Appendix C: Numerics and simulations across different market parameters

1 Simulation parameters

$\epsilon = 1$, $\alpha = 1$, $a_C = a_L = 0.5$
Drop the burn in time and calculate the value of the estimator on the time interval $[T_0 = 5, T = 25]$. Scale time by $\min\{\lambda, \tau\}$ so that the number of events (i.e., bookings) that occur in the time interval is consistent across different values of λ and τ.

2 Market scenarios

Analyze the effect of changes in customers choice set parameters on the behavior of the estimators, fix $\lambda = \tau = 1$
Varying average utility: scale the utility v, Low utility/ Medium utility/High utility (Figure 7)
Heterogeneity of customers: two customer types γ_1, γ_2, vary the ratio $v_{\gamma_2}(\theta)/v_{\gamma_1}(\theta)$, Homogeneous/Low level of heterogeneity/High level of heterogeneity (Figure 8)
Heterogeneity of listings: two listing types θ_1, θ_2, vary the ratio $v(\theta_2)/v(\theta_1)$, Homogeneous/Low level of heterogeneity/High level of heterogeneity (Figure 9)
Heterogeneity of treatment effect: two listing types, vary $\widetilde{v}(\theta_2)/v(\theta_2)$ and $\widetilde{v}(\theta_1)/v(\theta_1)$, Multiplicative/Heterogeneous treatment effects-amplify/Heterogeneous treatment effects-reverse (Figure 10)

3 Robustness with varying market balance

Vary λ/τ. The representative settings shown are low utility (varying average utility), high level of heterogeneity (heterogeneity of customers), high level of heterogeneity (heterogeneity of listings), and heterogeneous treatment effects amplifying existing preference (heterogeneity of treatment effects). (Figure 11-14)

4 Modifications of consideration sets

Fixed size K =50 consideration set. (Figure 15)

5 Remark

The number of listings and number of runs in the paper are $N = 5000, nruns = 500$. However, due to the limited capacity of my laptop, it took too many hours to run with this simulation setting, so I ran with $N = 1000, nruns = 100$. The resulting plots of bias and standatd error are quite similar with the plots in the paper, but the RMSE plots are different from the ones in the paper.
This discrepancy agrees with the finding of the paper: in a large enough market with a long enough time horizon, TSRI-2 is the estimator that minimizes RMSE, although this can change depending on the size of the market and the relative sizes of the bias and the standard error.