



INTERNATIONAL CENTRE
OF EXCELLENCE FOR
EDUCATION IN
MATHEMATICS

Credit Risk Modelling
David Farchione, Department of Mathematical and Statistical Sciences,
La Trobe University

Credit Risk modelling is concerned with the loss associated with a portfolio of obligors.

There are four types of Credit Risk models: asset value models, macroeconomic models, actuarial models and intensity models. I focussed on an actuarial model, namely the Credit Risk+ Model which was developed by Credit Suisse Financial Products.

I first constructed an independent Credit Risk+ model in which it is assumed that the number of defaults for a given obligor in the portfolio follows a Poisson distribution with its own fixed default rate and that the obligors in the portfolio are independent of each other. The analysis involved grouping exposures in the portfolio into exposure bands and then modelling the loss of a portfolio of obligors using a factorial moment generating function.

Secondly I constructed a sector Credit Risk+ model. In this model, it is assumed that each obligor is affected by a number of systematic factors and so obligors are allocated among several sectors in which the sectors are independent of each other. As a result, obligors are not independent of each other and the default rates of the obligors in the portfolio are now random since the default rates can be related to the volatility of a sector. To construct this model it is assumed that the number of defaults in a sector follows a Gamma-mixed Poisson distribution which in turn leads to a negative binomial distribution. The loss of the portfolio of obligors is then once again found using a factorial moment generating function.

I thoroughly enjoyed the AMSI scholarship program as it gave me a an opportunity to develop my research skills as a lead up to my Honours year in Statistical Science.