

# Replication instructions for “Semiparametric Bayesian Estimation of Dynamic Discrete Choice Models”

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## Contents

<a href="#">1 Summary of Matlab functions</a>	1
<a href="#">2 Rust (1987)’s model of bus engine replacement</a>	2
<a href="#">3 Gilleskie (1998)’s model of medicare use and work absences</a>	2

## 1 Summary of Matlab functions

### 1. `tune_hmc_given_m.m`

tunes the HMC parameters for simulating from the posterior distribution conditional on a particular value of the number of mixture components  $m$ . The tuning is done based on the Matlab built-in function `tuneSampler`.

### 2. `run_hmc_given_m.m`

samples the model parameters from the posterior distribution conditional on a particular value of  $m$ . The posterior sampling is based on `drawSamples` from the Matlab package `HamiltonianSampler`.

### 3. `run_jump_step.m`

draws the number of mixture components  $m$  based on the optimal reversible jump algorithm from [Norets \(2021\)](#).

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## 2 Rust (1987)'s model of bus engine replacement

Our results can be replicated as follows:

1. Run `Rust_estimation.m` in order to sample the parameters from the posterior distribution.
2. Run `Rust_post_estimation.m` to conduct the counterfactual analysis and produce the figures in the paper.

In the replication code, we set `Nmcmc_iter=500,000` for the actual application.

## 3 Gilleskie (1998)'s model of medicare use and work absences

The data set can be generated either from a non-logistic DGP or from a logistic DGP:

- `gilleskie_gen_data_evmix.m`  
computes the true CCP under a specified mixture data-generating-process and sequentially simulates the data on choices based on it.
- `gilleskie_gen_data_logit.m`  
computes the true CCP under the dynamic logit assumption and sequentially simulates the data on choices based on it.

Our results can be replicated as follows:

1. Run `Gilleskie_estimation.m` in order to sample from the posterior distribution.
2. Run `Gilleskie_post_estimation.m` to conduct the counterfactual analysis and produce the figures in the paper.

In the replication code, we set `Nmcmc_iter=20,000` for the actual application.

## References

- Gilleskie, D. (1998). A dynamic stochastic model of medical care use and work absence. *Econometrica*, 6(1), 1-45.
- Norets, A. (2021). Optimal auxiliary priors and reversible jump proposals for a class of variable dimension models. *Econometric Theory*, 37, 49-81.
- Rust, J. (1987). Optimal replacement of gmc bus engines: an empirical model of harold zurcher. *Econometrica*, 55(5), 999-1033.