

Bayesian Econometrics

PC Tutorial 02

Tutor: Richard Schnorrenberger

richard.schn@stat-econ.uni-kiel.de

Institute for Statistics and Econometrics
Kiel University

Winter Term 2024/25

Exercise 1

Consider the house price example discussed in the textbook and in the lecture. Try to replicate the results. To this end, proceed in the following steps.

- ▶ (a) Write a Matlab function `normgam_posterior.m` that computes the normal-gamma posterior of a multiple regression model with normal-gamma prior. Specifically, the user should supply data y and X as well as prior parameters $\underline{\beta}$, $\underline{\kappa}$, \underline{s}^2 , and $\underline{\nu}$. Then the function should compute and hand back posterior parameters, posterior means of β and h , and posterior variances of β and h .
- ▶ (b) Write a Matlab script that opens the data file `HPRICE.txt`, sets informative prior parameters $\underline{\beta}$, $\underline{\kappa}$, \underline{s}^2 , and $\underline{\nu}$ (e.g., those discussed in the lecture), calls the function `normgam_posterior.m`, and displays the results.
- ▶ (c) Add to the Matlab script a part that sets noninformative priors, calls the function `normgam_posterior.m`, and displays the results. Note: make sure that the function can handle zeros for $\underline{\kappa}$ and $\underline{\nu}$.

Exercise 1

- ▶ (d) Write a Matlab function `t_interval.m` that computes symmetric $100 \cdot (1 - \alpha)\%$ intervals for each of the k random variables of a k -dimensional t distribution with parameters μ , Σ , and ν .
- ▶ (e) Add to the Matlab script a part that calls the function `t_interval.m` and displays 95% and 99% HPDI intervals for β_1 to β_5 .
- ▶ (f) Add to the Matlab script a part that computes $p(\beta_i > 0|y)$, $i = 1, \dots, 5$, both based on the informative and noninformative priors.
- ▶ (g) (*) Add to the Matlab script a part that computes posterior odds ratios for models $M_i : \beta_i = 0$ compared to the unrestricted model.