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Abstract

Credit risk is perhaps the oldest and most challenging risk for banks. The risk emanates from the probability that borrowers will default on terms of debt, subsequently putting the capital of a bank in jeopardy. This concern has resulted in several attempts to manage the exposure of banks to credit risk, the most notable one being the Basel-II accord – later revised to Basel-III. The Basel guidelines aim at entrenching strict culture of managing inherent credit risk by financial institutions. Kenyan banks, like other financial institutions elsewhere, face the same problem and rely heavily on collateral lending which is a traditional instrument of providing security against loan advances. Although collateral lending gives lender some confidence, it has serious shortcomings. Notably, it hampers competition and limits lending activity especially if the banking sector demonstrates over-reliance on it. This study used time series data, deploying cointegration and error correction techniques to identify a long-run model for determination of bank lending behavior in Kenya. Evidence of over-reliance on collateral lending by the banking sector in Kenya is found, which can be attributed to less attention given to other credit mitigation measures by banks. The study also reviews other credit mitigation measures like credit referencing which has been introduced in the market recently and credit risk transfer which has not been considered in Kenya. We conclude that deepening the use of credit referencing, and introduction of credit risk transfer instruments – most basic of which is credit derivatives – could increase lending activity so long as the necessary institutional capacity, regulation and oversight are addressed well in advance.

Introduction

Lending institutions play a major role in economic growth and development through provision of credit to execute economic activities. However, the major concern of any lender while advancing credit is how they will get their money back (Fleisig, 1995), and this implies that the engagement between lenders and borrower is accompanied by certain level of risk.

The major types of risks faced by lending institutions globally include market risk, operational risk, and performance and credit risks (Pyle, 1997). The level of each type of risk largely depends on the environment that the lending institution is conducting its operation. In the Kenyan banking sector for instance, while market risk is a great business concern for all institutions, credit risk is cited as a major concern by 95 per cent of the banking institutions (CBK, 2011). The overall observation of risks facing the banking sector is that while market risk can be easily managed through hedging activities, credit risk has emerged as a new management challenge to financial institutions (Gonzalez-Paramo, 2010)

Credit risk is defined as the change in the value of the asset portfolio of a bank, due to the failure of an obligor to meet his payment commitments (Pyle, 1997; CBK, 2005). The risk attributable to loan default leads to high effective borrowing rates, through a risk premium that varies with the exposure to default. This is because a bank has to undergo costs to carefully evaluate and closely monitor the risk, especially in an environment where probability of default is high (Parlour and Winton, 2008). In Kenya, credit risk is a real

threat to the banking industry due to the fact that loan portfolios form the largest part of the balance sheet items (CBK, 2005).

Bank for International Settlement (2004) identifies four major techniques of credit risk mitigation namely: collateral, guarantees, on-balance sheet netting and credit derivatives. The utilization of these techniques by banking institutions seems to be largely dependent on the national and/or environmental characteristics (legal and regulatory framework, national accounting systems), the size, sophistication and specific strategy of a lending institution. In Kenya, it is clear that the major strategy for credit default rate mitigation is collateral lending [Financial Sector Deepening-Kenya (FSD-Kenya, 2009)].

Collateral can generally be described as a defined asset issued by the borrower to the lender, in a show of commitment towards repaying the loan advanced. If the counterparty fails to honor his repayment commitments, the collateral is liquidated and the value of the loan recovered from such proceeds. Collateral involves contractual arrangements revolving around the defined asset which are generally difficult to implement in developing and least developed countries that have diverse[1] and weak legal and regulatory systems. This is detrimental to such economy because it exposes the capital of financial institutions to the risk of default by debtors, making it hard for both borrowers and lenders to meet their economic goals. Globally, there exist several forms of collateral accepted by banks for purposes of guaranteeing the recovery of loans like personal guarantors, receivables, fixed deposit accounts among others. The persistence of credit risk accompanied by growing importance of credit in the global economic setting has seen a shift in credit risk mitigation strategies, and that is the subject of this study.

1.1 The Problem

Credit risk is perhaps the oldest and most challenging risk for financial institutions, leading to innovations geared at addressing this problem (Broll, Pausch and Welzel, 2002). This risk emanates from the probability that borrowers will default on terms of debt, subsequently putting the capital of a bank in jeopardy. This concern has resulted into several attempts to manage the exposure of banks to credit risk, with the most outstanding one being the Basel-II accord – later revised to Basel-III. The Basel guidelines aim at entrenching strict culture of managing inherent credit risk by financial institutions globally.

Kenyan banks, like other financial institutions elsewhere face the same problem and rely heavily on collateral lending which is a traditional instrument of providing security against loan advances to the borrower. Although collateral lending gives the lender some confidence in business, FSD-Kenya (2009) notes that collateral has serious shortcomings in Kenya. Firstly, the choice of a borrower is inhibited by the fact that there are no concrete legislations on transfer of

[1] This is because assets presented as collateral in Kenya take several forms, with different legal requirements governing them.

collateral between lenders[2]. This leaves the borrower with no room to move to a more attractive option if collateral is already attached by one lender, even in an environment of changing interest rates. As a result, it is not possible for the borrower to switch to a financial services lender with more competitive rates making loans unresponsive to changing interest rates.

Secondly, land-related assets are the most utilized as collateral in Kenya. Land system in Kenya has its unique challenges, making clearing of the said asset quite slow and costly. For example to create and perfect a building in the capital city of Nairobi as collateral for a loan of Ksh.10,000,000, it will cost a total of Ksh.577,995 or 5.78% of the loan amount and sixty working days (FSD-Kenya, 2009). This in turn erodes the value of the loan advanced against such collateral because lenders transfer all the related financial and time costs to the borrower. Although there are measures being implemented by various stakeholders to remove these inefficiencies, they are likely to take a longer period to bear outcome and cannot promise an immediate solution to the policy concern of high cost of credit in the country.

Furthermore, the process of realizing the loan amount outstanding from security liquidation (enforcement) has proved to be very cumbersome and costly for lenders. The owners of property obtain court injunctions and restraining orders, which sometimes make it difficult to dispose the said property leaving the lender with unrealized securities and non-performing loans. According to FSD-Kenya, obtaining statutory power for sale of the property in the above scenario will cost the lender Ksh.379,700 and 150 working days if the borrower doesn't litigate. Otherwise the cost in terms of time and money may go up as it may take up to four years to realize the security.

Furthermore, the risk associated with collateral increases the capital requirement for banks, through increased capital provision for such risky assets. According to CBK (2006) a 50 or 100 per cent risk weight is attached to residential and other properties that are mostly pledged as collateral by borrowers, for purposes of determining the capital adequacy of a bank. This requirement and over-reliance on collateral imply limited capacity for creating loans (supply) as well as profitability of banks. In addition, difficulties affecting enforceability of collateral make lenders more risk-averse thereby limiting provision of credit for economic activity. Generally, over-reliance on collateral lending is detrimental to borrowers; lenders and the general economy. This study seeks to identify ways through which banks can lend more without over-relying on the collateral system, thus supporting economic growth and development goals.

1.2 Objectives of the study

1. Establish evidence for collateral-reliant lending in Kenya.
2. Identify other credit mitigation measures viable for the Kenyan Economy
3. Identify adapting measures to make the additional credit mitigation measures workable in the Kenyan system.

[2] Security interest, especially when in the form of immovable securities, is affected by several legislations, making effective transfer complicated. In essence the collateral system is not efficient enough, the fact that there seems to be heavy reliance on this form of credit mitigation notwithstanding.

1.3 Justification

Over-reliance on collateral lending in Kenya hinders economic development through high cost of borrowing and conservative lending behaviour by banks. This is due to shortcomings associated with collateral creation, clearing and enforcement distributed across legal and institutional spectrum and the wide use of collateral as a risk mitigation technique. Although there are on going efforts to address some of the problems affecting collateral, financial institutions need to explore ways to break the barriers of limited lending and high interest rates partly created by the status quo. These attempts will therefore be important in exploring and recommending such alternatives.

Literature Review

2.1 Credit risk mitigation problem and banking institutions

By its very nature, banking institutions are faced with the probability of default by counterparties in financial contracts. Loans constitute the biggest assets for banks, thus credit risk is arguably the biggest risk that banks face.

It is therefore necessary for banks to put in appropriate measures to first of all prevent occurrence of these risks, and be able to deal with the risk if and when it occurs. Credit risk mitigation techniques have evolved overtime, courtesy of global financial innovation. Traditionally, collateral and guarantees have remained the most popular credit risk reduction strategies. These are largely 'ex-ante' considerations, implying that any loan appraisals that do not pass this test are rejected. Moreover, the bank conducts a monitoring exercise to keep track of adverse changes that might affect the value of the collateral, periodic repayments as well as the total value of the loan (Radevic and Ahmedin, 2010). The most outstanding feature of the traditional credit risk mitigation measures is that loans remain in the balance sheet of the bank and a capital charge on this risky asset is subsequently conducted.

Perhaps, a general way of looking at the evolving credit risk mitigation measures is to make a distinction between the traditional and modern banking models. Boot and Schmeits (2005) note that in the former model, the originating bank holds risky, non-marketable and illiquid loans that are largely funded by deposits. However, the latter model introduces a way of transferring

the risk associated with such holdings through credit risk transfer mechanisms and instruments. Simply speaking, the originating bank assumes all responsibilities and risks of the entire credit process in a traditional model while in the modern model the credit process is unbundled with the originating function remaining with the bank as the associated credit risk is transferred to other market players. The traditional banking model brings on board other institutions like insurance companies and other agents that are best placed to handle that kind of business.

2.2 Over-reliance on collateral in the Kenyan banking sector

The Kenyan Banking sector constitutes 43 commercial banks and one mortgage financial institution[3]. According to the results of the risk management survey by the Central Bank of Kenya, the sector largely operates under the traditional model with collateral being the most popular credit risk mitigation technique (CBK, 2011).

To assess the over-reliance on collateral lending in Kenya, we make use of information from past surveys conducted to assess the same. The likely limitation from this attempt is that it will restrict the discussion to particular sectors of the economy that were covered by these past interviews, and the information is subject to the fact that this information was collected in the past. According to Larossi (2009) 90 per cent of firms in different sectors of the economy reported that collateral was a requirement for loan approval[4]. The study notes that this figure was highest among comparator countries in the developing nation's category namely: India, China and South Africa. Although Tanzania and Uganda were included, the percentage of firms reporting the same is not significantly different from that reported in Kenya. Looking at how firms finance their working capital and investment needs may further clarify the implication of the previous observation. The study notes that while financing of working capital from retained earnings is lower than South Africa but higher that in India, trade credit plays a larger role in Kenya than in both comparator countries. However, financing of working capital with bank credit is lowest in Kenya compared to India and South Africa. Long-term investment in Kenya is majorly financed by retained earnings, with 30 per cent of the sample reporting the use of bank credit to finance long-term investments. This is highest in all comparator countries, with India and South Africa having 20 per cent of the firms reporting the use of bank credit to finance new investment. The high use

3 There are other actors in the economy including 6 deposit taking microfinance institutions; 118 foreign exchange bureaus; two credit reference bureaus and representative offices of foreign banks. However, for the purpose of this paper, we will concentrate on the commercial bank and the mortgage finance institution because by the very nature of their business and size in the banking sector are largely affected by the problem of credit risk.

4 The survey that is the basis of this study was conducted in 2007. The sample comprised of 781 (657 formal and 124 informal) firms in the manufacturing and services sector. Regions of survey included Nairobi; Kisumu; Nakuru and Mombasa

of bank credit is attributed to lower cost of borrowing and availability of quality information for use by banks in the form of audited financial statements.

Given the high level of collateral requirements posted by the survey, one would expect the same to feature among impediments to finance. From the study, the popularity of posted collateral categories was as follows: machinery and equipment (60 per cent), land/buildings (50 per cent); accounts receivables/ inventories (45 per cent) and personal assets (28 per cent). Evaluations of reasons for loan rejection during the period of study revealed that unacceptable collateral was the most popular. The problem was found to be more severe for small enterprises (59 per cent reported collateral as main reason for loan rejection) compared to medium-large enterprises (19 per cent) and can be attributed to the fact that small enterprises may not own land and buildings or satisfactory inventories that is attractive for use as collateral.

The above findings present evidence of over-reliance on collateral-lending in Kenya. We however acknowledge the need for a more current study which covers larger sectors of the economy. It is not expected that the findings with respect to over-reliance on collateral will change significantly given that the Kenyan banking sector still operates under the traditional banking model.

2.3 Theoretical literature relating to bank lending

2.3.1 Credit Market clearing (neo-classical) theory

This theory postulates that if collateral and other pertinent restrictions remain given, then it is only the lending rate that determines the amount of credit that is dispensed by the banking sector. Therefore with an increasing demand for credit and a fixed supply of the same, interest rates will have to rise. Any additional risk to a project being funded by the bank should be reflected through a risk premium that is added to lending rate to match the increasing risk of default. Subsequently, there exist a positive relationship between the default probability of a borrower and the interest rate charged on the advance.

Although this theory does not explicitly discuss how collateral would impact on the risk premium, it creates the impression that collateral has no effect on lending rate, and if a risky borrower would wish to face the same lending rate as a borrower with a lower risk, then all that is required is to pledge more collateral to lower his risk profile and therefore enjoy a lower risk premium. This brings about the 'moral hazard' and 'adverse selection' phenomena, firstly because of information asymmetry existing between the lender and borrowers. The borrower has a more accurate assessment of the risk profile of this investment that is not known by the lender and thus may perform secret actions to increase the

risk of his investment without the realization of the lender. The adverse selection problem appears as lenders raise their interest rates to shield themselves from default and on the other hand attract only high risk borrowers and eliminate low risk borrowers.

2.3.2 Signaling Argument

According to this theory, borrowers who always have private information will be forced to reveal (signal) their better quality through pledging of collateral to show their better status as opposed to lower quality borrowers. This is because in the absence of full information the bank is not able to assess the true quality of a borrower and may resort to credit rationing in an attempt to mitigate the problem of adverse selection. Pledging more collateral is therefore viewed by borrowers a most credible signal of their commitment towards repayment of the advance amount[5]. Lower quality buyers who have private information regarding the true risk profile of their investment will shy away from pledging valued collateral, since they privately know that there is a higher chance of losing it because they will be unable to service the loans. Thus, they unknowingly send a signal regarding their ability to meet the contractual obligations. Higher premiums will be observed in borrowers pledging lower collateral while lower premiums will be observed for borrower pledging more collateral. However, there is the adverse signaling theory that is a counter to the signaling theory and it postulates that firms perceived to be less risky will pledge low or not premium.

2.3.3 Firm Characteristics

Lending institutions can study the characteristics of an individual firm and form unbiased opinion about the firm's future and ability to repay a credit advance. According to Ewert, Schenk and Szczensy (2000) "there are firm-specific agency problems that can be mitigated using collateral or such covenant and each firm chooses a financial contract that maximizes firm value by trading off additional bonding and monitoring costs against reductions in interest rate premiums". A firm-specific financial contract is thus made for each firm depending on the perceived problems of the firm in question, and the use of collateral by a specific firm can be observed to reduce the credit costs (high interest premiums). However, such conclusion will most likely not hold for many firms because, as mentioned before, there are high-risk firms that will offer valuable collateral and probably accept high premiums.

2.3.4 Loan Pricing Theory

This theory explains why it is not prudent for banks to set very high interest rates to optimize profit from loan sales. If banks set up very high interest rates, they could induce the problem of adverse selection and moral hazard by attracting borrowers with very risky

[5] The counter-argument to this is that the willingness of a borrower to give additional collateral may be a signal of weak investment fundamentals that necessitates additional comfort to the lender. This study has not tested this proposition, thus makes no recommendations in that regard.

projects into their portfolio. The high interest rates would later act as an incentive for the risky borrowers to consider adding more risk to their investment portfolio due to high affinity for high returns.

2.4 Empirical Literature

Olokoyo (2011) examines predictors of the lending behavior of Nigerian Banks. The study considers volume of deposits, foreign exchange, investment portfolio, minimum cash reserve ratio, lending rate, liquidity ratio and GDP. Utilizing time series data for the period 1980-2005, the vector error correction estimates indicate that while the coefficients of foreign exchange, investment portfolio, deposits and liquidity ration have significant impacts upon the lending volumes, the coefficients of lending rate and minimum cash reserve ratio were insignificant implying that monetary policy instruments do not affect bank lending volumes in Nigeria. The study does not, however, consider collateral as one of the explanatory variables; thus it is not possible to tell the impact of collateral requirements on the bank lending behavior in Nigeria.

Chernykh and Theodossiou (2011) investigated the determinants of long-term lending by banks to firms in an emerging market using bank-level information from 881 banks in Russia. The variables of concern include bank size, capitalization, liability structure, risk taking, ownership type, managerial expertise and location of individual banks. The findings reveal that the size of the bank (measured by assets) and the bank capitalization are the only determinants of not only loans expended to businesses but also long-term loans. This is attributed to the fact that bigger and well capitalized banks can withstand the risks emanating from long-term lending. The study thus demonstrates that there are supply-side constraints to credit expansion, although it did not consider the role of collateral on bank lending levels.

Ewert et al. (2000) study the determinants of bank lending performance in Germany using credit file information of 260 medium-sized firm borrowers for the period 1992-1998. The study aims at testing the several theories relating collateral to interest rate premiums and therefore lending performance, using a random effects model on panel data analysis to eliminate the borrower and time-specific effects. Two models were estimated with interest rate premiums and probability of distress as the two predicted variables .Interest rate premium was set to be predicted in a random effects model by among other variables: collateral; bank relationships; bank firm rating; firm characteristic and firm size. The highlight of this study's finding was that interest rate premium increased with rise in the collateral pledged. This was contrary to the signaling and firm characteristics theories above, where we would expect higher interest rate premium for firms pledging little or no collateral. However, estimation of distress probabilities of the same firms revealed that more collateral and covenant in credit contracts lead to lower distress probabilities. Combining the above results, the study

gives controversial finding that riskier credit contracts are assigned lower interest rate premiums by banks.

Panagopoulos and Spiliotis (1998) study the determinants of commercial banks lending behaviour to commercial firms in Greece by inferring on the Post-Keynesian notion that banks lend money for purposes of execution of production activities by firms. The study uses firm expenses as well as general macroeconomic monetary indicators to predict the level of loan advances to industrial, hand craft and trade companies in Greece. The loan predictor variables are last period loan amount, employment costs or wage bill, corporate tax expenses, deposits

Methodology

3.1 Empirical Model Specification, data description and sources

The foregoing theory and empirical survey suggests that there are several variables responsible for explaining the lending behavior of banks. Such variables include bank profitability, economic growth, level of non-performing loans, amount of held deposit, treasury bill rate/lending rate, among others.

The current study aims at assessing whether collateral influences the overall lending behavior of Kenya's banking sector. This orientation influences the choice of variables that may generally affect the overall lending by the banking sector. Collateral requirement is incorporated in the model, although no empirical study of a macro nature has demonstrated the impact of collateral on lending. The empirical model applied for the study is stated as follows:

$$ladv_t = a_0 + a_1 dep_1 + a_2 coll_t + a_3 gdpg_t + a_4 npl_t + a_5 ledr_t + \varepsilon_t$$

The variables were measured as follows:

variable	representing	How it was measured	Source of data
Ladv	Bank lending	Loans advanced by the banking institutions (Ksh. Millions)	KBA
Dep	deposit	Total deposits by banking institutions(Ksh. Millions)	KBA
Coll	collateral	Value of non-cumulated collateral value (KSh. Millions)	KBA
Gdpg	GDP growth rates	GDP (%)	KNBS
Npl	Nonperforming loans	Annual values of non-performing loans in Ksh. Millions)	KBA
Ledr	Lending rate	Overall annual lending rate	CBK

The data used spans the period 2002-2011, because of completeness of the series within the period. Due to the few number of observations, data is interpolated to quarterly frequency using the 'constant-match average' method given that the original data was not very smooth for most variables.

3.2 Time series properties and cointegration tests

Time series data is known to be non-stationary (the series evolves with time, is trended and thus not mean-reverting) implying that the assumptions of ordinary least square method no longer apply. The graphical expression for the variables used for this study is given in Appendix A1. Consequently, unit root tests (Augmented Dickey Fuller and Philips Perron) were performed on the series and the results are reported in Appendix A2. Overall, five variables (loan advanced, lending rate, non-performing loan, GDP growth and collateral) are found to be integrated of the same (first) order, while deposits and bank income series were found to be integrated of order two. The latter two variables were therefore left out of further analysis.

Johansen's cointegration test is conducted to check for existence of a long-run relationship among the series (loan advance, lending rate, GDP growth, collateral and Non-performing loans). The result of the Johansen cointegration test (with one lag) is given in Appendix A3. While the trace test reveals presence of two cointegrating equations, the Maximum Eigen value test indicates no cointegration at all. When the two tests disagree, reference to theoretical probability of existence of a long-run relationship among the variables is made. We thus uphold the trace test over the Maximum Eigen value test statistic, concluding that there are two cointegrated equations among the variables.

The cointegration equation (long-run relationship) normalized on our variable of interest is as follows:

$$ladv = 52.12 + 1.235*coll + 0.005gdpg - 4.69*npl - 0.06*ledr$$

Further, upon estimation of the VECM the sign of the adjustment term in the error correction model (loan advanced) is negative and significant implying that loans advanced and collateral terms adjust in the short-term

3.3 Interpretation of results

The purpose of the above exercise is to establish the relationship between collateral requirement and lending in the banking sector. The coefficient of collateral from the cointegrated equation is positive and significantly different from zero, implying that increased collateral is an important requirement for increased lending in Kenya. The results of this study are in line with the findings of Larossi (2009) discussed elsewhere in this paper, that conducted an assessment of collateral requirement for business loans whose results indicate that the Kenyan banking sector could be over-relying on collateral as a risk mitigation measure. The next section reviews other credit mitigation measures with an aim of recommending their adoption, if there is merit.

3.4 Overview of Credit Risk Mitigation options to collateral lending

3.4.1 Credit referencing bureau

These are information brokers, providing creditors with reliable, relevant and comprehensive data on the repayment habits and current debt of their credit applicants. Under reciprocity agreements, credit bureaus obtain data from creditors and other sources, consolidate and package information into individual reports, and distribute it to creditors at a fee, Bonalos (2000). They provide a number of benefits to the creditor and the applicant and this include expanding access to credit by allowing creditors to differentiate good and bad credit risks, reducing the cost of borrowing to good risks by increasing competition, and creating a credit culture as borrowers become aware that the market rewards and sanctions them based on their repayment history.

3.4.2 Credit derivatives

A derivative is a financial instrument (bilateral agreement between two parties) that derives its value from the performance of an underlying asset (Mengle, 2007). A credit derivative is one such instrument that offers protection against the risk of credit default, through transfer of credit risk from the originating bank to another institution specializing in selling credit protection (Ranciere, 2002; Kumar, 2007). This is in contrast to collateral lending which is an ex-ante way of trying to mitigate bank-held risk of default, because with credit derivatives the decision on whether or not to lend and how much to lend is made while knowing that the resultant credit risk will be transferred to another entity. Although other means of credit default protection have been in use (loan sales/securitization and letters of guarantee), credit derivatives are the latest innovation in two ways. Firstly they introduce a separate credit risk transfer market independent from the original loan process. Secondly, credit risk transfer is completely separate from the funding obligation (Rule, 2001). The art of credit transfer introduces other market participants and through the de-concentration of risks, creates additional financial stability (Greenspan, 2005). Because the primary business of commercial banks comprises of loans which carry the risk of default they are the major users of credit derivatives in the world.

3.4.3 How and why commercial banks use credit derivatives

A bank transfers the credit default risk by buying protection from entities specializing in protection sellers like insurance companies. The protection buyer gets premiums from the bank and undertakes to pay the bank the full or outstanding amount of the insured loan in the event that the reference entity defaults or a credit event as defined in the contract details occurs. According to Minton et al. (2009) there must be stronger reasons why banks would want to transfer credit risk given their advantage of customer relationship that allows them to monitor their debtors. Further, banks can choose to use loan securitization or loan sales, which remove the entire loan from the

balance sheet of the bank instead of using credit derivatives that leave the loan in the bank's books. The authors observe that there are associated costs to banks that occur with loan sales and securitizations, and the same do not manifest in credit derivatives. A major problem is the loss of borrower-bank relationship, once a loan is sold or securitized by a bank. This could be particularly relevant to the Kenyan case where competition for bankable population is getting stiffer by the day.

The major concern in the Kenyan banking sector is that lending capacity is affected by over-reliance on collateral lending. So, does the option of credit derivative bring about increased credit supply? There are few studies to the effect that introduction of credit derivatives and other credit mitigation techniques increase the bank credit supply (Minton et al, 2006). Hirtle (2008) finds that increase in credit derivative activity in US banks led to increase in credit supply to only large and long-term borrowers in the commercial and industrial sectors. This could mean that the characteristics of an economy would greatly determine whether or not credit derivatives stimulate credit supply.

3.4.4 Prerequisites for a credit derivative market

Credit derivative markets are largely two party agreements, and by virtue of the fact that they diversify credit risk into the wider financial system require well thought out legal and regulatory systems as well as sound precedents. The financial system has also to be assessed for interdependencies that could lead to system failures, like those witnessed during the World financial crises of 2008.

Credit derivatives introduce major players in the risk transfer market, especially the protection sellers and willing investors in trading of risk. The popular institutions forming this market include insurance companies who are net protection sellers as well as pension and hedge funds who may participate in risk trading. This study has not come across feasibility studies conducted to gauge an economy's preparedness for credit derivatives, and it looks like risk trading is spontaneously introduced in economies. However, there are studies (FSB, 2010; Olatundun, 2009) to assess the usefulness and examine the role of credit derivatives in the financial crises and they present a good evaluation of system weaknesses that need to be sealed for effective operation of a risk trading market. For the Kenyan case, it may require careful review of the regulator and legal system's capacity to handle such an innovation and the capacity of the other market players in the credit risk trading market.

Conclusions and policy recommendations

From the results obtained it is clear that collateral plays a significant role in the credit provision in Kenya. Given the shortcomings associated with collateral in Kenya as highlighted at the beginning of this study report, it is important for the banking industry to consider other credit mitigation measures in order to enhance provision of credit within the country. The following is a brief presentation of two of these options, acknowledging that one of them are already being implemented locally.

i. Credit reference bureaus

Credit reference bureaus (CRBs) provide a number of benefits to the creditor and the applicant and this include; expanding access to credit by allowing creditors to differentiate good and bad debtors. Secondly, reducing the cost of borrowing to good debtors by increasing competition and creating a credit culture as borrowers become aware that the market rewards and sanctions them based on their repayment history. CRBs are particularly useful for the household segment, which forms a large proportion of the loan market in Kenya and this may help in deepening credit access and lower risk premiums.

ii. Credit derivatives

Credit derivatives would introduce a separate credit risk transfer market independent from the original loan process. There are independent market participants in the credit transfer market, and the feasibility of such a market in Kenya could be carried out. Letting agents who specialize in trading of risk could create additional financial stability in the economy, which could enhance growth if there is proper regulation and sector governance rules. Although this proposition may by its very nature take some time to implement, the process need to begin early, in order to meet domestic credit demand from a growing corporate sector in Kenya.

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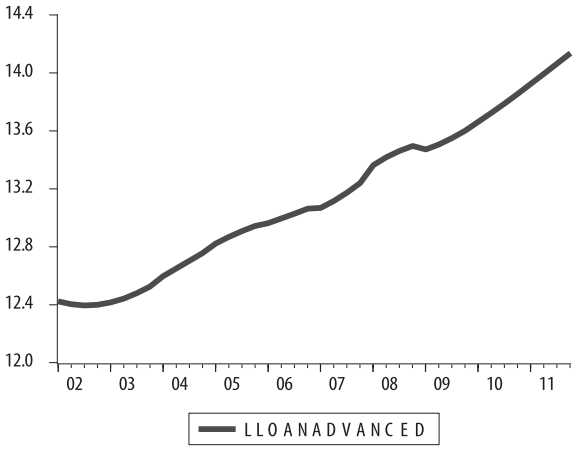
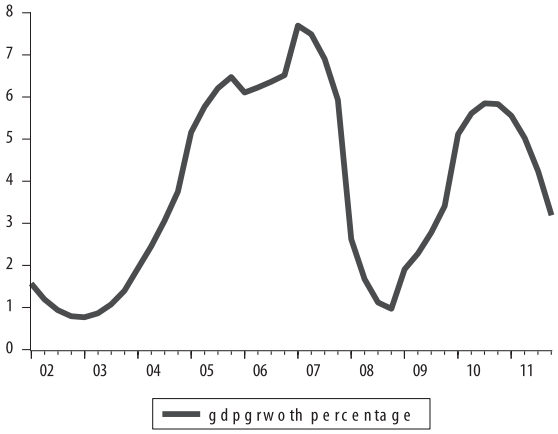
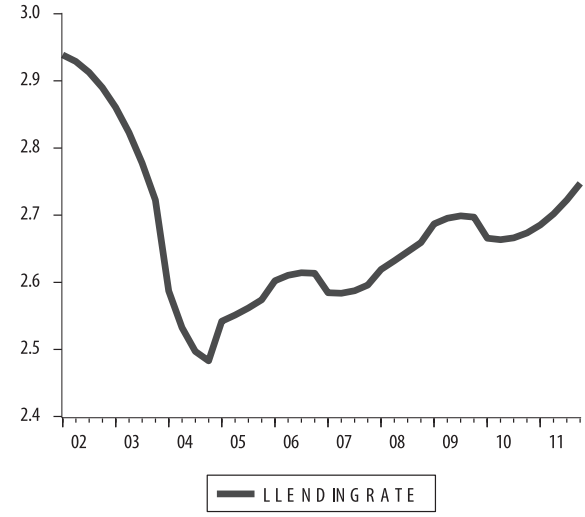
Appendix

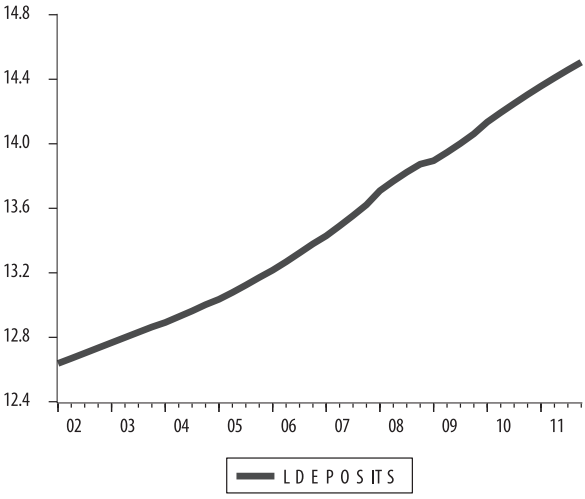
A1: Time series variables



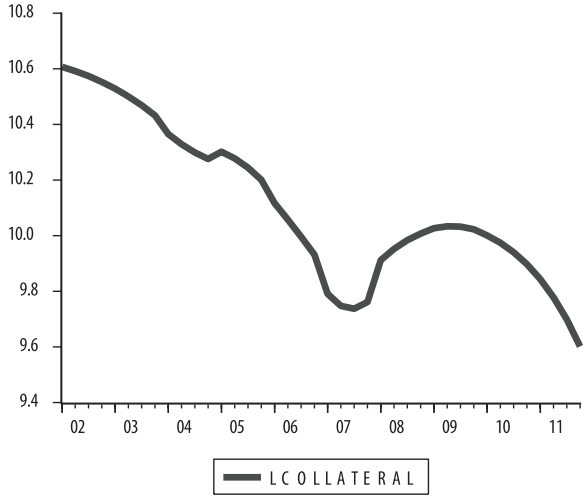


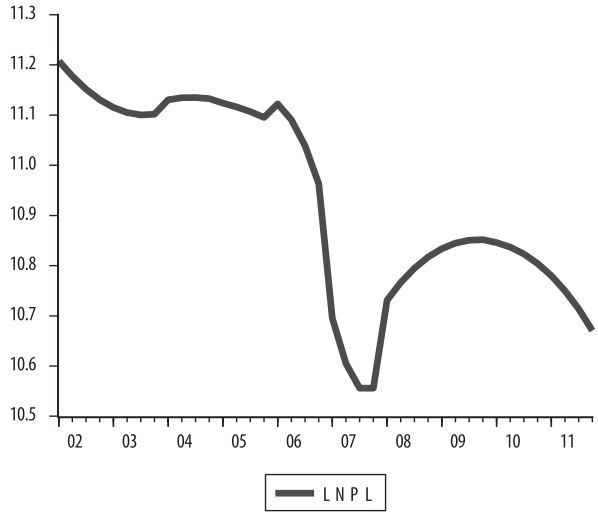
A1: Time series variables





A1: Time series variables





Variable	ADF			PP		
	Levels	1st difference	p-values	Levels	1st difference	P-values * I(1)
Loan advance	2.3850	-3.3779	0.021	-2.6662	-3.3785	0.018*
	-4.2191	-3.6156		-4.2119	-3.6156	
	-3.5331	-2.9411		-3.5297	-2.9411	
	-3.1983	-2.6091		-3.1964	-2.6091	
Lending rate	0.17009	-3.1358	0.034	-1.7644	-2.9227	0.05*
	-3.6702	-3.6701		-4.2119	-3.6156	
	-2.9640	-2.9640		-3.5298	-2.9411	
	-2.6210	-2.6210		-3.1964	-2.6091	
GDP growth	-2.5556	-2.9048	0.051	-1.8671	-3.1009	0.003*
	-3.6156	-3.6156		-3.6105	-2.6272	
	-2.9411	-2.9411		-2.9390	-1.9500	
	-2.6091	-2.6091		-2.6080	-1.6115	
Collateral	-2.3330	-2.0179	0.041	-1.7546	-2.6361	0.09*
	-4.2191	-2.6272		-4.2119	-3.6156	
	-3.5331	-1.9498		-3.5297	-2.9411	
	-3.1983	-1.6115		-3.1964	-2.6091	
Nonperforming loans	-2.6975	-3.5142	0.0129	-1.3250	-3.6396	0.009*
	-4.2191	-3.6156		-3.6105	-3.6156	
	-3.5331	-2.9411		-2.9390	-2.9411	
	-3.1983	-2.6091		-2.6080	-2.6091	
Deposits	-2.7292	-1.6134	0.46	-2.3471	-2.4138	0.1448
	-4.2529	-3.6394		-4.2119	3.6156	
	-3.5485	-2.9511		-3.5298	-2.9411	
	-3.2071	-2.6143		-3.1964	-2.6091	
Bank income	-2.9231	-2.4483	0.139	-2.3650	-2.5309	0.116
	-4.2268	-3.6156		-4.2119	-3.6156	
	-3.5366	-2.9411		-3.5298	-2.9411	
	-3.2003	-2.6091		-3.1964	-2.6091	

A3: Cointegration test results (1 lag)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.513665	76.52800	69.81889	0.0132
At most 1 *	0.473093	49.13538	47.85613	0.0377
At most 2	0.301570	24.78763	29.79707	0.1691
At most 3	0.215467	11.14865	15.49471	0.2025
At most 4	0.049454	1.927317	3.841466	0.1651

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.513665	27.39261	33.87687	0.2429
At most 1	0.473093	24.34776	27.58434	0.1230
At most 2	0.301570	13.63898	21.13162	0.3954
At most 3	0.215467	9.221332	14.26460	0.2682
At most 4	0.049454	1.927317	3.841466	0.1651

Max-eigenvalue test indicates no cointegration at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

A4: VECM results (1 lag)

Error correction	D (loan advance)	D (lending rate)	D (GDP growth)	D (collateral)	D (npl)
coinEq1	-0.0416	0.0073	1.2502	-0.0716	-0.1004
SE	0.0111	0.0165	0.3599	0.0189	0.0286
t-values	-3.7469	0.04424	3.4741	-3.7819	-3.5066

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