Nanyang Technological University
School of Social Sciences

HE2002 Macroeconomics II AY23-24 SEMESTER 2

Tutorial 9

1. **Chapter 10, Q2. Assume that every month the average student in Japan and the average student in China buy the quantities and pay the prices indicated in the following table:**

	Food		Transportation Services	
	Price	Quantity	Price	Quantity
Japan	¥600	60	¥170	80
China	RMB15	50	RMB3	100

   (a) Compute the Japanese consumption per student in yen.

   (b) Compute the Chinese consumption per student in yuan.

   (c) Suppose that 1 yuan is worth 17 yen. Compute Chinas consumption per student in yen. Is it larger or smaller than consumption per person in Japan? This method of comparing consumption in China to consumption in Japan uses market exchange rates.

   (d) Using the purchasing power parity method and Japanese prices, compute the Chinese consumption per student in yen.

   (e) Under each method, is the standard of living in China lower than in Japan? What difference does the choice of method make?

2. **Chapter 10, Q3**

   Consider the production function:

$$Y = K + 2N$$

   (a) Compute output when $K = 10$ and $N = 20$.

   (b) If both capital and labor triple, what happens to output?

   (c) How would you qualify the returns to scale for this production function?

   (d) Write this production function as a relation between output per worker and capital per worker.

(e) Let $K/N = 2$. What is Y/N? Now double $K/N = 4$. Does Y/N double as a result?

(f) Does the relation between output per worker and capital per worker exhibit the same returns to scale as the production function in part (c)?

(g) What is the difference between the two production functions?

(h) Plot the relation between output per worker and capital per worker. How does the shape of the relationship between the two compare with Figure 10-4?

3. **Chapter 10, Q4 The growth rates of capital and output**

Consider the production function given by $Y = \sqrt{K}\sqrt{N}$. Assume that N is constant and equal to 1. Note that if $z = x^a$, then $g_z \approx a g_x$, where g_z and g_x are the growth rates of z and x (See Appendix 2 at the end of the book).

(a) Given the growth approximation here, derive the relation between the growth rate of output and the growth rate of capital.

(b) Suppose we want to achieve output growth equal to 2% per year. What is the required rate of growth of capital?

(c) In part b, what happens to the ratio of capital to output over time?

(d) Is it possible to sustain output growth of 2% forever in this economy? Why or why not?