1.0 Introduction

The financial health of the banking industry is an important prerequisite for economic growth and stability. As a consequence, the assessment of banks’ financial condition is a fundamental goal for regulators and policy makers. The prediction of bank failures is very important for many reasons. An understanding of the factors related to an institution's failure will enable better bank management and regulate banks more efficiently. In other words, if examiners can detect problems early enough, regulatory actions can be taken either to prevent a bank from failing or to minimize the cost to the NDIC, CBN and the government.

Bank supervisors use on-site examination and off-site surveillance to identify the banks most likely to fail. The most useful tool for identifying problem institutions is onsite examination, where examiners travel to a bank and review all aspects of its safety and soundness. On-site examination is, however, both costly and burdensome: costly to supervisors because of its labour and capital intensive nature and burdensome to bankers because of the intrusion into their day-to-day operations.

Off-site analysis uses different methods, such as CAMEL-based approaches and Early warning systems. CAMEL ratings incorporate a bank's quality of its management and systems of internal control. While the quality of a bank's management is generally acknowledged to be a key contributor to institutional collapse, it is usually excluded from early-warning models for lack of a metric. In some instances, this variable is subject to the particular examiner's assessment and views. A different examiner may assign a different rating. This introduces a great deal of bias in the prediction of banking failure. In addition, the information content of the CAMEL ratings derived from on-site bank examinations can decay fairly rapidly, becoming obsolete in as little as six months (Cole and Gunther (1998)).

In addition, CAMEL relies on Call Reports data and accounting data that is available either monthly or quarterly but neglects market-based data. The financial world is aware of the information of market data (eg from stock exchange) as unbiased because it contains the view of investors about performance of the banks and other firms. Market data is also used as input to some early warning systems (eg Moody's default prediction models) with daily new information providing daily new bank prediction on failure.

As a result, new methods have been developed to forewarn bank regulators about possible vulnerabilities at both the systemic and bank-specific levels. These methods, which could be broadly classified as “Early Warning Systems of Bank Distress,” provide quantitative risk measures for the aggregate banking system and individual banks. When compared with all CAMEL ratings available at a given point in time, the Early Warning Systems of Bank Distress provide a more accurate indication of failure.
2.0 Types of Early Warning Systems of Bank Distress

The most commonly used models for predicting distress can be grouped under discriminant analysis, econometric and credit risk approaches.

The early multivariable models were largely developed using multivariate discriminant analysis (MDA). Discriminant analysis was a very popular method for model development in the early stages of bankruptcy prediction. One of the most well-known bankruptcy prediction models was developed by Altman in 1968 using MDA. MDA classifies firms into groups (bankrupt or non-bankrupt) based on each firm’s characteristics (ratios/factors). Based on the observations, coefficients are calculated for each characteristic (ratio). The products of the ratios and their coefficients are summed to give a discriminant score, allowing classification of the firm.

However, advancements and technology have made other methods (including logit analysis, probit analysis, neural networks and credit risk) more prominent.

The econometric models, logit analysis and probit analysis, take into account the probability that the firm will go bankrupt. The logit/probit models, typically, uses financial ratios to predict the probability of bank failure (EDF). The model assumes that the probability of bank failure takes a logistic functional form and is, by definition, constrained to fall between 0 and 1.

The famous rating agency, Moody’s, has developed a procedure for estimating the default probability of a firm that is based conceptually on Merton’s 1974 option-theoretic, zero-coupon, corporate bond valuation approach. The starting point of the Moody’s model is the proposition that when the market value of a firm drops below a certain liability level, the firm will default on its obligations. The value of the firm, projected to a given future date, has a probability distribution characterized by its expected value and standard deviation (volatility). The area under the distribution that is below the book liabilities of the firm is the Probability of Default, called the Expected Default Frequency.

3.0 Importance of Early Warning Systems

Cole and Gunther (1998) find that using CAMEL ratings to identify bank failures matches or exceeds that of off-site econometric model only when the ratings are based on exams conducted no more than one or two quarters prior to the forecast period. For the banks with ratings more than one or two quarters old, the probit econometric model provides a more accurate indication of survivability. The ability to detect a deterioration in bank condition from accounting and market data for much longer horizons using early warning systems will reduce the cost of monitoring banks by lessening the need for on-site examinations.

Regulators for a long-time depended on off-site early warning models, to supplement the CAMEL ratings derived from periodic on-site exams and to provide up-to-date assessments of
the financial status of individual banks. Another useful purpose of early warning systems as being used in FDIC is to detect the deterioration of a depository institution’s condition between scheduled examinations so that the FDIC can move that institution up in the on-site examination queue (Thomson, 1991).

Early warning systems (based on statistical techniques and credit risk models) reflect the rapidity with which the performance of a bank responds to a changing macroeconomic cycle, the conditions on the monetary and financial markets, and the interventions of the supervisory authority. Therefore, statistical techniques like discriminant analysis and probit/logit regressions play a dominant role in off-site banking supervision.

4.0 Objectives and Deliverables of the Exercise

As stated earlier, CAMEL-based prediction is subject to bias of the examiner, is accurate for a short-time period and neglects information in market data that is available intra-day, daily and weekly frequencies. This has made many regulators to either develop their bank failure prediction based on only Early Warning Systems (EWS) or complement CAMEL-based ratings with EWS. It is based on the foregoing that the NDIC is developing robust and reliable early warning system for predicting bank distress with a very good degree of accuracy a few quarters before the failure.

The specific objectives of the exercise are to:

1. Develop a reliable and easy to use early warning system for detecting bank distress within reasonable time for regulators to effect change in the identified bank.
2. Build a memory on supervised banks with particular emphasis on their health.
3. Capture possibility of systemic distress in the banking sector, therefore providing support for policy making.
4. Provide information about likely bank distress in-between on-site examination.
5. Optimize allocation of scarce resource used in banking supervision.
6. Establish reformatory strategies early so as to reduce the risk of costly bank failures.

The following deliverables will be provided:

1. At the end of the exercise, a software package that is robust, easy-to-use and reliable will be produced for ISD and other relevant departments.
2. A detailed user-guide on how to populate the database, run the application and produce results will be provided to ISD.
3. Staff training on how to use the package shall be conducted.
4. A detailed report will be written and delivered to management containing comparative analysis of different models with associated findings.
References:


