Homework 3

- 1. Apply the classical theory of income distribution to predict the effect on the real wage (实际工资) and the real rental price of capital (实际资本租金) if the following events happen:
 - (1) An earthquake damages part of the capital stock.
 - (2) The government raises the retirement age.
 - (3) Inflation raises all prices (output price and factor-input prices) by 10%.
 - (4) A technological breakthrough improves the production function (suppose the production function is labor-augmenting). (hint: on labor-augmenting and capital augmenting technologies, read page 5 of macro03.pdf.)
- 2. Suppose that the output of an economy can be characterized by the Cobb-Douglas function,

$$F(K,L) = AK^{\alpha}L^{1-\alpha}, 0 < \alpha < 1.$$

- Calculate the marginal product of labor (MPL) and the marginal product of capital (MPK). Check whether they are positive.
- (2) Calculate the second derivatives. Check that MPL is decreasing as L increases and that MPK is decreasing as K increases.
- (3) Verify that the Cobb-Douglas function satisfies constant-return-to-scale.
- 3. Suppose that every year in Shanghai, 2% of married couples get divorced and 3% of single adults get married. Define a steady state, and what would be the steady-state percentage of single people in the adult population?