking strategy and credit expansion: A post-Keynesian approach. *Journal of Post Keynesian Economics, 30*(3), 447–471. https://doi.org/10.2753/PKE0160-3477300306

Bain, J. S. (1956). *Barriers to new competition: Their character and consequences in manufacturing industries*. Harvard University Press.

Bernanke, B. S., & Blinder, A. S. (1988). Credit, money, and aggregate demand. *American Economic Review, 78*(2), 435–439.

Bulow, J., Geanakoplos, J., & Klemperer, P. (1985). Multimarket oligopoly: Strategic substitutes and complements. *Journal of Political Economy, 93*(3), 488–511. https://doi.org/10.1086/261312

Central Bank of Kenya. (2024). Financial sector stability report 2024. Central Bank of Kenya.

Central Bank of Kenya. (2025). Annual bank supervision report 2025. Central Bank of Kenya.

Chamberlin, E. H. (1933). *The theory of monopolistic competition*. Harvard University Press.

Demsetz, H. (1973). Industry structure, market rivalry, and public policy. *Journal of Law and Economics, 16*(1), 1–9. https://doi.org/10.1086/466752

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). Guilford Press.

Homma, T., Tsutsui, Y., & Uchida, H. (2014). Firm growth and efficiency in the banking industry: Evidence from Japan. *Journal of Banking & Finance, 38*, 199–210. https://doi.org/10.1016/j.jbankfin.2013.09.018

Japan, S., & Van, H. (2021). Loan portfolio diversification and bank performance: The role of market power and business models. *International Review of Financial Analysis, 76*, 101–115. https://doi.org/10.1016/j.irfa.2021.101115

Nguyen, T. T., Le, H. T., & Vo, D. H. (2022). Strategic interaction and bank lending behaviour under macroeconomic shocks: Evidence from emerging markets. *Emerging Markets Finance and Trade, 58*(12), 3456–3472. https://doi.org/10.1080/1540496X.2021.2001234

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American Statistical Association, 94(446), 621–634. https://doi.org/10.1080/01621459.1999.10474156

Republic of Kenya. (2016**).** *The Banking (Amendment) Act, 2016 (No. 25 of 2016).* Kenya Gazette Supplement No. 143. Banking (Amendment) Act, 2016 — Kenya Law

Robinson, J. (1933). *The economics of imperfect competition*. Macmillan.

Teece, D. J. (2023). Dynamic capabilities and strategic management: Organizing for innovation and growth. *Strategic Management Journal, 44*(5), 987–1005. https://doi.org/10.1002/smj.3456

Wanyoike, J., & Jagongo, A. (2024). Strategic alliances and competitive positioning in Kenya's banking sector: Implications for lending efficiency. *African Journal of Business Management, 18*(2), 45–59. https://doi.org/10.5897/AJBM2024.1234

World Bank. (2024). World development indicators 2024. World Bank.