

# Macro Problem Set 3

## Q1

The economy Keynesia is characterized by the following equations, with all numbers in \$:

- Consumption:  $C = 800 \text{ million} + 0.8(Y - T)$
- Investment:  $I^P = 500 \text{ million}$
- Government expenditure:  $G = 300 \text{ million}$
- Net taxes:  $T = 500 \text{ million}$
- Net exports:  $NX = 400 \text{ million}$

- a. Show that the equilibrium output for Keynesia is \$8,000 million. Draw a Keynesian Cross diagram (output on the horizontal axis, aggregate expenditure on the vertical axis) to illustrate the equilibrium.
- b. Suppose government expenditure falls by \$200 million.
  - i. Show that the new equilibrium output is \$7,000 million. Illustrate your new equilibrium by adding to your Keynesian Cross diagram.
  - ii. Describe qualitatively the process by which the economy moves to a new goods market equilibrium.

## Q2

The economy Taxia is identical to Keynesia, except for net taxes, which are not autonomous, but instead varies positively with the economy's output.

- Taxia's net taxes:  $T = 0.0625Y$

- a. Is this a more realistic assumption of net taxes than that in Keynesia?
- b. Show that the equilibrium output for Taxia is also \$8,000 million.
- c. **Submission not required, for discussion in class.** If you were to sketch the aggregate expenditure line for Taxia in a Keynesian Cross, how would its slope differ from the aggregate expenditure line for Keynesia?
- d. Suppose government expenditure falls by \$200 million.
  - i. By how much does equilibrium output fall?
  - ii. Explain how Taxia's tax system makes its economy **more stable** than Keynesia's.

**Q3**

The economy Investia is identical to Keynesia, except for planned investment, which is not fully autonomous, but is composed of an autonomous part and a part that varies positively with the economy's output.

- Investia's investment function:  $I^P = 100 \text{ million} + 0.05Y$
- a. Is this a more realistic assumption of planned investment than that in Keynesia?
- b. Show that the equilibrium output for Investia is also \$8 billion.
- c. **Submission not required, for discussion in class.** If you were to sketch the aggregate expenditure line for Investia in a Keynesian Cross, how would its slope differ from the aggregate expenditure line for Keynesia?
- d. Suppose government expenditure falls by \$200 million.
  - i. By how much does equilibrium output fall?
  - ii. Explain how the way planned investment reacts to changes in output in Investia's economy, makes it **more volatile** than Keynesia's.

**Q4**

Consider the Keynesian model of a closed economy, with output  $Y$ , consumption function  $C = a + b(Y - T)$ , and other autonomous expenditure  $I^P$  and  $G$ .

- a. Verify that when the economy's goods market is in equilibrium, the following equation holds:  $S = I^P + (G - T)$ , where  $S$  is saving.
- b. Starting from an equilibrium, suppose households decide to increase saving by \$100. This is represented in the Keynesian model as a fall in autonomous consumption, from  $a$  to  $a - \$100$ . Show algebraically that when the economy reaches its new equilibrium in the Keynesian model, saving subsequently falls by \$100, canceling out the initial increase.
- c. Discuss the answer that the Keynesian and Classical models provide for this question: "are attempts by households to increase saving good for the economy?"
- d. **Submission not required, for discussion in class:** Why might one expect that real world expenditure multipliers are not as large as the Keynesian model suggest, but not as small as the Classical model suggests?

**Q5**

Read pages 15-22 of "Discretionary Fiscal Policy in Economic Downturns" (pages 15-22) in the Singapore Government's Budget Highlights Financial Year 2009, 22 January 2009 (available for download on LumiNUS). Use the reading to do the following activities.

- a. Explain the importance of fiscal stimulus being well-targeted.
- b. **Submission not required, for discussion in class:** Drawing from personal experience or general knowledge, describe a fiscal stimulus measure that the Singapore

government used during the recent Covid-19 recession, and explain the appropriateness of the measure's targeting.

- c. List three factors that affect (i.e., either strengthen or weaken) the case for using discretionary fiscal stimulus against recessions in Singapore, compared to other countries in general. For this, you may benefit from reading the Macro 3 reading excerpt by Tim Harford.