There are a number of statistical models that could be used to analyze the simulation results. One possibility is to use a linear model. However, our response variables are fractional (i.e. the fraction of iterations that result in a certain outcome). Thus, application of a linear model would have several undesirable implications. Linear models require the marginal effects of explanatory variables be constant over their range. Yet our response variable is bounded by 0 and 1, so the effect of a particular explanatory variable cannot typically be constant. Relatedly, the predicted fractional responses from a linear regression may lie outside [0, 1].

Alternatively, we could model the log-odds ratio as a linear function of the explanatory variables. However, we have many observations that equal 0 or 1, and we would have to make an adjustment to many observations to proceed with estimation. Thus, we follow Papke and Wooldridge (1996) and assume

where is the fraction of iterations with a certain outcome, is a particular set of parameter values, is the logistic CDF, and is a set of parameters to be estimated. The log-likelihood for this model is