Structural-default models rely on the appealing interpretation of corporate default as a consequence of insufficient asset values to cover contractual obligations of the corporate. Multivariate extensions typically assume correlated firm-value processes to introduce dependence between individual default events. On a theoretical level, the resulting default correlation and portfolio-loss distribution depend on the choice of the (multivariate) asset-value process and the definition of the default event. In most modeling frameworks, the explicit computation of default correlations and the portfolio-loss distribution is not possible. Therefore, balancing realistic assumptions with computational tractability is a key challenge for all multivariate structural-default models. Especially models for large portfolios, which are required for the pricing of portfolio derivatives and risk management, use simplifying assumptions concerning the firms involved, numerical approximations, and Monte Carlo simulations for the computation of the relevant quantities. An important example is Vasicek’s asymptotic single-factor model, which under several simplifying assumptions allows the derivation of a closed-form expression for the portfolio-loss distribution. This formula is used to compute regulatory capital for loan portfolios under the Basel II framework.