14.02 Principles of Macroeconomics, Spring 2000
2 pages

Problem Set 2
Due: Wednesday, February 23

Question 1. (5 points each) True, False, Uncertain. Provide a brief explanation.

a) The *four tigers* are four high-growth economies in East-Asia.

b) A country can increase its GDP per-capita only by investing more in physical capital.

c) If a country makes even a small investment every year, its GDP per-capita must be growing.

d) Economic growth is not a modern phenomenon. GDP per capita has been growing steadily in the last 1,000 years.

e) Saving reduces aggregate demand so it is bad for growth.

f) A regression of Y on X does not necessarily tell us whether Y is caused by X.

g) The actual values are always larger than the fitted values of the regression.

Question 2 (40 points) **Building a Macro Model**

Consider the following economy.

Consumers pay a tax of 25% of their gross income (wages plus dividends). They spend 80% of their disposable income on consumer goods.

Firms pay 80% of their revenues (GDP) as wages. They pay the rest as dividends to stockholders (the consumers). Investment is 10% of GDP but falls by \$100 for every 1 percentage point increase in the interest rate (r). Assume for now that $r = 0$.

The government purchases goods worth \$500 a year. Exports are \$1000 a year. Imports are one third of consumption.

a) (10 points) Which variables are exogenous and which are endogenous in this model? Write the behavioral equations of the model.

b) (5 points) What is the share of consumption in GDP?

c) (10 points) Find the equilibrium values of GDP and consumption. What is the government budget deficit/surplus?

d) (5 points) Suppose that exports increase to \$1100. What is GDP in the new equilibrium? Is the change in GDP greater/smaller than the change in exports? Give the intuition.

e) (5 points) Suppose exports remained at \$1000 but the government wanted to attain the new level of output that you found in (d). By how much would it have to raise its spending to achieve that goal?

f) (5 points) Now assume that the central bank (The Fed) wants to completely undo the effect of increased government spending (from part e) on output. In other words it wants to keep GDP at the equilibrium level you found in (c). By how much should it increase the interest rate?

Question 3 (25 points) **Econometrics**

An economist used data on consumption (C) and disposable income (Y) over many years. He applied an appropriate econometric procedure to estimate the following aggregate consumption function:

$$C_t = \alpha + \beta Y_t + residual \tag{1}$$

The regression yielded the following estimates $\alpha = 5$, $\beta = 0.7$.

a) (10 points) Suppose that for one of the observations in the sample $Y_t = 100$ and $C_t = 125$. What is the fitted value for that observation? What is the residual? Interpret the residual.

The researcher also estimated the following regression:

$$\log C_t = \alpha + \beta \log Y_t + residual \tag{2}$$

b) (10 points) Explain the difference in the interpretation of β in equations (1) and (2).

Consider another model:

$$C_t = \alpha + \beta_1 Y_t + \beta_2 Y_{t-1} + residual \tag{3}$$

c) (5 points) Interpret β_2. Can you suggest why it might be positive?