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International Macroeconomics
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Midterm Exercise Sheet FS2021

1. Consider a small open economy in which the representative agent maximizes

$$U_t = \boldsymbol{E}_t \left\{ \sum_{s=0}^{\infty} \beta^s u(C_{t+s}) \right\}$$

with

$$u(C_{t+s}) = -\frac{1}{2}(h - C_{t+s})^2$$

subject to the intertemporal budget constraint

$$B_{t+1} = (1+r)B_t + NO_t - C_t$$

and $\lim_{k\to\infty} \frac{B_{t+k}}{(1+r)^k} = 0$.

The notation is familiar from the lecture:

B_t	Holdings of foreign bonds
r	World interest rate
C_t	Consumption
Y_t	Gross Domestic Product (GDP)
I_t	Gross Investment
$NO_t = Y_t - I_t$	Net Output / National Cash-Flow
$\boldsymbol{E}_t(\cdot)$	Expectations Operator
K_t	Capital stock
$I_t = K_{t+1} - K_t$	Investment

(a) Under the assumption that $\beta(1+r) = 1$, we have shown in the course that the current account balance, CA_t, is given by

$$CA_t = -\sum_{k=1}^{\infty} \frac{\boldsymbol{E}_t(\Delta NO_{t+k})}{(1+r)^k} \tag{1}$$

Carefully explain an empirical test of equation (1). In your answer give special attention to why it is important to include the current account in the forecasting equation for ΔNO_{t+k}.

(b) Now assume that net output is composed of permanent (P_t) and transitory (T_t) components so that

$$\Delta NO_t = \lambda \Delta P_t + (1 - \lambda)\Delta T_t$$

where $0 \leq \lambda \leq 1$ and

$$\Delta P_t = \alpha \Delta P_{t-1} + \eta_t$$
$$\Delta T_t = (\rho - 1)T_{t-1} + \nu_t$$

with α, ρ between zero and one and where η_t and ν_t are time t shocks. Use equation (1) to show that the response of the current account in period t ...

1. ... to a shock in ΔP_t equals $-\frac{\lambda\alpha}{1+r-\alpha}$
2. ... to a shock in ΔT_t equals $\frac{(1-\lambda)(1-\rho)}{1+r-\rho}$

(c) It has been observed that current accounts are more negatively correlated with (net) output growth in emerging than in developed economies. Suppose the above model can describe both groups of economies (i.e. emerging and developed). In which respect should the parametrization of the model differ between the two groups? Explain carefully!