

## Online Supplement C

Table C1 presents the percentage of times<sup>42</sup> each type of draw performed the best, in terms of the lowest  $MTL_{0.05}$  for each number of draws.<sup>43</sup> In the overwhelming majority of cases, *Sobol* draws were the best – they resulted in the lowest variation of the log-likelihood function value of the estimated models.

**Table C1. Percentage of times each type of draw resulted in the lowest simulation error ( $MTL_{0.05}$ ) for the log-likelihood function value**

Number of draws used	<i>Pseudo-random</i>	<i>MLHS</i>	<i>Halton</i>	<i>Sobol</i>
100	0.00%	0.00%	19.44%	80.56%
200	0.00%	0.00%	25.00%	75.00%
500	0.00%	0.00%	22.22%	77.78%
1,000	0.00%	0.00%	25.00%	75.00%
2,000	0.00%	0.00%	0.00%	100.00%
5,000	0.00%	0.00%	19.44%	80.56%
10,000	0.00%	0.00%	16.67%	83.33%

The conclusions are similar when comparing simulation bias associated with parameter estimates.<sup>44</sup> Table C2 presents the percentage of times<sup>45</sup> each type of draw performed the best, in terms of the lowest  $MTL_{0.05}$  for each number of draws.<sup>46</sup> In the majority of cases, *Sobol* draws were the best – they resulted in the lowest variation of parameter estimates. The relative advantage of using Sobol draws is less evident than in the case of LL values but still evident, especially for higher numbers of draws.

**Table C2. Percentage of times each type of draw resulted in the lowest simulation error ( $MTL_{0.05}$ ) for the parameter estimates**

<sup>42</sup> Each cell of Table C1 corresponds to 36 dataset cases.

<sup>43</sup> Using  $MTL_{0.01}$  does not qualitatively change these results.

<sup>44</sup> It is worth noting, that in this case the absolute levels of parameter-specific  $MTL$  differed considerably. As expected, the lowest  $MTL$  were observed for the means of the discrete-valued variable ( $X_5$  or  $X_{10}$ ), while the highest were for the standard deviation of the alternative specific constant ( $X_1$ ). Nevertheless, *Sobol* draws consistently performed the best in all cases.

<sup>45</sup> Each cell of Table C2 corresponds to 450 dataset and parameter cases.

<sup>46</sup> Using  $MTL_{0.01}$  does not qualitatively change these results.

Number of draws used	<i>Pseudo-random</i>	<i>MLHS</i>	<i>Halton</i>	<i>Sobol</i>
100	2.67%	6.89%	36.22%	54.22%
200	1.11%	2.00%	30.67%	66.22%
500	0.89%	0.67%	37.56%	60.89%
1,000	0.22%	0.89%	28.44%	70.44%
2,000	0.00%	0.22%	19.33%	80.44%
5,000	0.00%	0.00%	36.67%	63.33%
10,000	0.44%	0.44%	32.22%	66.89%

Finally, Table C3 summarizes the performance of the different types of draws for the z-statistics of the estimated parameters; in other words, not only taking parameter estimates into account but also the associated standard errors. Z-statistics of parameters are important, because they usually provide a basis for judging if a parameter is statistically significant or not. Once again, using Sobol draws results in the lowest simulation error.

**Table C3. Percentage of times each type of draw resulted in the lowest simulation error ( $MTL_{0.05}$ ) for the z-statistics of the parameters**

Number of draws used	Pseudo-Random	MLHS	Halton	Sobol
100	2.22%	8.44%	37.56%	51.78%
200	1.56%	4.44%	33.78%	60.22%
500	1.56%	5.11%	32.89%	60.44%
1,000	1.11%	2.44%	26.00%	70.44%
2,000	1.11%	3.33%	23.78%	71.78%
5,000	2.44%	3.33%	29.78%	64.44%
10,000	0.00%	0.00%	29.11%	70.89%