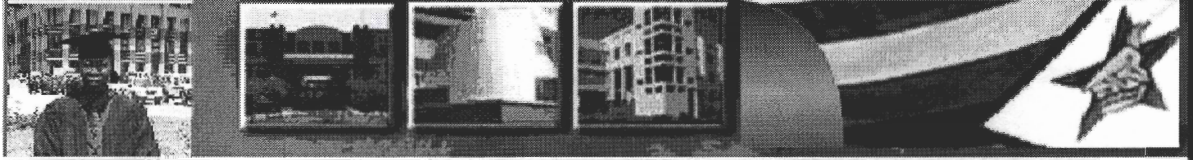


National University of Science and Technology

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FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED MATHEMATICS

DETERMINATION OF BENCHMARK OPERATIONAL RISK CAPITAL FOR ZIMBABWEAN BANKING INSTITUTIONS USING THE LOSS DISTRIBUTION APPROACH AND SIMULATION

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ABSTRACT

The Advanced Measurement Approach (AMA) in Basel II Accord permits unprecedented amount of flexibility in the methodology used by banking institutions to assess operational risk (OR) capital requirements. Since its adoption on during the end of 2007, firms in the developed markets have witnessed the advent of the loss distribution approach (LDA) as the generic AMA and the benefit of a lower OR capital allocation. This research primarily aimed at developing a robust benchmark (LDA) model for the determination of operational risk capital based on actuarial and statistical methods using existing operational loss data and generated scenarios. This was achieved through the identification, measurement and forecasting by way of simulation the likely levels of operational risks faced by banking groups in Zimbabwe as a case for the developing world. Theoretical and empirical literature studies were carried out so as to address the research objectives, questions and to justify the adopted modelling approach. A survey of risks faced by banks, current operational risk capital determination methods and various frequency and severity probability distributions was done and parallels drawn. An applied quantitative research design was adopted and focused on three banking groups and two commercial banks. Historical OR loss data, generated scenarios and minimum capital requirements are combined to produce scaled data which was then used to determine the parameters for the chosen Poisson frequency and two Gamma severity distributions. Finally a Monte Carlo simulation of up to 10,000 runs/replications per each event type were done for each event type to determine the Aggregate Loss Distribution whose percentiles were then used to come up with the OR Capital Charge in the form of Economic Capital (EC) and Capital at Risk (CaR). The research findings reveal that operational loss data have an identifiable frequency and severity distributions, with the two equal mean gamma densities giving similar estimates for CaR but differing on the EC estimates. The importance of operational risk management is highlighted and the operational risk exposures in Zimbabwe are suppressed mainly by low business volumes and few product ranges. The RBZ risk management guidelines have led to sound operational risk management which however lags behind on the quantitative aspects. The research findings point to a lower OR capital to MCR ratio of between 5-6% which supports the Basel II proposition of decreasing OR capital charge with increasing sophistication in quantification approach. From the research findings, a progressive operational risk management framework, a quantitative operational risk measurement guideline from the RBZ and collaboration between academics and practitioners can be recommended.