Computational Problem Set 9

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1 Results

I wrote code for all three methods. Log likelihoods for the three methods are similar, with values near -10000. All three methods are computed very quickly, with runtimes for a single likelihood costing around a second of computational time for GHK and quadrature, and under 1/10 of a second under accept/reject. To speed up computation, all random draws come from various precomputed Halton draws of appropriate dimensions, mapped into the appropriate distributions via the inverse CDF.

Method	Log Likelihood
Quadrature	-1.201e+04
GHK	-1.288e+04
Accept/Reject	-1.481e+04

Maximum likelihood estimates of the parameters are given. Computational runtime is around 30 minutes using the default settings in fminunc.

Due to issues (as of yet undiagnosed) in the likelihood estimates from my implementation of the quadrature method under extreme paramterizations, I used the GHK method in the log likelihood. This fixed the issues in optimization procedure and yields realistic looking results.

	$\hat{\theta}$
α_0	3.331
α_1	-2.138
α_2	-6.593
γ	-0.5693
ρ	0.03545
score_0	-0.3621
rate_spread	-1.49
i_large_loan	-0.7106
i_medium_loan	-0.1296
i_refinance	15.05
age_r	10.71
cltv	5.886