

## **EFFECT OF CREDIT INFORMATION SHARING ON DEFAULT RATES IN KENYA**

**Rosemary M. James** 

Department of Management Science, School of Business, Kenyatta University, Kenya

[james.rosemary@ku.ac.ke](mailto:james.rosemary@ku.ac.ke)

**X. N. Iraki**

Department of Management Science, School of Business, University of Nairobi, Kenya

[xniraki@gmail.com](mailto:xniraki@gmail.com)

**Julius Korir**

Department of Economic Theory, School of Economics, Kenyatta University, Kenya

[jkorir1@gmail.com](mailto:jkorir1@gmail.com)

### **Abstract**

*This paper provides an empirical assessment of the impact of credit information sharing on default rates in Kenya controlling for bank characteristics. Panel data from all the 43 financial institutions for the period 2008-2012 was used. Random effects regression results revealed that the presence of information sharing negatively impacted on default rates in Kenya. This implies that information sharing by banks created a disciplinary effect on the borrowers who put more effort to avoid default. However, the effect of the intensity of use of information sharing on default rate was not significant. The study recommends that sources of information for CRBs be expanded beyond the banking sector and customers be sensitized on the benefits of credit information sharing to enhance performance of the credit markets.*

*Keywords: Asymmetric Information, Default Rate, Information Sharing, Intensity of use of Information Sharing*

## INTRODUCTION

Efficient credit markets are important for economic growth and development. However, asymmetric information between borrowers and lenders results in inefficient apportionment of credit and credit rationing. In lending, the problem of asymmetric information arises where the lenders possess imprecise knowledge of a borrower's likelihood of repaying. This results in unpredicted default by borrowers, which is the main cause of the credit crunch. Lenders react to the asymmetric information and insufficient creditor safety by reducing the amount of credit supplied, increased lending rates, and shorter loan maturity (Bae & Goyal, 2009; Padilla & Pagano, 1997; Pagano & Jappelli, 1993; Stiglitz & Weiss, 1981). The end result is inefficient allotment of credit, less effective banking industry, sluggish economic growth and development (Beck, Levine & Loayza, 2000).

Collateral is frequently used as one of the ways to ease the problem of information asymmetry. However, the use of collateral to guarantee loans is often challenging mostly in developing countries and particularly for small and micro entrepreneurs (SMEs) and new firms which might lack tangible fixed assets that could be offered as collateral. Furthermore, liquidation of the collateral can be costly to the lenders and the process can be lengthy (Love & Mylenko, 2003). The other mechanism for easing asymmetric information is monitoring and screening by lenders. Screening enables lenders to acquire information about borrowers' characteristics including the uncertainty of their investment projects. After credit is granted, monitoring enables lenders to control the conduct of the borrower, who may not put effort to repay or may conceal the earnings of their investment to evade repaying the loan (Jappelli & Pagano, 2000). Sharing information gathered by lenders through monitoring and screening can create a credit market with reduced informational asymmetries leading to more efficient allocation of credit.

### Statement of the Problem

In Kenya, information asymmetry between banks and borrowers has been a contributory factor to the high levels of Non-Performing Loans (NPLs) in the country's banking sector (CBK, 2010). It is for this reason that the government licensed Credit Reference Bureaus (CRBs) to reduce problems of information asymmetries by facilitating credit information sharing effective 31<sup>st</sup> July 2010. It was envisaged that this would reduce the soaring levels of non-performing loans among commercial banks in the country.

Although there is strong evidence that sharing of credit information improves the efficiency of the credit market by reducing default rate, most of this is limited to the developed countries. In most developing countries, credit information systems are still in their formative

years and sharing of credit information among lenders is not strong (Luoto, McIntosh & Wydick, 2007). Further, Brown, Jappelli & Pagano, (2007) affirms that the scope and effectiveness of credit information sharing systems vary significantly between countries and whether information sharing is associated with efficient credit markets is left to the empirical evidence. Given the recent entrance of the CBRs into the financial market in Kenya, the emerging question is whether or not the introduction of credit information sharing has improved the efficiency of the credit market through reduced default rates. This study therefore sought to provide an empirical assessment of the impact of credit information sharing on default rates in Kenya controlling for bank characteristics.

## **LITERATURE REVIEW**

### **Theoretical Review**

The study was underpinned by the disciplinary effects model and the adverse selection model. Disciplinary effect happens when banks, instead of sharing information about the applicants' quality, communicate to each other data about previous defaults. Padilla and Pagano (2000) have shown that when lenders share default data, default becomes an indicator of bad quality for external banks and carries the penalty of higher lending rates or denial of access to credit in the future. To evade this penalty, borrowers put more effort, leading to a reduction in default rates.

In the adverse selection model, Pagano and Jappelli (1993) demonstrate that information sharing minimizes adverse selection by enhancing lenders information about borrowers. In this model, every lender has confidential information about the credit worthiness of their clients but has no information about new applicants. The new applicants, therefore, face adverse selection. However, these new applicants might have borrowed before from other banks and therefore are known to that bank. If banks share information about their customers' quality, they can assess the creditworthiness of the new applicants and lend to them as securely as they do with their long – standing clients and as a result, default rate decreases.

### **Empirical Review**

In an effort to validate these models, Jappelli and Pagano (1999) investigated the effects of private and public information sharing on bank lending and default rates. "Credit Risk" indicator based on the International Country Risk Guide (ICRG) survey of leading international bankers was used as a proxy for default rate. The fraction of non-performing loans was not a reliable measure since it difficult to compare across countries owing to international differences in the

definition of a non-performing loan. The results of the study show that default rates are inversely related with the indicators of information sharing.

The analysis by Kallberg and Udell (2003) complement and extends the empirical work of Jappelli and Pagano (1999). Their study, however, focused on the value added by information exchanges at the micro level (that is, the individual credit decision-making level) rather than at the macro level. The study results indicated that formal information exchanges added economic value. Their main result suggested that exchange generated information was valuable in assessing borrower quality.

Luoto et al. (2007) investigated the growth in credit information systems in developing countries. The study performed an impact analysis of a newly implemented credit bureau covering the microfinance sector of Guatemala. As a measure of delinquency, the percentage of loans in a branch that were late as of the last payment was used. Two indicators of information sharing were used. The first, a dummy equal to zero before the bureau was rolled out to a branch and one after, indicates the presence of the bureau, while a variable measuring the number of checks performed in the bureau each month measured the intensity of use. The fixed effects regression results showed that enhanced screening from the system made the level of arrears to decline approximately two percentage points after it was implemented in branch offices. An even more considerable and significant effect of the information system in reducing late payments that occur during the loan cycle was observed.

Adams, Liran, and Jonathan (2009) explored liquidity constraints and imperfect information in subprime lending. They used unique data from a large auto sales company to study credit market conditions for precisely the population that is most likely to have a difficult time obtaining credit, those with low incomes and poor credit histories. The principal characteristics of subprime lending were high interest rates and high default rates. With such a high probability of default, screening the good risks from the bad, and monitoring loan payments, was extremely important. The specific data consisted of all loan applications and sales from June 2001 through December 2004. The study found that lenders faced substantial informational problems. Default rates rose significantly with loan size, providing a rationale for loan caps and higher-risk borrowers demand larger loans. This adverse selection was mitigated, however, by risk-based pricing.

Many of the reported studies on the relationship between credit information sharing and default rates have been conducted in developed countries where credit markets are well developed. The Kenyan credit markets are relatively under-developed and credit information systems are still in their formative years. This study extends from other researchers by using

panel data to estimate the effect of credit information sharing on default rates in Kenya while controlling for bank characteristics; bank ownership structure, bank size and bank age.

### **Conceptualization and Measurement of Variables**

The dependent variable for this study was default rates. Data on the non-performing loans which was an indicator of default rates were collected from Central Bank of Kenya.

The independent variable was information sharing which had two indicators; presence and intensity of Information Sharing. Presence of information sharing was a dummy variable equal to zero before credit information sharing was rolled out and one after. The variable was to gauge the discrepancy in performance of default rates after the introduction of credit information sharing. Presence of information sharing was expected to reduce the default rates in the country's banking sector (Jappelli & Pagano, 1999).

Intensity of information sharing referred to the total number of consultations to the bureau's database made by the various banks. It was hypothesized that if lenders made reference to the credit reports from CRBs while evaluating the credit worthiness of their borrowers, they would enhance their knowledge of the applicants' characteristics and permit more accurate prediction of repayment probability. This would lower default rates and consequently reduce the cost of credit (Jappelli & Pagano, 2000).

Bank characteristics, that is, bank ownership structure, bank size and bank age were the control variables. The variable bank ownership structure was categorised as local and foreign. It was expected that foreign banks would benefit more from information sharing than their local counterparts. Bank size was categorized into small, medium and large banks as per the peer grouping of the financial institutions by CBK. Two dummy variables were used for bank size. The first Medium Bank, equal to one if a bank is medium and zero otherwise. The second, Large Bank, equal to one if a bank is large and zero otherwise. It was hypothesized that small banks would benefit more than larger institutions from sharing credit information. Bank age referred to the years of operation since its establishment. Banks with less than 20 years in operation were considered young banks. A dummy variable Bank Age equal to one for old banks and zero for young banks was used. It was expected that young banks would benefit most from information sharing.

### **Hypotheses**

- i) There is no effect of the presence of information sharing on default rates in Kenya.
- ii) There is no effect of the intensity of use of information sharing on default rates in Kenya.
- iii) There is no effect of the bank characteristics on default rates in Kenya

## METHODOLOGY

An explanatory non-experimental research design was adopted to analyse the effect of credit information sharing on default rates among financial institutions while controlling for bank characteristics. Explanatory research establishes causal relationships between variables (Saunders, Lewis & Thornhill, 2009 & Robson 2002). An explanatory non-experimental research design is appropriate where the researcher is attempting to explain how a phenomenon operates by identifying the underlying factors that produce change in it, in which case there is no manipulation of the independent variable (Kerlinger & Lee, 2000). This study was then explanatory non-experimental seeking to establish the effect of credit information sharing and bank characteristics on default rates.

The target population was the 43 financial institutions that are licensed under the Kenyan Banking Act 2010. These comprised of 42 commercial banks and 1 mortgage finance company. Out of the 43 institutions, 30 were locally owned and 13 were foreign owned. Based on the peer grouping by CBK, there were six large banks, 15 medium banks and 22 small banks. The study excluded the non-banks which include Micro-Finance Institutions (MFIs), Savings and Credit Cooperatives (SACCOs), other financial sector regulators and utility companies. The choice of the 43 financial institutions was based on the fact that these institutions are under obligation to submit their non-performing loans data and other information sets to licensed CRBs on a monthly basis. They are also the dominant players in the Kenyan banking system.

The study adopted a census approach because the financial institutions and CRBs in Kenya are relatively few. A census approach enhances validity of the collected data by including certain information-rich cases for study (Saunders *et al.*, 2009).

The study utilized panel data. Panel data enhances the quality and quantity of data to levels that would otherwise be impossible to achieve with either time series or cross-sectional data only (Gujarati, 2003). Data on non-performing loans which was an indicator of default rates were obtained from the financial disclosures prepared by banks on a quarterly basis for the period 2008-2012. CRB Africa provided the total number of consultations to the bureau's database made by the various banks for the same period, which was the measure of intensity of use of information sharing.

Descriptive statistics and panel data regression methods were used to analyze the data. The following empirical model was used:

$$DFTrate_{it} = \alpha_i + \beta_1 (ISpresence)_{it} + \beta_2 (ISintensity)_{it} + \beta_3 (Ownershipstrut)_{it} + \beta_4 (MediumBank)_{it} + \beta_5 (LargeBank)_{it} + \beta_6 (BankAge)_{it} \dots\dots\dots(3.2)$$

Where,

$DFTrate_{it}$  = Default rate of bank  $i$  at time  $t$

$ISpresence$  = Presence of Information Sharing

$ISintensity$  = Intensity of Information Sharing

$Ownershipstruc$  = Ownership structure of bank  $i$  at time  $t$

$Mediumbank$  = A dummy variable = 1 for medium bank zero otherwise

$Larg ebank$  = A dummy variable = 1 for large bank zero otherwise

$BankAge$  = Age of bank  $i$  at time  $t$

$\alpha_{it}$  = Unobserved random variables specific to cross sectional units capturing individual heterogeneity

Diagnostic tests were done to check for statistical problems inherent in the panel data. The Hausman test of model specification was used to determine the appropriate panel data model for the study.

## RESULTS AND DISCUSSIONS

### Descriptive Statistics

This study sought the opinion of the informants on whether there has been a reduction in the default rates in their respective banks after the introduction of credit information sharing in the country; the results are shown in Table 1.

Table 1: Reduction on Default Rates

	Response	Frequency	Percent
Has there been a reduction on the fraction of Non Performing Loans in your bank since the introduction of Credit Information Sharing?	Yes	27	75
	No	9	25
	Total	36	100

The majority of the respondents (75 %) reported that there had been a reduction in the fraction of NPLs in their banks since the introduction of information sharing. This shows that credit information sharing is a key factor in the reduction of default rates in the country. The study also sought to establish the relationship between the bank characteristics and the reduction in the fraction of non-performing loans. The results are reported in Tables 2, Table 3 and Table 4.

Table 2: Ownership Structure and Reduction in Default Rates

			Reduction NPLs		Total
			No	Yes	
Ownership Structure	Foreign	Number of Respondents	5	6	11
		Percent	45.5	54.5	100.0
	Local	Number of Respondents	4	21	25
		Percent	16.0	84.0	100.0
Total	Number of Respondents		9	27	36
	Percent		25.0	75.0	100.0

The results in Table 2 indicate that the majority of the banks that had witnessed a reduction in their fraction of the non-performing loans were local. However, there was no significant relationship between the ownership structure and reduction in default rate ( $\chi^2=3.535$ ,  $p=0.06$ ,  $\alpha = 0.05$ ) which implied that reduction in default rates was independent of ownership structure.

The results of Table 3 indicate that all the large banks had witnessed a reduction in their non-performing loans. The chi-square tests show that there was no significant relationship between the bank size category and reduction in default rate ( $\chi^2=2.857$ ,  $p=0.240$ ,  $\alpha = 0.05$ ) which implied that default rate and bank size were independent variables.

Table 3: Bank Size and Reduction in Default Rates

			Reduction NPLs		Total
			No	Yes	
Bank Size Category	Small	Number of Respondents	4	12	16
		Percent	25.0	75.0	100.0
	Medium	Number of Respondents	5	9	14
		Percent	35.7	64.3	100.0
	Large	Number of Respondents	0	6	6
		Percent	0	100.0	100.0
Total	Count		9	27	36
	Percent		25.0	75.0	100.0

In the bank age category, results in Table 4 show the majority of the banks that had witnessed a reduction in the NPLs were old banks. However, the chi-square tests show that there was no



significant relationship between the bank age category and reduction in default rates ( $\chi^2=0.059$ ,  $p=0.808$ ,  $\alpha = 0.05$ ) indicating that default rate and bank age were independent variables.

Table 4: Bank Age and Reduction in Default Rates

		Reduction in NPLs			
		No	Yes	Total	
Bank Age Category	Young	Number of Respondents	2	5	7
		Percent	28.6	71.4	100
	Old	Number of Respondents	7	22	29
		Percent	24.1	75.9	100
Total		Number of Respondents	9	27	36
		Percent	25	75	100

The study further sought to find out what the percentage decline was from those who had reported a reduction in their fraction of NPLs. The results are shown in Table 5.

Table 5: Percentage Reduction in the Default Rates

	Response	Frequency	Percent
By what percent was the reduction in the NPLs	Less than 1 percent	6	22.0
	1 to 3 percent	11	41.0
	4 to 6 percent	6	22.0
	7 to 10 percent	1	4.0
	More than 10 percent	3	11.0
	Total		27

Among those that had reported reduction in NPLs, 22.0 percent reported a reduction of less than 1 percent, 41.0 percent had a reduction of between 1 to 3 percent, 22.0 percent had a reduction in NPLs of between 4 and 6 percent, 4.0 percent reported a reduction of 7 to 10 percent while 11.0 percent had reported a reduction of more than 10 percent.

Many respondents attributed the reduction to the availability of customer track records during loan appraisal which had helped weed out the serial defaulters. The lenders were therefore firmer in providing credit facilities especially to those with unpleasant credit history. Fear by clients of being blacklisted was also pointed out as having contributed to the reduction in the fraction of NPLs. The respondents suggested that positive information should be shared

to better evaluate the customers and that information sharing should be broadened to include the microfinance institutions, SACCOs, other financial sector regulators and utility companies. In addition, borrowers need to be made aware that their loan histories are being shared among various lenders and have them understand the implication of this sharing.

### Diagnostic Test Results

To test for heteroscedasticity the modified Wald test for group wise heteroscedasticity in FE regression model was used. The null hypothesis is homoscedasticity or constant variance against heteroscedasticity of some unknown general form. The test produced a chi-square value of 310 and a p-value of 0.098 which led to the non-rejection of the null hypothesis of homoscedasticity.

To test for multicollinearity, Variance Inflation Factor (VIF) which quantifies the severity of multicollinearity in a regression analysis was used. The magnitude of multicollinearity was analyzed by considering the size of VIF. A common rule of the thumb is that if  $VIF > 10$ , then multicollinearity is high (Kutner, Nachtsheim & Neter, 2004). The results gave a mean VIF value of 1.54 indicating that there was no multicollinearity among the variables of the study.

The test for normality of the residuals was conducted based on the Jarque-Bera statistic. The test statistic is distributed as a chi-square with 2 degrees of freedom. The results showed that the residuals of default rate ( $Chi^2=1.892$ ,  $p=0.293$ ) were normally distributed.

The Im-Pesaran-Shin (2003) panel data unit root test was used to test for stationarity in the series. The test has the null hypothesis that all the panels contain a unit root, and the alternative is some panels are stationary. The IPS panel unit root test gave a value of -12.8456 with a p-value of 0.0000 indicating that there was no unit root and therefore the data was stationary.

The Hausman test was used to choose between fixed and random effects model. The null hypothesis of the test was that the random effects model was preferred to the fixed effects model. The test provided a p-value greater than 0.05 ( $Prob>chi^2 = 0.7858$ ) therefore the researcher failed to reject the null hypothesis that the random effects model was preferred to fixed effects model as recommended by Greene (2008).

### Hypothesis Testing

Data on Non-Performing Loans (NPLs) which was an indicator of default rate was regressed on the measures of information sharing that is, the presence and intensity, controlling for bank characteristics; bank ownership structure, bank size and bank age. Table 6 summarizes regression results for the variable default rate.

Table 6: Regression Results for the Variable Default Rate

Variable	Coefficient	Standard Error	Z	$P >  Z $
Presence of IS	-0.0377221***	0.0051487	-7.33	0.000
Intensity of IS	-3.33e-07	2.33e-07	-1.43	0.154
Ownership Structure	0.0453812	0.0282378	1.61	0.108
Medium Bank	-0.0582224**	0.0282081	-2.06	0.039
Large Bank	-0.0587865	0.0393313	-1.49	0.135
Bank Age	0.0037389	0.0055122	0.68	0.498
Constant	0.1129848***	0.028645	3.94	0.000
Observation	850			
Wald Chi2 (6)	73.03			
P-Value	0.0000			
Hausman Test	Prob>Chi2 = 0.7858			

\*\*\* Significant at 1% level of significance; \*\* Significant at 5% level of significance;

\* significance at 10% level of significance

The coefficient of the presence of information sharing was negative and statistically significant at 1 percent level. This implies that presence of information sharing was an important determinant of default rate. The negative coefficient suggests that, on average, default rate declined after the introduction of information sharing. This could be attributed to the fact that information sharing was mandatory for all the banks and therefore its presence created a disciplinary effect on the borrowers who put more effort to avoid default. These findings are in support of the assertion by Jappelli & Pagano (2000) that default rates are negatively correlated with information sharing indicators.

The result is also consistent with the findings of Padilla and Pagano (2000) who showed that when banks share data about previous defaults, default becomes an indicator of bad quality for external banks and carries the penalty of higher interest rates or no future access to credit. In this case, borrowers repay their loans because they know that defaulters will be blacklisted, reducing external finance in the future. The results also confirmed the findings of Klein (1992) who showed that information sharing can stimulate debtors to repay loans when the legal environment makes it hard for banks to enforce credit contracts. According to the estimates, the difference in default rate for the time periods before and after information sharing is

approximately 3.77 percent implying that on average default rate had declined by approximately 3.77 percent after the introduction of information sharing. Therefore it is in the interest of all banks to share information.

The coefficient of the intensity of use of information sharing was negative but not statistically significant at 5 percent. This implies that the intensity of use of information sharing was not an important determinant of default rate. Thus, the intensity of use of credit reports had very little effect on default rate. These results are inconsistent with the idea that information sharing increases banks' knowledge of the applicants' characteristics and allows more accurate prediction of the repayment probability (Jappelli & Pagano, 2000). However, the effect of the intensity of use of the credit reports would consist mostly of the screening aspect and credit information sharing in Kenya is still young which means that its effect on default rates may not have been fully absorbed.

The variable ownership structure had a positive coefficient which was not statistically significant. The positive coefficient indicates that the local banks are likely to exceed the foreign banks in their default rates meaning that foreign banks are associated with lower default rates as compared to their local counterparts. However, the difference between the two bank categories is not statistically different from zero even at the 10 percent level. This implied that the efficiency of the banks in managing their default rates was not different for local and foreign banks. This could be attributed to the fact that the banking sector in Kenya is a highly regulated industry.

The coefficient of the variable medium bank was negative and statistically significant at five percent level, which implies that medium banks were associated with lower default rates as compared to the small banks. On average, the estimates indicate that default rates for the small banks are likely to exceed those of the medium banks by approximately 5.82 percent. The coefficient of the variable large bank was negative but not statistically different from zero indicating that the difference in default rate for the small and large banks was not significant. Therefore both small and large banks have high default rates as evidenced by the p-value of 0.135. This is inconsistent with the expectation that large banks are more efficient in terms of managing their default rates. This efficiency of the medium banks as compared to the small and large banks brings out medium bank as an optimal bank size.

The coefficient of bank age was positive but not significant. The positive coefficient indicates that young banks were associated with lower default rate as compared to the old banks. This could be attributed to the fact that the old banks have been in operation longer and have therefore accumulated their non-performing loans for a longer period as compared to young banks. This difference however was not statistically different from zero even at the 10

percent level and therefore it was concluded that there was no significant difference in default rate between young and old banks.

## **SUMMARY AND CONCLUSIONS**

The empirical results showed that the presence of information sharing significantly reduced the default rates in the country. However, the intensity of information sharing had very little effect on default rate. The study therefore concludes that the presence of information sharing motivated borrowers to repay loans to avoid being blacklisted as defaulters as this would reduce their external financing in the future.

The estimate of the variable ownership structure indicated that there was no significant difference in the default rates between local and foreign banks owing to the highly regulated nature of the banking sector. Under bank size, there was evidence to show that the medium banks were associated with lower default rates as compared to small and large banks. The estimates of the variable bank age indicated that there was no significant difference in default rate between young and old banks.

## **POLICY IMPLICATIONS**

The results of this study have significant policy implications. Firstly, the study found out that on average default rate declined after introduction of information sharing. The study therefore recommends that the government puts non-banks such as MFIs, SACCOs and other financial sector regulators and utility companies under obligation to share their Non-Performing Loans (NPLs) data through the licensed CRBs. This would help enhance performance of the credit markets.

Secondly, the government needs to embark on effective awareness creation of the benefits of credit information sharing to the borrowers. The borrowers too need to be made aware that their credit histories are being shared among various lenders and have them understand the implication of this sharing.

## **SUGGESTIONS FOR FURTHER RESEARCH**

The current study used panel data regression models to establish the effect of credit information sharing on the default rates in Kenya controlling for bank characteristics. A similar study can be carried out that controls for the potential endogeneity of information sharing with respect to default rate to validate the findings of this study.

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