Neural Nets Versus Logistic Regression: A Comparison of Each Model’s Ability to Predict Commercial Bank Failures

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Introduction

According to SAS No. 59, The Auditor’s Consideration of an Entity’s Ability to Continue as a Going Concern [AICPA, 1988], the auditor has a responsibility to evaluate whether there is substantial doubt about the client’s ability to continue as a going concern for a reasonable period of time, not to exceed one year beyond the date of the financial statements being audited. Once this evaluation is complete, if the auditor concludes there is substantial doubt, he is required to add an explanatory paragraph to the audit report reflecting his conclusion. The going concern evaluation is particularly troublesome for commercial bank clients operating in a regulated environment. For these institutions, federal and state regulators ultimately decide whether and when a particular bank will be closed, and the auditor faces the additional challenge of predicting whether regulators will take such actions within 12 months of the date of the financial statements.

This study examines the usefulness of annual financial statement data and alternative modeling methodologies for modeling regulators’ decisions to close commercial banks. A bank failure prediction model could be applied at the audit planning stage (using annualized third quarter data) to aid resource allocation decisions. The model could also be applied at the review stage of the audit (using annual post-adjustment data) as an aid to the final opinion reporting decision.

We focus on two different methodologies - logistic regression and neural network computing - and compare their abilities to predict commercial bank failures over a 12-month horizon. Our preliminary results indicate that both methodologies yield similar predictive accuracy across the range of all possible model cutoff values, with the neural network performing marginally better in the “gray area” where some failing banks appear to be less financially distressed.

The remainder of the paper contains sections covering sampling methodology, selection of candidate predictor variables, modeling methodology, estimation of model fit, and prediction results. The paper concludes with a summary of our research findings.