ECON 520
International Macroeconomics   **25 May 2017**
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Final

1. (50 Points) An Infinite-Horizon Model

Suppose that there is an infinite-horizon **small** open economy in which utility function U of the representative agent is $U = \sum_{s=t}^{\infty} \beta^{s-t} U(C_s)$, $U(C_s) = \frac{C_s^{1-\theta}-1}{1-\theta}$ and $\beta = \frac{1}{1+\rho}$. In the model economy, current account identity is defined as $CA_s \equiv B_{s+1} - B_s = F(K_s) + \bar{r}B_s - C_s - I_s$, in which B_s is the value of net claims on the rest of the world, K_s is the physical capital stock, $F(K_s) = A_s^{1-\alpha} \cdot K_s^{\alpha}$ is the production function, and $I_s = K_{s+1} - K_s$. It is assumed that $A_{s+1} = (1 + \bar{x})A_s$ for $s \geq t$. Find the equilibrium path of C_t.
Hint: Do not forget to impose transversality condition in due place.

2. (25 Points) A Stochastic Current Account Model (Small-open economy)

Suppose that the representative individual, faced with uncertainty, maximizes the expected value of lifetime utility $U = E_t\{\sum_{s=t}^{\infty} \beta^{s-t} U(C_s)\}$, where the operator $E_t\{\cdot\}$ is a mathematical conditional expectation, $U(C_s) = \ln(C_s)$ and $\beta = \frac{1}{1+\rho}$. In the model economy, **income is given and fixed in all periods**, the (international) real rate of interest is $\bar{r}$, and current account is defined as $CA_t \equiv B_{s+1} - B_s = \bar{Y} + \bar{r}B_s - C_s$, in which B_s is the value of net claims on the rest of the world. Find the equilibrium path of C_t.

3. (25 Points) The Relative Price of Nontraded to Traded Goods

Consider a small open economy that produces two composite goods, tradables T and nontradables NT. Outputs are given by CRTS production functions of the capital K and labor N employed: $Y_T = A_T \cdot K_T^{\alpha} \cdot N_T^{1-\alpha}$ and $Y_{NT} = A_{NT} \cdot K_{NT}^{\beta} \cdot N_{NT}^{1-\beta}$, where A_T and A_{NT} are productivity parameters in the respective sector. Labor is **internationally immobile but can migrate instantaneously between sectors** within the economy. Total domestic labor supply is fixed, $N_T + N_{NT} = \bar{N}$. There is however **no economy-wide resource constraint for capital because it is internationally mobile**. It is assumed that one unit of tradables can be transformed into a unit of capital at zero cost. The utility function U of the representative agent is presumed to be $U = \sum_{s=t}^{\infty} \beta^{s-t} U(C_{T,s}, C_{NT,s})$, where $U(C_{T,s}, C_{NT,s}) = \ln(C_{T,s}) + \ln(C_{NT,s})$, and $\beta = \frac{1}{1+\rho}$. **Find the equilibrium value of relative price, $p = \frac{p_{NT}}{p_T}$.**
Hint: For a small country, the relative price is independent of consumer demand pattern.