

**Problem Set 7**  
**Advanced Macroeconomics**  
**Winter 2025/26**

## **Centralized Ramsey Model**

Consider the Ramsey model in a centralized economy from the lecture, chapter 6.

1. Set-up the dynamic optimization problem of the central planner. Derive the first-order conditions for a welfare maximum.
2. Use the first-order conditions to set-up the dynamic equilibrium conditions and derive the analytical steady state.
3. Adjust the Dynare code from the lecture to simulate a positive shock on the capital depreciation rate, for example, as a consequence of a natural disaster that destroys a part of the capital stock. Plot the shock variable and all endogenous variables and explain what you observe.
4. \* Analyze how the steady state and dynamic adjustments change depending on various parameter values.