

ECON20001 Intermediate Macroeconomics

Tutorial 10 (Week 11)

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This tutorial will be recorded for self-isolating students.

Introduction

Zheng Fan

- Ph.D student in Economics at Unimelb
- Consultation & Ed discussion board (your first priority)
- Email coordinators for administrative issues
- Consult Stop 1 for special consideration

Before asking any questions, make sure you have gone through the Ed discussion board, subject guide, announcements and Q&A on Canvas!!!

Last week lectures

Open economy

- Openness in goods markets, financial markets, and factor markets

Good market:

$$\frac{\$US}{\$AU} \uparrow \rightarrow \text{value of } \$AU \uparrow.$$

- Nominal exchange rate: relative price of domestic currency in terms of foreign currency. Indirect quote: increase \Rightarrow appreciation.
- Real exchange rate: relative price of domestic goods in terms of foreign goods

$$\varepsilon = \frac{\overset{\$AU}{P}}{\underset{\$US}{P^*/E}} = \frac{EP}{P^*} \rightarrow \$US (\text{price of goods in } AU) \rightarrow \$US (\text{price of goods in the US})$$

- $\varepsilon \uparrow$: real appreciation: An increase in the relative price of domestic goods in terms of foreign goods

$$\varepsilon \uparrow \rightarrow \begin{matrix} P \uparrow \\ P^* \downarrow \end{matrix} \rightarrow \begin{matrix} X \downarrow \\ M \uparrow \end{matrix} \rightarrow NX \downarrow.$$

Last week lectures

Financial markets:

- Balance of payments: trade flows and financial flows
 - The current account: sum of net exports, net income from abroad and net transfers received
 - The capital account: net capital flows
- Interest parity condition

$$1 + i_t = (1 + i_t^*) \frac{E_t}{E_{t+1}^e} \Rightarrow i_t \approx i_t^* - \frac{E_{t+1}^e - E_t}{E_t}$$

Last week lectures

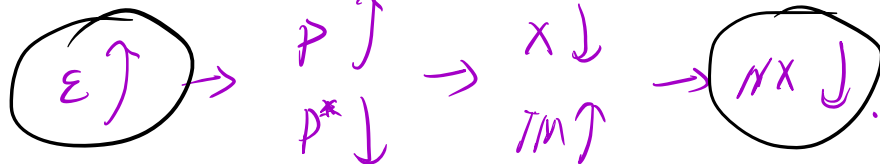
Demand for domestic goods: $Z = C + I + G + X - IM/\varepsilon$

Model: $NX(\varepsilon) = X(Y^*, \varepsilon) - IM(Y, \varepsilon)/\varepsilon$

- Substitution effects:

- X decreases in ε

- IM increases in ε



- Valuation effect: denominator in $IM(\cdot)/\varepsilon$

- Marshall-Lerner condition satisfied if

- $NX(\cdot)$ is overall decreasing in the real exchange rate

- 'valuation' effect smaller than the 'substitution' effects

Last week lectures

closed : $G \uparrow \rightarrow Y \uparrow \rightarrow C \uparrow \rightarrow Y \uparrow \rightarrow C \uparrow \rightarrow \dots$
 open : $G \uparrow \rightarrow Y \uparrow \rightarrow \boxed{NX \downarrow} \rightarrow Y \uparrow \rightarrow \boxed{NX \downarrow} \rightarrow \dots$

Goods market equilibrium in an open economy:

- Increases in demand

$G \uparrow \rightarrow Y \uparrow \rightarrow NX \downarrow$

- Domestic demand: Government spending $\uparrow \rightarrow$ output \uparrow and net exports \downarrow

- The multiplier is smaller in open economy

- Foreign demand: $\uparrow \rightarrow$ output \uparrow net exports \uparrow

$Y^* \uparrow \rightarrow NX = x(Y^*, \epsilon) - IM(Y, \epsilon) / \epsilon$

- Fiscal policy and exchange rate policy

- Exchange rate policy: a real depreciation

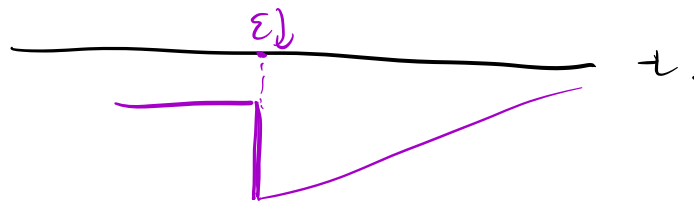
- Trade deficit falls

$\epsilon \downarrow \rightarrow NX \uparrow \rightarrow Y \uparrow$

- Output rises

- Fiscal policy: contractionary (to avoid overheating)

Last week lectures



Goods market equilibrium in an open economy:

- J curve: the dynamic adjustment process of the trade balance in response to a real depreciation

$$\varepsilon \downarrow \rightarrow NX \uparrow \rightarrow Y \uparrow$$

- Short run: the effect likely to be reflected more in prices than in quantities
- Long run: improves the trade balance

$$P \downarrow$$

- Saving, investment, and the current account balance

- Net export: $NX = (S - I) + (T - G)$

- If saving remains constant, an increase in investment (government's budget deficit) results in a deterioration of the trade balance

$$I \uparrow \rightarrow Y \uparrow \rightarrow NX \downarrow$$

In-tutorial Sheet - Q2

2. Consider an open economy characterized by the following equations:

$$C = c_0 + c_1(Y - T); \quad I = d_0 + d_1 Y$$

and

$$\boxed{IM = m_1 Y; \quad X = x_1 Y^*} \quad NX = X - IM$$

The parameters m_1 and x_1 are the propensities to import and export. Assume that the real exchange rate is fixed at a value of 1 and treat foreign income Y^* as fixed. Also assume that taxes are fixed and that government purchases are exogenous (i.e., decided by the government). We explore the effectiveness of changes in G under alternative assumptions about the propensity to import.

In-tutorial Sheet - Q2

(a) Write the equilibrium condition in the market for domestic goods and solve for Y .

$$Z = C + I + G + X - IM.$$

$$\text{equilibrium : } Y = Z.$$

$$\Rightarrow Y$$

In-tutorial Sheet - Q2

(a) Write the equilibrium condition in the market for domestic goods and solve for Y .

Goods market equilibrium condition requires

$$Y = C + I + G + X - IM = \underbrace{c_0 + c_1(Y - T)}_C + \underbrace{d_0 + d_1 Y}_I + \underbrace{G}_G + \underbrace{x_1 Y^* - m_1 Y}_{NX},$$

It follows that

$$Y = \frac{1}{1 - c_1 - d_1 + m_1} (c_0 - c_1 T + d_0 + G + x_1 Y^*)$$

$$\frac{\partial Y}{\partial G} = \frac{1}{1 - c_1 - d_1 + m_1}$$

In-tutorial Sheet - Q2

$$G \uparrow \rightarrow Y \uparrow \rightarrow NX \downarrow.$$

(b) Suppose government purchases increase by one unit. What is the effect on output? (assume that $0 < m_1 < c_1 + d_1 < 1$) What is the effect on net exports?

$$\Delta Y = \frac{\partial Y}{\partial G} \cdot \Delta G = \frac{\partial Y}{\partial G} \cdot 1 = \frac{1}{1 - c_1 - d_1 + m_1} > 0.$$

$$NX = X - IM = d_1 Y^* - \underline{m_1 Y}.$$

$$\begin{aligned} \Delta NX &= \frac{\partial NX}{\partial G} \cdot \Delta G = \frac{\partial NX}{\partial Y} \cdot \underbrace{\frac{\partial Y}{\partial G} \cdot \Delta G}_{\Delta Y} = \frac{\partial NX}{\partial Y} \cdot \underline{\Delta Y} \\ &= -m_1 \cdot \frac{1}{1 - c_1 - d_1 + m_1} < 0. \end{aligned}$$

In-tutorial Sheet - Q2

(b) Suppose government purchases increase by one unit. What is the effect on output? (assume that $0 < m_1 < c_1 + d_1 < 1$) What is the effect on net exports?

If government purchases increase by one unit, output will increase by $1/(1 - c_1 - d_1 + m_1)$.

Net exports is

$$NX = x_1 Y^* - m_1 Y$$

Here the one unit increases in government purchases raises output by $1/(1 - c_1 - d_1 + m_1)$.

For net exports, it will fall by $m_1/(1 - c_1 - d_1 + m_1)$.

In-tutorial Sheet - Q2

$$NX = X - IM = d_1 Y^* - m_1 Y$$

import.

Now consider two economies, one with $m_1 = 0.5$ and the other with $m_1 = 0.1$. Each economy is characterized by $c_1 + d_1 = 0.6$.

(c) Suppose one of the economies is much larger than the other. Which economy do you expect to have the larger value of m_1 ? Explain.

In-tutorial Sheet - Q2

$$\begin{aligned} NX &= X - IM \\ &= \frac{d_1 Y^*}{\Delta} - \frac{m_1 Y}{\Delta} \end{aligned}$$

Now consider two economies, one with $m_1 = 0.5$ and the other with $m_1 = 0.1$. Each economy is characterized by $c_1 + d_1 = 0.6$.

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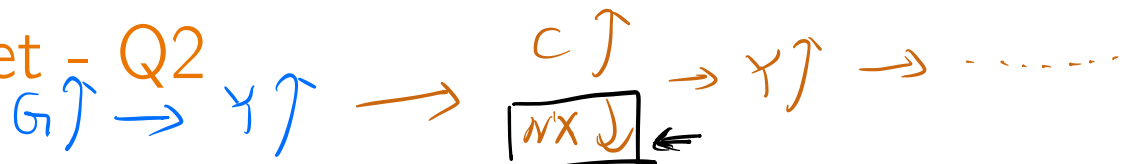
A larger economy tends to have a smaller value of m_1 .

$$m_1 = 0.1$$

In-tutorial Sheet - Q2

(d) Calculate your answers to part (b) for each economy by substituting the appropriate parameter values.

In-tutorial Sheet - Q2



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$m_1 = 0.5$ small

$\Delta G = 1$

For economy one, one unit increase in government purchases will raise output by

$$1/(1 - 0.6 + 0.5) = 1.11 \uparrow Y_{\text{small}}$$

and reduce net exports by

$$0.5/(1 - 0.6 + 0.5) = 0.56 \downarrow NX_{\text{small}}$$

$m_1 = 0.1$ large

For economy two, one unit increase in government purchases will raise output by

$$1/(1 - 0.6 + 0.1) = 2 \uparrow Y_L$$

and reduce net exports by

$$0.1/(1 - 0.6 + 0.1) = 0.2 \downarrow NX_L$$

In-tutorial Sheet - Q2

(e) In which economy will fiscal policy have a larger effect on output? In which economy will fiscal policy have a larger effect on net exports?

In-tutorial Sheet - Q2

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Fiscal policy has a larger effect on output in economy two, the large economy, but has a larger effect on net exports in economy one, the small economy.

This is because the increase in output induces less "leakage" through imports in the large economy.

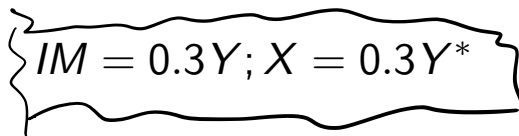
However, since the small economy has a larger share of imports as a fraction of output, the fall in net exports is larger in the small economy.

In-tutorial Sheet - Q3

3. Consider the following open economy. The real exchange rate is fixed and equal to 1. Consumption, investment, government spending and taxes are given by

$$C = 10 + 0.8(Y - T); \quad I = 10; \quad G = 10; \quad T = 10$$

Import and exports are given by


$$IM = 0.3Y; X = 0.3Y^*$$

(asterisks denote foreign variables).

(a) Solve for the equilibrium in the domestic economy given Y^* . What is the multiplier in this economy? If we were to close the economy | so exports and imports were identically equal to zero - what would the multiplier be? Why are they different?

In-tutorial Sheet - Q3

closed: $Y = C + I + G$
 $= 10 + 0.8(Y - 10) + 10 + 10$

(a) Starting with

$$\Rightarrow (1 - 0.8)Y = 10 - 8 + 10 + 10$$

$$\rightarrow \frac{1}{1 - 0.8} = 5$$

$$Y = C + I + G + NX$$

$$= 10 + 0.8(Y - 10) + 10 + 10 + 0.3Y^* - 0.3Y$$

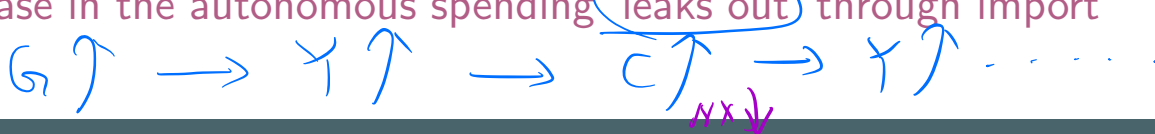
Solving for Y (given Y^*) we have

$$Y = \left[\frac{1}{1 - 0.8 + 0.3} \right] (22 + 0.3Y^*) = 44 + 0.6Y^*$$

The multiplier is 2 ($= 1/(1 - 0.8 + 0.3)$) when foreign output is fixed.

The closed economy multiplier is 5 ($= 1/(1 - 0.8)$).

It differs from the open economy multiplier because, in the open economy, part of the increase in the autonomous spending 'leaks out' through import demand.



In-tutorial Sheet - Q3

previously : $Y^* \uparrow \rightarrow Y \uparrow$
 here : $Y^* \uparrow \rightarrow Y \uparrow \rightarrow Y^* \uparrow \rightarrow \dots$



(b) Assume that the foreign economy is identical to the domestic economy (with asterisks reversed). Use the two sets of equations to solve for the equilibrium output of each economy. What is the multiplier for each economy now? Why does your answer differ from (a) above?

$$Y = \frac{1}{1 - 0.8 + 0.3} (22 + 0.3 Y^*)$$

$$\Rightarrow \begin{cases} Y = 44 + 0.6 Y^* \\ Y^* = 44 + 0.6 Y \end{cases} \quad \leftarrow Y^* = Y \quad \Rightarrow \begin{cases} Y = 110 \\ Y^* = 110 \end{cases}$$

$$\Rightarrow (1 - 0.8 + 0.3) Y = 22 + 0.3 (44 + 0.6 Y)$$

$$\Rightarrow (1 - 0.8 + 0.3 - 0.3 \times 0.6) Y = 22 + 0.3 \times 44$$

$$\Rightarrow \text{multiplier} = \frac{1}{1 - 0.8 + 0.3 - 0.3 \times 0.6}$$

In-tutorial Sheet - Q3

(b) Assume that the foreign economy is identical to the domestic economy (with asterisks reversed). Use the two sets of equations to solve for the equilibrium output of each economy. What is the multiplier for each economy now? Why does your answer differ from (a) above?

Since the countries are identical, $Y = Y^* = 110$.

Taking into account the endogeneity of foreign income, the multiplier for each country is equal to

$$1/(1 - 0.8 - (0.3 \times 0.6) + 0.3) = 3.125 > 2_{(a)}.$$

The multiplier is higher than the open economy multiplier in (a).

In-tutorial Sheet - Q3

previously $G = 10$

(c) Assume that both countries have a target level of output of 125. What is the increase in G necessary in either of these countries, assuming the other country does not change its level of government spending, to achieve target output? Solve for net exports and the budget deficit in each country.

$$\text{initial } \therefore Y = Y^* = 110.$$

$$\begin{cases} Y = 44 + 0.6Y^* \\ Y^* = 44 + 0.6Y \end{cases}$$

$$Y = 125 \rightarrow Y^* = 119$$

In-tutorial Sheet - Q3

(c) Assume that both countries have a target level of output of 125. What is the increase in G necessary in either of these countries, assuming the other country does not change its level of government spending, to achieve target output? Solve for net exports and the budget deficit in each country.

If $Y = 125$, then the foreign output is $Y^* = 44 + (0.6 \times 125) = \underline{119}$

Using these two facts and the domestic equation $Y = 2 \times (12 + G + 0.3Y^*)$

will yield the new government expenditure: $125 = 24 + 2G + 0.6 \times 119$.

previously $G = 10$
Solving for G gives $G = 14.8$.

In the domestic country, $NX = 0.3 \times 119 - 0.3 \times 125 = \underline{-1.8}$; $T - G = 10 - 14.8 = \underline{-4.8}$.

$$NX^* = 1.8$$

In-tutorial Sheet - Q3

(d) What is the common increase in G needed to achieve target in each
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In-tutorial Sheet - Q3

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If $Y = Y^* = 125$, then we have: $125 = 24 + 2G + 0.6 \times 125$, which implies $G = G^* = 13$.

previously 10.
In both countries, net exports are zero, but the budget deficit has increased by 3. *(not 4.8)*.

In-tutorial Sheet - Q3

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(e) Why is fiscal coordination (such as in (d) above) hard to achieve in practice?

In-tutorial Sheet - Q3

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In both countries, net exports are zero, but the budget deficit has increased by 3.

(e) Why is fiscal coordination (such as in (d) above) hard to achieve in practice?

In part, fiscal coordination is difficult to achieve because of the benefits of doing nothing (where the foreign country achieves a trade surplus at the expense of the home country), as indicated from (c).

The end

Thanks for your attention! 😊