

## **A multiple state model for the joint-life reverse mortgage termination speed**

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Reverse mortgage loans have no scheduled periodic repayments of principal or interest. The lenders and investors have positive cash flow only at the loan termination time. It is widely recognized that termination speed is a major risk factor in assessing reverse mortgage loan performance. The original Home Equity Conversion Mortgage (HECM) termination assumption has been proved outdated. Multivariate statistical models have there-after been applied, in order to improve accuracy in predicting HECM repayment rates. However, multivariate statistical models need much economic and non-economic information about the borrowers, and the model specification is data-driven. This research extends a semi-Markovian joint-life mortality model to incorporate three main termination modes of reverse mortgages: death, long-term care (LTC) entry, and non-health related termination, which arises when the mortgagee moves out for non-health related reasons. The proposed model is practical, intuitive, and easy to capture dynamic termination patterns of reverse mortgages. Combined with an appropriate interest rate model and house price appreciation rate model, the proposed approach gives a comprehensive evaluation of the embedded "nonrecourse" provision in the reverse mortgages.