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Our research examines the copula method used to rate collateralized debt obligations (CDOs) in the mortgage market. The copula method links the marginal probability of default of individual mortgages to a joint distribution, and takes into account correlation, which plays an important role in the financial industry. The most popular model used in industry is the one factor Gaussian copula. Through Monte Carlo simulation, we tested this and several other copula models against the two primary criteria used to rate CDOs: probability of loss, used by Standard and Poor's, and expected loss, used by Moody's. We extended the current research in two ways. First, we designed efficient computational programs to reach statistical conclusions by observing confidence intervals: the probability of loss criterion is a more conservative method. Secondly, we conclude that the different copulas used greatly affect the modeled risk, which should be considered seriously by credit rating agencies. (Received July 31, 2009)