MACROECONOMICS II 2025
PROBLEM SET I
DUE BEFORE CLASS ON APRIL 10

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Instructions: Write up answers neatly using a LaTex editor (or similar program). Hand in answers (in pdf form) and any code used for computations in a zipped folder named using the convention `macro_ps1_your_firstnames.zip`. You may work in groups of up to 3 students. It is enough for one group member to hand in the problem set. Make sure that *all* names and NetIDs of the group members are listed on the front page. Grades are Pass or Fail. If Fail, you can hand in again one week after deadline for half credit (if Pass at second attempt). Re-read the instructions for how to name the zipped folder.

Consider the classical model as described in CH. 2 of Gali's textbook (but disregarding the preference shock Z_t).

(1) Solve the model, i.e. find expressions for the endogenous variables y_t, n_t and ω_t as functions of productivity a_t and the model parameters. Use the parameterization

σ	φ	α	ρ_a	σ_a^2	β
2	3	0.3	0.8	1	0.99

where ρ_a is the persistence of the (log) productivity process a_t and σ_a^2 is the variance of the productivity innovations ε_t^a.

(2) Simulate 100 periods of the equilibrium outcomes for y_t, n_t and ω_t. Plot the time series. What are the sample variances of the endogenous variables? What are their sample (cross-variable) correlations? How do the sample moment differ from the population (i.e. the "true") moments? Why is there a difference?

(3) Compute and plot the impulse response functions of y_t, n_t and ω_t to a productivity shock ε_t^a.

(4) Redo part 1-3 with $\sigma = 0.5$. What do you conclude?

(5) Redo part 1-3 with $\varphi = 10$. What do you conclude?

(6) Redo part 1-3 with $\alpha = 0.5$. What do you conclude?

(7) Compute the standard deviation of the output gap as defined by the ST Louis Fed here: https://fred.stlouisfed.org/graph/?g=f1cZ If you want the standard deviation of output in the model to match that of the output gap in the data, which parameter(s) would you change and to what value(s)?

Date: March 25, 2025.