“The aim is to identify imminent systemic banking crises according to banking and economic behaviour before the crises occurs.” – Dr Joel Dabrowski

The Actuarial Society of South Africa (“ASSA”) Banking Committee and the International Actuarial Association (“IAA”) Banking Working Group hosted a webinar on the 7th of February 2018. The title of the webinar presentation was Systemic Risk Modelling and Early Warning Systems and it centred on predicting banking crises before they occur using the Naïve Bayes Switching Linear Dynamic System (NB-SLDS) model.

The webinar attracted 116 registrations and 73 attendees from across the globe. It was moderated by Kudakwashe Mupandawana, the ASSA Banking Committee Research Representative. The panellists were Dr Conrad Beyers, the current Barclays Africa chair in Actuarial Science at the University of Pretoria (South Africa); Professor Pieter de Villiers, an engineering professor at the University of Pretoria (South Africa); Dr Joel Dabrowski, a member of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Australia). All the panellists have done extensive research on applications of dynamic Bayesian networks as early warning systems for systemic banking crises. In addition, the panellists co-authored the paper, Systemic Banking Crisis Early Warning Systems Using Dynamic Bayesian Networks, which won the ASSA RGA Prize for best published paper in 2016.

Dr Conrad Beyers gave an overview of the research and work done to come up with the NB-SLDS model. He detailed how the systemic risk research considered different layers of complexity as banks interconnect not only amongst themselves but also with other financial entities. The research also takes into consideration changes over time and into the future.

Dr Beyers also spoke on bank networks and the effect of interventions and shocks e.g. legislation. He detailed issues considered for research. This included stress testing approaches of different regulators worldwide, credit ratings and, the cost and benefit of regulation. The work on Systemic Risk Modelling and Early Warning Systems shows that the financial sector is not efficiently modelled and there is need for a more robust methodology. This led to the development of the NB-SLDS model.

Professor Pieter de Villiers spoke on the modelling approach. He detailed how the models are based on a decision loop which considers how we view the world through our senses and sensors. The decision loop considers the following states; hidden world state; senses and sensors (only projections of the real world are observed); inference; modelling an aspect of interest and decision making. Prof de Villers also gave details on the assumptions used, the dynamism of the model as well as how predictions are made from the model.

Dr Joel Dabrowski gave details on the approach that was used to measure how the NB-SLDS model compared to other Early Warning Systems models (Logit, Signals, Hidden Markov and Switching Linear Dynamic Systems).
Dynamic System) in predicting imminent crises in the banking industry. He explained how the accuracy, recall, precision and F-score performance measures were used to determine the different models’ crises predictive powers. He shared results that showed how the NB-SLDS model was on average a better model in predicting banking crises.

The attendees asked a range of questions and made comments that showed great interest on the topic and a possible need for further research and engagement with banking stakeholders on model application.

The webinar was deemed a success with positive feedback by from the presenters, participants and organisers.

The recording and slides of the webinar can be downloaded from the following link:

http://www.actuaries.org/index.cfm?lang=EN&DSP=CTTEES_BANKING&ACT=DOCUMENTS