Chen Liu* (chen.liu@cgu.edu), Qidi Peng and Henry Schellhorn. A Monte Carlo Algorithm for Path-Dependent Bermudan Option Pricing Combining Regression and a Backward Control Variate.

We consider the problem of pricing Bermudan options by Monte Carlo using a regression approach, in the spirit of Tsitsiklis and Van Roy (1999) and Longstaff and Schwartz (2001). We decompose the option value into a backward control variate, which conditional expectation is easy to calculate, and a remainder, which we handle like in the regression approach. We show that, under some mild conditions, our new estimator has a smaller variance than the traditional regression-based estimator. We then generalize our approach to price path-dependent Bermudan options. We first show that the curse of dimensionality exhibited by Glasserman and Yu (2004) for path-independent options is even worse in the case of path-dependent options. We consider the numerically challenging case where the time lag between two successive exercise dates is significant, and thus where the time step in the simulation of the state variable has to be smaller than that time lag. In that case, we resort to a new technique to calculate conditional expectations, based on Malliavin calculus. (Received August 29, 2015)