

Semi-Markov reliability credit risk models

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The analysis of rating migrations is one of the most important problems in the financial literature. Fundamentally it consists of computing the default probabilities of a firm having a debt. The literature on this topic is very wide; see i.e. Duffie and Singleton (2003) and Lando (2004). Organisations like Fitch, Moody's and Standard & Poor's, give ratings to firms agreeing to be inspected. Each firm receives a "rating" representing an evaluation of the "reliability" on its capacity to re-pay the debt. Clearly, the lower the rating, the higher the interest rate that the firm should pay. Usually the rating process is represented by Markov chains. In some papers, the unfitting of Markov processes in the credit risk problems has been outlined see Carty and Fons (1994), Altman (1998), Lando and Skodeberg (2002), Trueck and Rachev (2009).

To overcome these problems D'Amico et al (2005) presented a model based on homogeneous semi-Markov processes. Subsequently many generalizations appeared; see D'Amico et al (2007, 2009a,b). In this work semi-Markov models are applied and the benefits reached with respect to the Markov models are quantified. The models are implemented using the Standard and Poor's complete historical file.