The pricing of insurance policies requires estimates of the total loss. The traditional compound model imposes an independence assumption on the number of claims and their individual sizes. Bivariate models, which model both variables jointly, eliminate this assumption. A regression approach allows policy holder characteristics and product features to be included in the model. This article presents a bivariate model that uses joint random effects across both response variables to induce dependence effects. Bayesian posterior estimation is done using Markov Chain Monte Carlo (MCMC) methods. A real data example demonstrates that our proposed model exhibits better fitting and forecasting capabilities than existing models.