

AN ANALYSIS OF THE CAUSES OF BANK FRAGILITY IN ZIMBABWE (2003-2005)¹

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ABSTRACT *This paper analyses the causes of bank fragility in Zimbabwe during the period 2003-2005, which period saw ten financial institutions being placed under curatorship, with two being liquidated and one discount house closed. Ordinary least squares (OLS) regression and non-probabilistic qualitative questionnaire analysis was applied on data for the period 2003Q₃ to 2005Q₂. The main variables selected for analysis in this study are the CAMELS ratios and selected micro- and macroeconomic factors which could cause bank fragility. Model results showed that two CAMELS ratios, return on assets (ROA) and liquidity (LIQ) and the macroeconomic environment (real GDP growth) were the main significant causes of financial distress of the banking sector. Qualitative results from the questionnaires indicate that other factors like the unethical conduct of management, ineffective boards, disregard for risk management tools & techniques, poor security analysis, high concentration of loans, connected lending and diversion from core to non-core activities also contributed to the fragility of financial institutions. The study advocates for sound corporate governance policies and plausible risk management tools. The regulators should also develop comprehensive early warning systems (EWS and) and strive for a stable macroeconomic environment, both crucial to avert bank failures.*

Keywords: Financial system, Bank fragility, Zimbabwe

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Overview

In Africa, many banks, especially local banks are afflicted by financial distress and some are closed by the authorities or restructured. Allied Bank, United Bank, Volkskas Bank and parts of the Sage Group merged to form Amalgamated Banks of South Africa in 1991 after facing financial distress. In Kenya two local banks and 10 NBFIs were closed or taken over between 1984 and 1989. A further five local banks and 10 NBFIs were taken over in 1993/94, and two more local banks in 1996. In Nigeria four local banks were put under liquidation in 1994 and another had its license suspended, while in 1995 a further 13 local banks were taken over by the Central Bank of Nigeria (CBN). Many more local banks were distressed and subject to some form of "holding action" imposed by the CBN and Nigeria Deposit Insurance Corporation (NDIC) in 1995. The Bank of Zambia (BOZ) closed three local banks in 1995, including the local subsidiary of Meridien BIAO, a bank which had been founded in Zambia in the 1980s and had expanded into an international bank with subsidiaries in many African countries. Another Zambian local bank was closed in 1991, but was subsequently restructured and re-opened. The Bank of Uganda (BOU) closed down a small local bank in 1994 and took over two more local banks for restructuring in 1995.

The Zimbabwean banking sector was marred by a devastating banking crises during the 2003/2004 period, when ten financial institutions were placed under curatorship, with two being liquidated and one discount house closed after the Reserve Bank introduced stringent supervision and surveillance standards.

Reserve Bank fact finding surveillance team (RBZ publications: 2005) found out that the major causes of the problems experienced by the financial institutions were among a few, inadequate risk management systems, poor corporate governance, diversion from core business to speculative activities, rapid expansion, creative accounting, overstatement of capital, high levels of non-performing insider loans, unsustainable earnings and chronic liquidity challenges.

Rent seeking activities by financial institutions threatened the stability of the whole financial sector, to which Trust, Royal and Barbican Banks sunk deeply into the mud and could not float, which factor resulted in the trio being amalgamated into the Zimbabwe Allied Banking Group (ZABG) as the final Troubled Bank Resolution Plan. This resolution was contested in court by the banks in question (RBZ Troubled Bank Resolution Plan).

The issue of bank fragility has been receiving increasing attention in the international financial community and attempts have been made on both academic and policy fronts, to model financial fragility's causal factors and integrate a model with the more traditional macro-economic analysis, in both domestic and international dimensions.

The last quarter of 2003 and the first quarter of 2004 witnessed a disruptive financial liquidity crisis, insolvency and corporate governance deficiencies. By the end of 2004, ten banking institutions had been placed under curatorship, two were under liquidation and one discount house had been closed. The costs of bank failures are astronomical and there is need to understand the causes and the relevant policies.

The objectives of this study are:

- i. To identify the causes of financial fragility for the period under study.
- ii. To recommend policies that can be used to prevent financial fragility.

Hypothesis

H₀: The causes of Zimbabwe's banking sector fragility for the period 2003Q₃-2005Q₂ are independent of the factors internal to the specific institutions.

H₁: Zimbabwe's banking sector fragility for the period 2003Q₃-2005Q₂ was largely due to factors in the operating environment, hardly specific to the affected institutions.

Literature Review

A number of studies have been done on the subject of bank failures and the development of econometric models to predict bank failure. Altman (1968) developed his scoring model, which is a potentially fruitful exercise, even though early results are often unreliable because of the paucity of observations. Polius and Sahely (2003) used an approach which enlists the set of impaired institutions, by using banks that are subject to intensive central bank scrutiny before they have reached the stage of failure as the dependent variable. The best available specification would appear to be a logistic regression (logit) model, with individual financial institution impairment, solvency or failure as the dependent variable and as arguments, selected CAMELS ratios, interest rate changes, inflation, exchange rate changes, asset price changes, and indices of real output or sectoral growth. The Zimbabwean literature seems to lag behind in terms of studies done on the subject of financial fragility. The central bank assesses the distress of the financial institutions using the qualitative analysis of FSIs and the IMF Article IV Stress Testing Methodologies.

Caprio and Klingebiel (1996) point out the microeconomic reasons for the delayed realization of individual bank's troubles. Diamond and Dybvig (1983) explain bank failures (bank runs) arising from game situation between depositors and the bank with inefficient equilibrium. The inefficiency arises when there is a coordination failure among the depositors and creditors loose confidence in their bank.

Kaminsky and Reinhart (1999) analyze the links between the two crises found them independent in 1970s but entwined in 1980s. The causal relation is not unidirectional, however when both crises occur the banking crisis was normally found preceding a currency crisis and aggravated by it.

Stock market crashes may cause a deterioration in non financial firms' balance sheets that reduces the likelihood of their repayment of their loans, thus exposing the banks

The stock market declines in Malaysia, Indonesia and the Philippines occurred simultaneously with the onset of the crisis (Laeven, 2000).

Regulatory laxity can also fuel excessive risk-taking which causes bank fragility. This was noted in the inadequacy of the regulatory/supervisory system in Japan, Mexico and the crisis countries in East Asia which were notorious for weak financial regulation and supervision (Laeven, 2000).

Bongini *et al* (2000) who built on models that have been developed to predict the failure of individual financial institutions, so called early warning systems and find that traditional, CAMEL-type indicators help to predict subsequent distress and closure of banks and non-bank financial institutions in the East Asian crisis countries.

Distinguin *et al* (2009) developed an early-warning system of bank financial distress and critically evaluated the reliability and stability of the potential indicators or factors of banks in thirteen emerging economies in the MENA region. Evidence from their studies portrays that the capital, asset quality, earnings, and liquidity ratios are crucial accounting indicators.

Some studies tend to expand the quantitative analysis of the models (Kolari, Glennon, Shin & Caputo, 2002; Wheelock & Wilson, 2000) or incorporate efficient-market variables to examine stock price and interest rate effects on the financial condition of financial institutions (Curry, Elmer & Fissel, 2007)

Research Methodology

The research is going to use the Zimbabwean exploratory case study for the period 2003Q3-2005Q₂, which period the country experienced a hype of banking failures. The research uses an

Ordinary Least Squares (OLS) Model for determining the causes of bank fragility in Zimbabwe. The research largely adopts a model based on Dyrberg (2001)'s indicators of financial instability for the financial sector which basically hinges on the Capital, Asset Quality, Management performance, Earnings, Liquidity and Sensitivity to market (the CAMELS ratios). Data was collected from secondary data sources, for the financial sector. The secondary data was from journals, statistical abstracts, published company financial results as well as the RBZ database.

Quantitative data

Quarterly figures ranging from 2003Q₃-2005Q₂ for 30 financial institutions was used. Twelve (12) were identified as problem banks by the regulator for the same period. Out of the 12 identified problem banks, four were closed. The quarterly figures utilisation increased the sample size, which gave enough observation for the OLS model.

Qualitative data

A survey was undertaken with a sample mainly comprised of employees from the 28 operating financial institutions, former employees of the closed banks and four auditing firms. Ward (1992) states that for a sample to be representative of the total population it has to be at least 1% of the population. This study gives us more than 1% of the total population which means it is representative. Sampling makes the research practical to be undertaken, saves time, reduces research costs and increases reliability.

Sampling design

The two kinds of sampling designs to be used are the probability and the non-probability sampling designs. The research will make use of the simple random sampling for financial institutions and auditing firms. Simple random sampling method has the advantages that each element has got an equal chance of selection, it is cheap, simple, easy and less time consuming. The research will make use of judgmental sampling in selecting respondents, making it easy, convenient and also providing a reasonable indicator.

Data analysis procedure

As a preliminary analysis, the time series properties of the data are addressed to provide valid statistical inference and to avoid problems of spurious relationships and incorrect inferences. The time series characteristics of the data are analysed by utilizing the statistical tools such as the R-squared, the t-statistic, the probability value (p-value) and the Dublin Watson Statistic (DW

statistic). After establishing the statistical properties of the data, the significance of variables in relation to solvency was examined using least square regression analysis.

Model specification

For the causes of bank fragility, the OLS model will be:

$$car_1 = \alpha_0 + \beta_1 inl + \beta_2 npl + \beta_3 \log ta + \beta_4 roa + \beta_5 loss + \beta_6 liq + \beta_7 irsr3 + \beta_8 gdp$$

Where:

car = capital to risk weighted assets (capital adequacy ratio);

npl = non performing loans to total loans (asset quality);

logta = logarithm of total assets as a measure of bank size;

inl = insider loans to capital (management quality);

roa = return on total assets (earnings);

loss = total loan losses to net loans and leases (earnings);

liq = prudential liquidity ratio(liquidity);

irsr3 = interest rate sensitivity ratio (sensitivity);

gdp = percentage change in gross domestic product (macroeconomic condition);

α = intercept;

β = variable coefficient and;

μ = error term

Dependant variable (car)

Capital Adequacy is a measure of the bank's financial strength, in particular its ability to cushion operational and abnormal losses. A bank should have adequate capital to support its risk assets in accordance with the risk-weighted capital ratio framework (10%). The expected sign of the coefficient for capital adequacy and bank failure is negative. A bank with higher capital is less likely to fail than the opposite. This ratio was used as the dependant variable and as an indicator for bank solvency.

Asset quality (npl)

The quality of assets particularly, loan assets and investments, would depend largely on the risk management system of the institution. The asset quality is measured by the ratio of Non-Performing Loans (NPL) to total loans. The expected sign of the coefficient for non performing loans and bank failure is negative since deterioration in asset quality affects the soundness of a bank. A bank with higher NPLs is more likely to fail than the opposite.

Management quality (inl)

The performance of the other four CAMEL components will depend on the vision, capability, agility, professionalism, integrity, and competence of the bank's management. Management quality is generally accorded greater weighting in the assessment of the overall CAMEL composite rating. Management efficiency was approximated by the ratio of insider loans to capital.

Size of the bank (logta)

The size of the bank approximated by logta is used to determine if size matters when it comes to bank fragility. The larger the institution, the less likely it could be distressed and vice versa.

Earnings (roa)

The earnings of a bank depend on how well its assets and liabilities are managed. A bank must earn reasonable profit to support asset growth, build up adequate reserves, boost depositors' confidence and enhance shareholders' value. The state of banks' balance sheets has an important effect on bank lending. The Return on Assets (ROA) was used to approximate the earnings ability and is measured by the ratio of net income to total assets.

Total loan losses to net loans and leases (loss)

This variable is considered to be a good indicator of the quality of the bank's loan portfolio, and therefore the overall prospects of the institution. The *a priori* sign for this variable is negative.

Liquidity (liq)

A bank must always be liquid to meet depositors' and creditors' demand to maintain public confidence. The liquidity and solvency of a bank are directly affected by portfolio quality. Liquidity will be measured by the ratio of total deposits to total assets.

Sensitivity (irsr3)

The objective of interest rate risk management is to control the effects that interest rate fluctuations have on net interest revenue and on the net present value of the Corporation's assets, liabilities and off-balance-sheet instruments. Interest rate risk is measured using net interest margin simulation and asset/liability net present value sensitivity analyses.

Local economic condition (gdp)

Monetary stability is critical for financial sector stability. Asset prices can fluctuate unexpectedly in response to economic fundamentals. Real GDP growth rate will be used to approximate the macroeconomic performance of the economy.

4. Data presentation and Analysis

The ordinary least squares results

The OLS results show that the model was correctly specified as indicated by a relatively high R-squared of 57.1%, a DW statistic of 1.64 and a significant F-Statistic. The model results indicate that the solvency or fragility of institutions was 57.1% explained by the variables included in the model and 42.9% explained by other factors that are not captured in the model which have been explained by the qualitative analysis provided by the questionnaire. A DW static of 1.64 indicates that there was no autocorrelation of variables used which could have produced spurious relationships. Three variables, ROA, LIQ and GDP were statistically significant, while the remaining five variables were not statistically significant, as shown on the table below.

Table 1: OLS regression results

Dependent Variable: car

Sample: 2 – 234, Included observations: 233

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
A	18.39313	13.06866	1.407422	0.1607
Npl	-0.088414	0.210749	-0.419523	0.6752
Log(TA)	-0.947750	0.789560	-1.200352	0.2313
Inl	-0.000828	0.020958	-0.039524	0.9685
roa***	0.467055	0.137222	3.403639	0.0008
Loss	-0.170309	0.422196	-0.403388	0.6870
liq***	0.223770	0.051162	4.373722	0.0000
irsr3	-0.001635	0.002564	-0.637809	0.5242
gdp***	-4.474456	0.975474	-4.586956	0.0000
R-squared	0.570961			
F-statistic	36.116753			
Durbin-Watson stat	1.642064			

***Statistically significant variables at 5% confidence level.

Source: Authors' calibrations from OLS regression

The coefficient signs for NPL, Log(TA), INL, LOSS, IRSR3, and GDP are negative, while that for ROA and LIQ are positive. Overall, the model indicates that fragility was determined by both the micro and macro level causes. ROA, LIQ and GDP ratios are the main significant factors causing financial fragility of banks for the period under study. The results are largely in conformity with literature (Caprio and Klingebiel, 1996; Diamond and Dybvig, 1983; Hoelscher and Quintyn, 2003).

Asset quality, Management quality, Sensitivity and Size of the bank were found to be insignificant variables.

Earnings

There is a positive and significant relationship between the return on equity and capital adequacy. A unit increase in return on equity would increase capital adequacy by 0.467055. The sign of the coefficient is in conformity to theory which states that good earnings performance would inspire the confidence of depositors, investors, creditors, and the public at large and hence the soundness of the bank.

There is also a negative and insignificant relationship between the losses to gross loans ratio. A unit increase in the loss to gross loans ratio would decrease the capital adequacy ratio by 0.170309.

Liquidity

Liquidity as measured by the ratio of total deposits to total assets has a positive and significant relationship to capital adequacy. A unit increase in the liquidity ratio would increase the capital adequacy ratio by 0.223770.

Local economic conditions

There is a negative and significant relationship between gross domestic product and capital adequacy ratio. A unit decrease in real GDP growth would decrease the capital adequacy ratio by 4.474456 units.

Other factors affecting bank fragility

A survey carried out to establish the factors causing bank fragility during the period under review indicate that the causes were those internal to the banking sector as well as the condition of the operating environment.

A total number of 50 questionnaires were distributed and 38 questionnaires were returned giving a percentage of 76% which is a high response rate. Saunders *et al* (2003) places an emphasis on high response rate.

Financial fragility of the economy

Most of the respondents agreed that the economy was financially fragile for the period under study. However, one respondent was neutral indicating that they were not keeping abreast with the economic trends.

The Zimbabwean banking sector distress condition

Most of the respondents agreed that the banking sector was very distressed for the period under study, save for three respondents who disagreed. The responses were correctly specified, given that 12 out of 28 institutions were classified as problem banks for the period under study by the central bank (RBZ Troubled Bank Supplement, Jan 2006). The level of institutions that were distressed disrupted the efficient allocation of savings to investment opportunities, thereby making the financial sector very fragile.

Closure and placement of financial institutions under curatorship by the Reserve Bank

Many respondents were neutral, they felt that the regulator could have taken other options of re-floating the distressed institutions as stated in literature by Salman (2002), who pointed out that regulatory authorities might not provide the appropriate help in the form of advice and necessary support in time for correction. He further singled out that supervision might be lax in the beginning while problems are accumulating and magnifying and then suddenly rules would be applied drastically and haphazardly. This painted the exact picture of what happened during the crisis period under study.

Corporate governance factors as causes of distress/fragility in institutions

The respondents felt that management qualifications and experience were not the causes for the fragility of institutions. However, the respondents were of the opinion that unethical practices and ineffective boards were the causes of the fragility of financial institutions.

4.0.1 Risk management factors as causes of distress/fragility in institutions.

The respondents were of the opinion that risk management factors which caused the fragility were largely due to the management's disregard for risk management tools and techniques. Institutions were disregarding the prudential liquidity ratio minimum and diverting from their core to speculative activities, which strained their liquidity conditions.

Credit risk factors as causes of distress/fragility in institutions

The respondents were of the opinion that poor security analysis (which includes unsecured lending), high concentration of loans and connected lending, increased the credit risk of institutions which in turn caused the fragility.

Liquidity challenges as a cause for the distress/fragility of institutions

The respondents were of the opinion that the institutions were distressed due to strained liquidity conditions, given the mismatch between their asset and liability maturities. This was mainly

caused by taking short term depositors' funds to buy physical assets like properties or stock market equities.

Undercapitalization as a cause for the distress/fragility of institutions

The respondents were of the opinion that the distressed financial institutions were heavily undercapitalized. The responses were correctly specified given that most of the identified troubled institutions had capital adequacy ratios below the regulatory minimum of ten percent (RBZ Troubled Bank Supplement, Jan 2006).

Macroeconomic factors as causes of distress/fragility in institutions

The respondents were of the opinion that inflation was the main macroeconomic factor that influenced the distress in financial institutions. The responses are supported by literature which states that precarious macroeconomic conditions are themselves a potential source of financial crisis even for otherwise sound banking system. Further to the literature, authors like Hoelscher and Quintyn (2003) point out that macroeconomic imbalance also affects the weak banking sector in other ways, weakening it further.

The OLS model results from this chapter showed that two CAMELS ratios, return on assets (ROA) and liquidity (LIQ) and the macroeconomic environment (GDP percentage change) were the main significant causes of financial distress of the banking sector. Qualitative results from the questionnaires indicated that other factors like the unethical conduct of management, ineffective boards, disregard for risk management tools & techniques, poor security analysis (for example issuing of unsecured loans), high concentration of loans, connected lending and diversion from core to non-core activities were the contributory factors to the fragility of the financial institutions.

Conclusions and Recommendations

The strengths of a model forecast lead to a financial distress index able to explain phenomena in the banking sector. Results of the OLS model used in the study show that bank fragility was mostly explained by two ratios of the CAMELS, which is earnings ratio, return on assets (ROA) and the prudential liquidity ratio (LIQ). Bank fragility was also explained by macro-economic imbalances approximated by the percentage growth in GDP. Qualitative results from the questionnaires indicated that other factors like the unethical conduct of management, ineffective boards, disregard for risk management tools & techniques, poor security analysis (for example issuing unsecured loans), high concentration of loans, connected lending and diversion from core

to non-core activities were the contributory factors to the fragility of the financial institutions. This led the author not to accept the null hypothesis that bank fragility for the period under study was caused by micro level causes internal to the banks and conclude that bank fragility for the period 2003 to 2005 was caused by both micro and macro level causes, internal and external to the banks.

Chapter three of this study described a range of qualitative and quantitative information and techniques that can be used to identify potential strengths and vulnerabilities in the financial system. Once weaknesses have been identified, the next question to consider is how can this information be used to help maintain financial stability, and how can policies be enacted or changed to minimize the risks of financial fragility. The answers to these questions are multifaceted, and depend on the nature of the vulnerabilities that have been identified.

Vulnerabilities and the corresponding policy actions can be categorized into four key areas: i) macro-economic, ii) institutional (relating to weaknesses in particular institutions or classes of institutions), iii) regulatory or supervisory (relating to the design and implementation of regulations and prudential standards), and iv) structural (relating to the operational infrastructure of markets, settlement systems, and safety nets).

The mix and timing of policy tools needs to be appropriate for the vulnerability to be addressed. For example, if rapid credit growth is mainly a result of macroeconomic imbalances, it needs to be addressed primarily by macroeconomic stabilization policies, while prudential tools can play only an auxiliary role. Conversely, if vulnerability were mainly a result of weaknesses in banking supervision and regulation, then using macroeconomic policies would be a second best should reforms of supervision and regulation turn out to be insufficient or slow to yield results. Such weaknesses need to be addressed in a timely manner through improved prudential supervision and oversight, effective surveillance of individual institutions and markets, and the development and maintenance of a robust financial infrastructure.

Macroeconomic policy adjustment, even when they are second best, could be crucial, for example, to limit inflationary pressures, credit growth, or bubbles in certain sectors that could substantially impact the financial sector. Also policies to develop institutions and markets (for example, money or government securities market development) and build infrastructure (for example, design a large value payment system) by themselves pose additional financial and

macroeconomic risks, which need to be managed through prudential policies and macro policy adjustments.

The calibration of policies can take into account information obtained from the quantitative macro prudential tools, in particular early warning signs and stress tests. For example, in the context of macroeconomic policies, the CAMELS offsite ratio analysis, financial fragility index, probability of failure models and stress tests or sensitivity calculations can provide an assessment of how a certain interest rate and exchange rate policy mix can impact the financial sector and the resulting impact on the economy as a whole. Similarly, in the context of regulatory policies, simulations can be used to assess what would be the impact of an envisaged policy change (for example, an increase in provisioning rates) on the health of the financial system. In the context of supervision, early warning models and stress test results can be used to direct supervisory attention to those groups of institutions that pose the greatest risk for the system as a whole. Similarly, evolution of financial soundness indicators and information from macro prudential surveillance may call for a more intensive supervision in specified areas (for example, market risks, or country risks).

An assessment on the overall fragility of the financial system is based on combining the analysis of risks and vulnerabilities with the assessment of various financial policy responses and policy frameworks. If the potential vulnerability to plausible shocks were not high or if the policy framework and policy responses were considered appropriate, then the system is judged not fragile. The fragility considerations would typically dictate that a range of prudential, and market development policies be given high priority.

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