

Advanced Macroeconomics

2014/15 Winter term

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Tutorial 9: Business Cycles

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1. *Cyclical Components (see excel file)*

- (a) Detrend the time series and identify the cyclical components, given the concept of detrending presented in the lecture. Plot quarterly GDP data for the entire period.
- (b) Compute leading, lagging and centred moving averages for each quarter (using 9 and then 17 quarters).
- (c) Compute the cyclical component of GDP and plot it.
- (d) When are the peaks and troughs of business cycles in Germany?

2. *An OLG Model Under Uncertainty*

Consider an agent living for two periods. The constraint in the first period is given by:

$$w_t = c_t + s_t$$

Where w_t is wage at time t , c_t is consumption and s_t represents savings. In the second period, i.e. at $t + 1$, the constraint reads:

$$(1 + r_{t+1}) s_t = c_{t+1}$$

Where r_{t+1} is the interest rate, and consumption at $t + 1$ is given by the value of savings at t plus interests.

- (a) Rewrite the maximisation problem using the constraints and explicitly showing which part of the expression is uncertain. Write out the full form of the problem.

$$\max_{s_t} U = E_t \{u(c_t) + \beta u(c_{t+1})\}$$

- (b) Solve the maximisation problem in its full form.
- (c) Given the Cobb-Douglas preferences below, find the optimal consumption and saving paths:

$$\max_{s_t} U = E_t \{\gamma \ln c_t + (1 - \gamma) \ln c_{t+1}\}$$