

Monte Carlo methods are widely-used simulation tools for market practitioners from trading to risk management. When pricing complex instruments, like mortgage-backed securities (MBS), strong path-dependency and high dimensionality make the Monte Carlo method the most suitable, if not the only, numerical method. In practice, while simulation processes in option-adjusted valuation can be relatively easy to implement, it is a well-known challenge that the convergence and the desired accuracy can only be achieved at the cost of lengthy computational times. In this paper, we study the convergence of Monte Carlo methods in calculating the option-adjusted spread (OAS), effective duration (DUR) and effective convexity (CNVX) of MBS instruments. We further define two new concepts, absolute convergence and relative convergence, and show that while the convergence of OAS requires thousands of simulation paths (absolute convergence), only hundreds of paths may be needed to obtain the desired accuracy for effective duration and effective convexity (relative convergence). These results suggest that practitioners can reduce the computational time substantially without sacrificing simulation accuracy.