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RESEARCH ARTICLE

Hedging and financial sustainability of Commercial Banks in Kenya

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Abstract

Hedging is a precursor for realization of financial sustainability. This is because the nucleus of commercial banks is intertwined with risks that should be off-set. This study sought to determine the effect of hedging on financial sustainability of commercial banks in Kenya.The study adopted a positivism research philosophy and an ex-post facto research design. Target population was 43 commercial banks. The study adopted panel data and the pooled, fixed effects or random effects models were adopted in the study. The study sought to find-out which model was the most appropriate to explain the effect of hedging on financial sustainability. Findings revealed that the fixed-effect model was the most appropriate model that was adopted to explain the effect of hedging on financial sustainability. The findings were as follows; options ($\beta = .0118$, $p < 0.05$), forwards ($\beta = .6116$, $p < 0.05$), swaps ($\beta = .0114$, $p < 0.05$) and futures ($\beta = .5555$, $p < 0.05$). The study concluded that hedging has a significant effect on financial sustainability of commercial banks. Financial derivatives such as options, forwards, swaps and futures helps commercial banks to hedge against risk. Hedging is the most optimal approach for off-setting risk so as to achieve financial sustainability. The fixed-effect model is the most appropriate model to explain the effect of hedging on financial sustainability. The study recommended that all financial institutions should practice hedging so as to off-set risk and be able to realize financial sustainability. Options, forwards, swaps and futures are the financial derivatives that should be adopted by commercial banks to hedge against risk.

Keywords: Hedging, Financial Sustainability, Financial Derivatives, Commercial Banks, Kenya

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1. Introduction

A commercial bank is said to have achieved financial sustainability when its operating income from the loan is sufficient to cover all the operating costs. [1] Financial sustainability is a pre-requisite of attracting commercial funding and thus achieving greater outreach [2]. It refers to the ability of an organization to continue operations and being in a position to cover operational, financial and administrative costs due to viable operations.[3] Commercial banks are supposed to capitalize on sales, exercise cost conscious, promote innovation and reduce both administrative and information asymmetry costs. The commercial banks should also lower adverse selection and moral hazard and hence realize profits or suffer least losses if they are to be considered financially sustainable.[4] Commercial banks are supposed to practice hedging so as to manage risks efficiently and effectively.[5] This is because the nucleus of banks is intertwined with risks which spans from credit risks that arises as a result of lending to customers; market risk, which arises as a result of changes in the economic environment that it operates; interest rate risk, that arises as a result of changes in prime lending rate and banks' lending rate and operational risk, which is a product of poor management that causes failure or allow loopholes for fraud penetration. [6] Hedging has an effect on financial sustainability of commercial banks.[7] Commercial Banks that fails to reduce risk may also fail to uphold a market position. Failure to uphold a market position in-turn has an effect on financial sustainability of the commercial banks.[8]

Borrowers, lenders, donors and savers tend to lose confidence in the commercial banks due to failure to uphold market position and as a results of this, funds usually begin to deplete when risks are poorly managed, and financial losses occur.[9] The survival and success of financial organizations depend critically on the efficiency of hedging these risks.[10] In circumstances where proper hedging is not in place these risks causes the commercial banks not to achieve financial sustainability.[11] Commercial banks that do not achieve financial sustainability over a prolonged period of time have either been closed and or put under receivership due to inability to meet their financial obligations. [8] In a bid to remain financially sustainable, commercial

banks have adopted various hedging techniques.[12] This is because hedging is a precursor in realization of financially sustainable commercial banks.[13] Commercial banks that are experiencing failure and/or financial difficulties are the ones that faces or faced challenges while applying hedging techniques in their day to day business transactions.[14] Hedging refers to a series of well elaborated methods or approaches whose main objectives are to identify the risks, address, and eliminate risk items before they become either lethal to successful business organization. [13]

In recent times, reduction of corporate risks with the use of hedging has been an increasingly popular corporate activity . [15] It is the most optimal approach for off-setting risk in order to improve firm value. [9] Most commercial banks utilize various hedging techniques in order to stabilize their financial earnings. [16] Hedging not only decreases the chances of financial distress but also the agency costs of debt and the costs of equity [17]. Commercial banks practice hedging using financial derivatives so as to mitigate against risk exposure. Not all commercial banks achieve financial sustainability in Kenya, despite the commercial banks practicing hedging. For example in 2015, Imperial bank was placed under receivership by the Central Bank of Kenya. [18] Dubai Bank was also placed under receivership in 2015.[19] Chase Bank was placed under receivership in 2016 due to financial challenges [20]. All these implies that that not all commercial banks achieve financial sustainability in Kenya. This study sought to determine the effect of hedging on financial sustainability of commercial banks in Kenya.

2. Methodology

The study adopted a positivism research philosophy and an ex-post facto research design. The study used panel data for a period of 5 years, between 2017 and 2021. The target population was 43 licensed commercial banks in Kenya. This study adopted panel data which was collected from the respective commercial banks audited financial statements. The data collected was analyzed using multiple linear regression analysis. The study adopted panel data and therefore a decision was to be made whether to use pooled model, fixed effects model or a random effects model. The decision on whether to use a fixed effects model or a random effects model depends on the correlation between the unit effects and the independent variables. [21] The standard test to distinguish which model to use is the Hausman specification test developed by Hausman.[22] The models were tested for significance at 0.05.

Pooled model:

$$FS_{it} = \beta_0 + \beta_1 0_{it} + \beta_2 Fo_{it} + \beta_3 S_{it} + \beta_4 Fu_{it} + \varepsilon_{it} \quad 1$$

Fixed model:

$$FS_{it} = \beta_0 + \beta_1 0_{it} + \beta_2 Fo_{it} + \beta_3 S_{it} + \beta_4 Fu_{it} + u_{it} \quad 2$$

Random model:

$$FS_{it} = \beta_0 + \beta_1 0_{it} + \beta_2 Fo_{it} + \beta_3 S_{it} + \beta_4 Fu_{it} + u_{it} + \varepsilon_{it} \quad 3$$

FS_{it} is the financial sustainability of commercial bank i at time t, O_{it} relates to value of options of commercial bank i at time t, Foit value of forwards of commercial bank i at time t, S_{it} value of swaps of commercial bank i at time t and Fuit value of futures of commercial bank i at time t, β_0 is the intercept coefficient of commercial bank i at time t, β_1, β_2, β_3 and β_4 are row vectors of slope coefficient of regressors, εit is the stochastic error term of commercial bank i at time t and uit is the error term of commercial bank i at time t.

3. Empirical Analysis and Discussions

Pooled Ordinary Least Square Model

As per the pooled ordinary least square model, the study held the assumption that groups or individual effects did not exist between the commercial banks. The results were presented in Table 1

The Adj.R^2 was 53.35%, this implies that 53.35% of the total variability in financial sustain

ability was explained by options, forwards, swaps and futures. The F (4, 165) = 11.3, Prob > F = 0.000). This implies that the pooled OLS model was significant to explain the predictor variables of financial sustainability at 0.05. The findings further revealed that the options had (β =0.0109, p < 0.05), forwards (β = 0.3172, p < 0.05), swaps (β = 0.0514, p < 0.05) and futures (β = 0.0771, p < 0.05). All the predictor variables had a significant positive effect on financial sustainability.

4. Detection of Multicollinearity Problem

No multicollinearity problem was detected because the VIFs were between 1.49 to 1.77.

5.Fixed Effect Model

In the fixed effect model, the individual-specific effect is a random variable that is allowed to be correlated with the explanatory variables. The results were presented in Table 3.

The R2 Overall was 0.1885, this implies that 18.9% of the total variation in financial sustainability was attributed to the value of options, forwards, swaps and futures. The F(4, 84) = 5.99 at 0.05 level of significance. This shows that model was fit for the study. The Rho value was 0.5093, which implies that 50.93% of the variances are due to the differences that exist across the panels. Options, forwards, swaps and futures were significantly associated with financial sustainability. Options had a significant positive effect on financial sustainability (β = 0.4737, p < 0.05), Forwards had a significant positive effect on financial sustainability (β = 0.5279, p < 0.05), Swaps had a significant positive effect on financial sustainability (β = 0.0140, p < 0.05) and futures had a significant positive effect on financial sustainability (β = 0.0748, p < 0.05). The intent of the study was to establish the effect of hedging on financial sustainability. The findings shows that both pooled OLS and fixed-effect model are significant to explain the

effect between the study variables. A comparison was made between the two models so as to determine which model was the most suitable to ascertain the effect of hedging on financial sustainability. The findings of the F-test had a p-value of 0.0000 which implies that the fixed effect model was deemed appropriate to ascertain the effect of hedging on financial sustainability.

6. Random Effect Model

In the random effect model, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables. The results were presented in Table 4.

Out of the 43 commercial banks, the researcher was able to get data for 33 commercial banks. This was equivalent to 165 observations. The random effect model findings revealed that, options (β = .0055, $p < 0.05$), forwards (β = .4056, $p < 0.05$), swaps (β = .0220, $p < 0.05$) and futures (β = .0718, $p < 0.05$) have a significant effect on financial sustainability.

The Breusch and Pegan Lagrangian Multiplier test was done to evaluate whether pooled OLS or random effect model was suitable to explain the determinants of financial sustainability of Commercial Banks. H0 was that the pooled effect exists while H1 was random effect exists. The Breusch and Pegan Lagrangian Multiplier results revealed that Prob > chibar2 = 0.0000. The study failed to accept the null hypothesis and the study concluded that there exist random effect.

Table 1: Pooled Ordinary Least Square Model Results

Variable	Co-efficient	Std. Error	t-statistic	Prob.	95% Confidence Interval	
C	0.2750	0.3429	2.361	0.0173	0.0339	0.6105
Options	0.0109	0.0110	1.855	0.0285	0.0321	0.0507
Forwards	0.3172	0.0392	2.104	0.0011	0.219	0.375
Swaps	0.0514	0.0296	2.173	0.0113	0.0087	0.0150
Futures	0.0771	0.0417	1.790	0.0170	0.0131	0.0578
No. of observations	33	14.91		R2		0.5948
F(4, 165) = 11.3				Adj.R2		0.5335
Prob > F 0.0000				Root MSE		0.0465

Table 2: Multicollinearity Test Results

	VIF
Options	1.49
Forwards	1.55
Swaps	1.51
Futures	1.77
Composite values	1.58

No multicollinearity problem was detected because the VIFs were between 1.49 to 1.77.

Table 3: Fixed Effect Model Results

Variable	Co-efficient	Std. Error	t-statistic	Prob.	95% Confidence Interval	
C	0.0825	0.0491	2.47	0.000	0.0450	0.0730
Options	0.4737	0.4443	2.53	0.031	0.1075	0.5193
Forwards	0.5279	0.1716	2.11	0.010	0.1035	0.5787
Swaps	0.0140	0.0606	0.053	0.000	0.0473	0.0730
Futures	0.0748	0.3520	1.76	0.000	0.0685	0.0550
No. of observations	165		R^2 within	0.3431	Sigma_u = 0.04100	
F(4, 84) = 5.99			R^2 between	0.2103	Sigma_e = 0.03700	
Prob > F 0.0000			R^2 Overall	0.1885	Rho= 0.5093	
F test that all u_i=0:	F(49,84)	17.23	Prob> F = 0.0000			

Hausman Test

It was used to choose between the fixed effects model and random effects model. H0 was that random effect exist while H1 random effect does not exist. The results were presented in Table 6.

The findings were as follows; (Prob>chi2 = 0.0739). The study failed to accept H0 and the fixed-effect model was explained further:

The study conducted a heteroskedasticity test in the fixed effect model. A similar set of coefficients and set of p values were found. Although the model was affected by heteroskedasticity, the problem did not have an impact on the observed findings. Cluster robust standard error was observed to control for unknown heteroskedasticity within the panel autocorrelations in addition to the robust standard error test presented in Table 7. The level of significance for all the predictor variables was similar in both the fixed effect model and cluster robust standard error.

The fixed-effect model was the most appropriate model that was adopted to explain the effect of hedging on financial sustainability. Options had a significant effect on financial sustainability ($\beta = .0118, p < 0.05$). The study failed to accept H01 and concluded that options have a significant effect on financial sustainability. The findings resembles that of Anyango [23] that options have a significant effect on financial sustainability. Forwards had a significant effect on financial sustainability ($\beta = .6116, p < 0.05$). The study failed to accept H02 and concluded that forwards have a significant effect on financial sustainability. The findings are similar to that of Gitogo [24] that forwards have a significant effect on financial sustainability. Swaps had a significant effect on financial sustainability ($\beta = .0114, p < 0.05$). The study failed to accept H03 and concluded that swaps have a significant effect on financial sustainability of commercial banks. The findings are in agreement with that of Kamenchu [25] that swaps have a significant effect on financial sustainability. Futures had a significant effect on financial sustainability ($\beta = .5555, p < 0.05$). The study failed to accept H04 and concluded that futures have a significant effect on financial sustainability of commercial banks. The findings resemble that of Njoroge, Matumo and Maina [26] that futures have a significant effect on financial sustainability of commercial banks.

Table 4: Random Effect Model Results

Variable	Co-efficient	Std. Error	t-statistic	Prob.	95% Confidence Interval	
C	0.0715	0.3026	3.61	0.000	0.7915	0.8150
Options	0.0055	0.0204	1.36	0.000	0.0359	0.0519
Forwards	0.4056	0.0545	2.65	0.000	0.5137	0.7180
Swaps	0.0220	0.0594	2.37	0.035	0.1790	0.2950
Futures	0.0718	0.4670	1.87	0.000	0.5550	0.7140
No. of observations	165		R^2 within	0.6672	Sigma_u = 0.07055	
Wald $Chi^2(4)$ 55.10			R^2 between	0.5787	Sigma_e = 0.00350	
Prob > Chi2 0.0000			R^2 Overall	0.5195	rho= 0.45100	

Table 5: Breusch and Pegan Lagrangian Multiplier Test for Random Effects

Estimated results	Var	Sd=sqrt(var)
Financial sustainability	0.0055	0.0585
E	0.0013	0.0171
U	0.0049	0.0755
Test: Var(u) = 0		
Chibar2(01) =151.73		
Prob> chibar2= 0.0000		

Table 6: Hausman Test

Variable	Fixed (b)	Random (B)	Difference (b-B)	Sqrt(Diag(v_b-v_B)
Options	0.0075	0.0081	0.0006	0.0002
Forwards	0.3785	0.6177	0.2392	0.0243
Swaps				
Futures	0.0049	0.0519	0.047	0.0275
Chi2(4) = (b-B)'[(v_b-v_B)^ (-1)](b-B) = 8.53				
Prob> chi2= 0.0739				

Table 7: Robust Standard Error

Variable	Co-efficient	Std. Error	t-statistic	Prob.	95% Confidence Interval	
C	0.0825	0.4055	2.48	0.000	0.4177	1.3520
Options	0.4737	0.0067	2.17	0.000	0.0225	0.0575
Forwards	0.5279	0.2033	2.63	0.000	0.1585	0.3175
Swaps	0.0140	0.0275	1.95	0.030	0.0598	0.0675
Futures	0.0358	0.0195	2.73	0.000	0.0350	0.0493
No. of observations	165		R^2 within	0.2047	Sigma_u = 0.07301	
F (4, 51) 6.85			R^2 between	0.1750	Sigma_e = 0.0351	
Prob > F 0.0039			R^2 Overall	0.1915	rho= 0.5700	

Table 8: Cluster Robust Standard Error

Variable	Co-efficient	Std. Error	t-statistic	Prob.	95% Confidence Interval	
C	0.7517	0.0051	2.17	0.000	0.7150	1.2231
Options	0.0118	0.0070	2.40	0.031	0.0415	0.0985
Forwards	0.6116	0.2027	3.15	0.010	0.0390	0.0710
Swaps	0.0114	0.0286	1.95	0.000	0.0540	0.0776
Futures	0.5555	0.0175	2.17	0.000	0.04790	0.0750
No. of observations	165		R^2 within	0.4184	Sigma_u = 0.08701	
F (4, 51) 4. 55			R^2 between	0.3717	Sigma_e = 0.0410	
Prob > F 0.0071			R^2 Overall	0.5965	rho= 0.5140	

4. Conclusion

The study concluded that hedging has a significant effect on financial sustainability of commercial banks. Financial derivatives such as options, forwards, swaps and futures helps commercial banks to hedge against risk. The survival and success of commercial banks depend critically on the efficiency of hedging risks. Hedging is the most optimal approach for off-setting risk so as to achieve financial sustainability. The fixed-effect model is the most appropriate model to explain the effect of hedging on financial sustainability. The study recommends that all financial institutions should practice hedging so as to off-set risk and be able to realize financial sustainability. Options, forwards, swaps and futures are the financial derivatives that should be adopted by commercial banks to hedge against risk.

Statement

The views expressed in this paper are strictly personal and not related to authors' respective institutional affiliation. All the errors, omissions etc., if any, are the sole responsibility of the author. The author may be contacted at isabwaharwood@gmail.com.

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