THE RELATIONSHIP BETWEEN DERIVATIVES AND THE FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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ABSTRACT
Increasing globalization of commerce is exposing firms to various financial risks, unrelated to their lines of business. Some of these risks are firm or situation specific with no ready-made exchange traded instruments to offset such risks. The management of these risks has created a new line of financial derivatives, the over-the-counter (OTC) derivatives. The objective of this study was to establish the relationship between derivatives and profitability of commercial banks in Kenya. A descriptive research design is concerned with describing characteristics of a problem. It is appropriate for this project because it helped to portray accurate profile of events and situations in the emerging derivative markets. Statistical package for social scientists (SPSS) software version 17 was used to analyze the data. Data was obtained through secondary sources. The secondary data was obtained from various financial journals; internet published financial statements and documents. The population of the study consists of all the 43 commercial banks in Kenya as at 31st December 2011, licensed and registered under the Banking Act. The study found that for commercial banks in Kenya to remain profitable they should have a put into
consideration the several proxies for derivatives highlighted it this study. The study concludes that there exists relationship between derivatives and financial performance of commercial banks in Kenya. The total deposit was found to positively influence the profitability of commercial banks in Kenya. The study recommends that for commercial banks in Kenya to remain profitable they should have a put into consideration the several proxies for derivatives highlighted it this study. This will help in making decisions about credit policies, matching investments to objectives, asset allocation for institutions, and balancing risk against profitability.

INTRODUCTION

According to Chance (1995), the evolution of derivatives can be traced back to the Bible in Genesis chapter 29. About year 1700BC, Jacob purchased an option costing him seven years of labour that granted him the right to marry Laban’s daughter Rachel. Jacob’s prospective father-in-law, however, reneged, making this not only the first derivative but the first default on a derivative. Laban required Jacob to marry his older daughter Leah. Jacob married Leah, but because he preferred Rachel, he purchased another option, requiring seven more years of labour, and finally married Rachel. Around 580BC, Thales the Milesian purchased options on olive presses and made a fortune off of a bumper crop in olives. So derivatives were around before the time of Christ. Other developments followed these.

Successful financial risk mitigation implementation goes through three distinct phases: identifying risk (this involves clearly identifying the financial risks the organization faces and how they interact with each other), measuring risk (this involves measuring risks in different ways depending on how an organization structures its risk management and managing risk through adoption of active or passive mitigation techniques (Binder, 1997). The early views of risk management led to the creation of risk management departments and risk managers with full responsibility for identifying, analyzing and accessing risk to an organization and implementing risk handling options to deal with negative impacts of such exposures. Risk management best practices are a strategy, approach, method, tool or technique that is particularly effective in helping an organization achieve its objective for managing risk (Asaf, 2004). The primary components of a sound risk management process are: Comprehensive system for measuring different types of risks; a framework for governing risk taking, individual limits, guidelines and
other relevant parameters; and an adequate management information system for monitoring, regulating and controlling risks (Li, 2003).

Statement of the Problem

Product innovation utilizing derivatives and gambling in high-risk trades has become a key driver of profitability within banks but this leaves them exposed to huge risks which in turn pose a threat to global financial stability. Policy makers urgently need to address this issue. Over the recent years, firms increased to use derivative to hedge their position. The derivative market has experienced a rapid growth over the recent year. Even though information on firm derivative usages is widely available, the empirical research regarding whether the use of derivative will increase a firm value is still debatable.

According to OCC’s Quarterly Report on Bank Trading and Derivatives Activities for the Fourth Quarter 2010, derivatives fell by 2% in the fourth quarter to $14.1 trillion. Derivatives outstanding remain below the peak of $16.4 trillion in the first quarter of 2008. From year-end 2003 to 2008, credit derivative contracts grew at a 100% compounded annual growth rate. Industry efforts to eliminate offsetting trades (“trade compression”), as well as reduced demand for structured products, has led to a decline in credit derivative notional. Contracts of all tenors that reference investment grade entities are 56% of the market, compared to 57% in the third quarter. The notional amount for the 35 U.S. commercial banks that sold credit protection (i.e., assumed credit risk) was $7 trillion, down 1.5% ($100 billion) from the third quarter. The notional amount for the 30 banks that purchased credit protection (i.e., hedged credit risk) was $7.2 trillion, a decrease of $200 billion (3%).

According to the NSE Website retrieved on 10th January 2006:http://www.nse.co.ke and information received from the CMA; like the rest of the economy, the banking industry is recovering from a long period of poor performance. The industry had benefited from the general improvement of business confidence, as well as specific policy measures, notably, the reduction of the cash ratio requirement from 8% to 6% in June 2003. Pre-tax profits of the banking industry surged form KShs.6 billion in 2002, to KShs.4 billion in 2003, and further to KShs.5 and 9.6 billion in 2004 and 2005 respectively. This reflects both growth and improvement in asset quality. Loans and advances increased by KShs.73 billion from December 2002 to
December 2005, a growth of 76%. Over the same period gross value of non-performing loans declined by 35% from KShs.9 billion to KShs.77 billion. Could the recent growth and improvement in financial performance of commercial banks be as a result of trade in derivatives? The local studies analyzed are biased towards the relationship between derivatives and profitability in commercial banks in Kenya. For instance: a study by Mwega (2009) had sought to determine global crises and its effect on policy on financial institutions in Kenya. Maina (2003) conducted a survey on risk based capital standards and the riskiness of bank portfolio in Kenya. Ndung’u (2003) in a study on the determinants of profitability of quoted commercial banks in Kenya finds that sound asset and liability management had a significant influence on profitability. Omondi (1996) also found out that the mean debt equity ratios were not significantly different for firms studied. He tested quite a number of factors (industry class, asset structure, profitability, interest charges, size, and growth, changes in cash flows, age and ownership) and found out that the industrial class was not statistically significant and that the capital structure of firms on sectoral basis was quite different.

The studies did not establish a clear relationship between derivatives and profitability. In addition, the studies have not discussed measures of profitability and derivatives in Banks. From the literature review there are various gaps identified and thus necessitating the study. The study investigated the relationship between derivatives and profitability of commercial banks in Kenya.

Objective of the Study
The objective of this study was to establish the relationship between derivatives and profitability of commercial banks in Kenya.

Theoretical Orientation
This section examines the body of literature that pointed to the problem of the study.

Marshall-Arrow-Romer Theory of Productivity
The biggest factor determining the location decision of a provider of financial services is merely where its potential customers are already located. Common sense, as well as a significant amount of theoretical and empirical research, dictates that there are also large positive externalities
associated with the co-location of similar or complimentary economic activities. Research on co-location externalities can be traced back at least to Marshall (1890), who explains that the productivity of firms is improved if they are located in the same city, because of knowledge spillovers. Henderson (1986) offered empirical evidence that worker productivity is higher in firms that are located near other firms in the same industry.

**The Modern Portfolio Theory**

The modern portfolio theory is formulated on the basic tenets of Harry Markowitz’s portfolio selection theory of 1952. This theory states that returns from investments can be maximized through reduction of unsystematic risks inherent in each of the assets constituting the portfolio. The modern portfolio theory advocates that the assets in an investment portfolio cannot be individually selected each on their own merit. It argues that it is important to consider how each asset in the portfolio changes in price and risks (correlation between the two assets). In its more technical form, modern portfolio theory models an individual asset’s return as a normally distributed random variable and defines risk as the standard deviation of returns. The portfolio is modeled as a weighted combination of assets’ returns. It quantitatively provides the basic evidence that by combining different assets whose returns, are not correlated the theory seeks to reduce the total variance of the portfolio.

**Profitability**

Profitability is the most common measure of financial performance. The measures of profitability are used to assess how well management is investing the firms' total capital and raising funds. Profitability is generally the most important to the firm’s total shareholders. Profits serve as cushion against adverse conditions such as losses on loans, or losses caused by unexpected changes in interest rates. Consequently, creditors and regulators concerned about failure also look to profits to protect their interests although the measures ignore firm's risk. Profits depend on three primary structural aspects of financial institutions: Financial leverage, Net interest margin and non-portfolio income sources. Return on Equity, (ROE) and Return on Assets (ROA) are the most commonly applied profitability ratios used to assess financial performance.
Adelegan (2009) pointed out that the South African Futures Exchange grew out of an informal market in April 1987. At that time a local merchant bank, Rand Merchant Bank, started an informal financial market. Subsequently, option contracts were introduced in October 1992, agriculture commodity futures in 1995 and a fully automated trading system in May 1996.

Several studies examined the use of derivatives by banks. Deshmukh, Greenbaum, and Kanatas (1983) argue that an increase in interest rate uncertainty encourages depository institutions to decrease their lending activities, which entail interest rate risk, and to increase their fee for service activities, which do not. Therefore, they argue that if interest rate risk can be controlled by derivatives, then perhaps banks that use derivatives would experience less interest rate uncertainty and can increase their lending activities which result in greater returns relative to the return on fixed fee for service activities. Thus their overall profitability would be higher compared to those banks that do not use derivatives to control for interest rate uncertainty. (Brewer 482).

**METHODOLOGY**

A descriptive research design is concerned with describing characteristics of a problem. A descriptive research design also enables generation of factual information about the study. This is so because the descriptive design relies much on secondary data which helps in developing the case basing on facts, sustained by statistics and descriptive interpretations from archival materials and data. Muijs (2004) define population as a group of people from which a sample can be drawn for the purposes of a research. The population of the study consists of all the 43 commercial banks in Kenya as at 31st December 2010, licensed and registered under the Banking Act. This population was the source of the study data.

Data was obtained through secondary sources. The secondary data was obtained from various financial journals; internet published financial statements and documents.

The empirical model given by the following Equation estimated to analyze the effect of derivative items on profitability of commercial banks.
Profit\textsubscript{it} = \alpha + \beta_1 \text{DI}_{it} + \beta_2 \text{TLTA}_{it} + \beta_3 \text{LTA}_{it} + \beta_4 \text{EA}_{it} + \beta_5 \text{FATA}_{it} + \beta_6 \text{LIQ}_{it} + \beta_7 \text{PLTA}_{it} + \epsilon_{it}

Where,

Profit\textsubscript{it} = one of the four profitability measures of the \textit{i}\textsuperscript{th} bank at time \textit{t}

\text{DI}_{it} = \text{Derivative Items}, which includes the options, forwards, futures and swaps of the \textit{i}\textsuperscript{th} bank at time \textit{t}

\text{TLTA}_{it} = \text{ratio of total loans to total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\text{LTA}_{it} = \text{natural logarithm of total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\text{EA}_{it} = \text{shareholder’s equity to total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\text{FATA}_{it} = \text{fixed asset to total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\text{LIQ}_{it} = \text{liquid asset to total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\text{PLTA}_{it} = \text{ratio of the provision for loan losses to total assets of the \textit{i}\textsuperscript{th} bank at time \textit{t}}

\epsilon_{it} = \text{random error term}

Summary Statistics

Financial Performance for Commercial Banks

Descriptive statistics were computed for both metrics measuring financial performance of commercial banks in Kenya. The results show that the total Total Loans among 43 commercial banks in Kenya is 12286.76 with a standard deviation of 18238.77. The banks have Loan losses with a mean of 16425.88 with a standard deviation of 23570.23. The Total Assets for the firms have a mean of 18604.21 with a standard deviation of 28176.32. The total Shareholders equity is 14.07 with a standard deviation of 22.44.

Descriptive Statistics

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<td>Total Loans</td>
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<td>Loan losses</td>
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Model Summary

Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |
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<td>1</td>
<td>.340(^a)</td>
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<td>.02163</td>
<td>R Square Change</td>
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<td>.115</td>
<td>.5</td>
<td>.02163</td>
<td>.115</td>
<td>1.239</td>
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</table>

a. Predictors: (Constant), Shareholders equity, Total Assets, Total Loans, Loan losses

R\(^2\) is called the coefficient of determination and tells us the extent financial performance of commercial banks in Kenya varied with derivatives. From table above, the value of R\(^2\) is .115. This implies that up to 11.5% of variations in financial performance are explained by the various factors of derivatives. 88.5% of variations in financial performance are due to other factors. The coefficient of correlation (R = 0.340) shows that there was a weak relationship between performance of commercial banks and various factors of derivatives as shown by a factor of 1.

Coefficients\(^a\)

<table>
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<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
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<th>Sig.</th>
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<td>Loan losses</td>
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<td>2.030</td>
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<td></td>
<td>Total Assets</td>
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<td>-1.178</td>
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<td>1</td>
<td>Shareholders' Equity</td>
<td>.000</td>
<td>.000</td>
<td>-.274</td>
<td>-.700</td>
</tr>
</tbody>
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a. Dependent Variable: ROAA
From the above coefficient results of years 2011 the established regression equation was:
\[ \text{Profit}_{it} = 0.021 + 2.56778 \text{DI}_{it} - 4.264 \text{TLTA}_{it} - 9.147 \text{LTA}_{it} + 0.000 \text{EA}_{it} + \epsilon_{it} \]

From the above equation the study found that holding Total Loans, Number of Operational Branches, Total Assets, and Loan losses to a constant zero net operating profit would be equal to 0.021. A unit increase in Total Loans lead to increase in profitability by a factor of -4.264, a unit increase Loan losses would lead to decrease in profitability by a factor of 1.884, unit increase in Total Assets lead to increase in profitability by factor of -9.147, a unit increase in Shareholders’ equity leads to increase in profitability by factors of 0.000.

Summary and Interpretation of the study
Descriptive statistics were computed for both metrics measuring financial performance of commercial banks in Kenya. The results for the year 2012 show that the total Loans among 43 commercial banks in Kenya is 12286.76 with a standard deviation of 18238.77. The banks have Loan losses with a mean of 16425.88 with a standard deviation of 23570.23. The Total Assets for the firms have a mean of 18604.21 with a standard deviation of 28176.32. The total Shareholders equity is 14.07 with a standard deviation of 22.44.

From the correlation analysis the study found that holding Total Loans, Number of Operational Branches, Total Assets, and Loan losses to a constant zero net operating profit would be equal to 0.021. A unit increase in Total Loans lead to increase in profitability by a factor of -4.264, a unit increase Loan losses would lead to decrease in profitability by a factor of 1.884, unit increase in Total Assets lead to increase in profitability by factor of -9.147, a unit increase in shareholders’ equity leads to increase in profitability by factors of 0.000.

The coefficient of determination the value of \( R^2 \) is 0.115. This implies that upto 11.5% of variations in financial performance are explained by the various factors of derivatives 88.5% of variations in financial performance are due to other factors. The coefficient of correlation shows that there was a weak relationship between performance of commercial banks and various factors of derivatives as shown by a factor of 1.

From the above regression model, the study found that there exist a relationship between the derivatives and the financial performance of the commercial banks. The study found the intercept to vary though with the highest value being 0.44 and the lowest being 0.028, this mean that...
profitability of commercial banks s would range between 0.028 and 0.44 holding various factors of derivatives factors to a constant zero.

The study also found the coefficient of Total Loans, Number of Operational Branches, Total Assets, and Loan losses was found to vary on the positive having it highest coefficient thus highest effect on profitability of commercial banks in Kenya. From the Adjusted $R^2$ is called the coefficient of determination and tells us how the profitability of commercial banks in Kenya varied with derivatives. From table above, the value of adjusted $R^2$ is 0.2. This implies that, there was a variation of 100% of profitability of commercial banks in Kenya with changes in derivatives at a confidence level of 95%. This means that 100% of the profits of commercial banks in Kenya is attributable to derivatives. The coefficient of correlation shows that there was a strong relationship between performance of commercial banks and various factors of size as shown by a factor of 1.

The major results of this project support the notion that financial derivatives are used to hedge interest rate risk. The results indicate that the lower a bank’s exposure to interest rate risk, as measured by net interest margin, the more likely the bank is to use derivatives. The study also found that larger banks tend to use derivatives to a greater extent than smaller banks and those banks with a greater proportion of credit risk are more likely to use derivatives. It was also found that banks that utilize derivatives typically have a higher capital to asset ratio. This result might indicate that banks with relatively more credit risk are more likely to use derivatives. This study found no relationship between bank profitability and derivative use.

**Summary Statistics**

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Coefficients

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<td>.004</td>
<td>.000</td>
<td>.013 - .029</td>
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<td>Derivative Items</td>
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<td>5.053</td>
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<td>(Constant) Derivative Items</td>
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<td>-2.74</td>
<td>-.700</td>
<td>.488</td>
<td>(Constant) Derivative Items</td>
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From the above coefficient results of years 2011 the established regression equation was:

\[ \text{Profit}_t = .021 + 2.56778 \text{DI}_t + -4.264 \text{TLTA}_t + -9.147 \text{LTA}_t + .000 \text{EA}_t + \epsilon_t \]

From the above equation the study found that holding Total Loans, Number of Operational Branches, Total Assets, and Loan losses to a constant zero net operating profit would be equal to .021. A unit increase in Total Loans lead to increase in profitability by a factor of -4.264, a unit increase Loan losses would lead to decrease in profitability by a factor of 1.884, unit increase in Total Assets lead to increase in profitability by factor of -9.147, a unit increase in Shareholders’ equity leads to increase in profitability by factors of .000.

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The major results of this project support the notion that financial derivatives are used to hedge interest rate risk. The results indicate that the lower a bank’s exposure to interest rate risk, as measured by net interest margin, the more likely the bank is to use derivatives. The study also found that larger banks tend to use derivatives to a greater extent than smaller banks and those banks with a greater proportion of credit risk are more likely to use derivatives. It was also found...
that banks that utilize derivatives typically have a higher capital to asset ratio. This result might indicate that banks with relatively more credit risk are more likely to use derivatives. This study found no relationship between bank profitability and derivative use.

The study recommends that for commercial banks in Kenya to remain profitable they should have put into consideration the several proxies for derivatives highlighted in this study. This will help in making decisions about credit policies, matching investments to objectives, asset allocation for institutions, and balancing risk against profitability.

The study also discourages closeness of customers to bank employees as it has been reported to lead to operational fraud, employees are advised to try and live within their means, to avoid financial difficulties and hence minimizes occupational risk.

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