Principles of Macroeconomics

Topic 4 Part 2

Government and Fiscal Policy (CH 9)

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Discretionary vs Non-Discretionary

- **The government sets G and T according to economic conditions.** These deliberate changes in G and T are called “discretionary fiscal policy”.

- **discretionary fiscal policy** Changes in taxes or spending as a result of deliberate changes in government policy.

- There is also **“non-discretionary”** fiscal policy. (FOR THIS CLASS)

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Non-Discretionary Fiscal Policy

- **"Non-Discretionary" Fiscal Policy** is a policy that is NOT subject to discretion, judgment, or decision of anyone.
- An example of this policy is a "**policy rule**" on Taxation.

- Example: $T = T_1 Y$

  where T_1 is Marginal Propensity to Tax (MPT).

- If t = 0.2, everyone pays 20% **income tax**.

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Discretionary + Non-Discretionary

- We can also have a mixed policy between a lump-sum tax and an income tax.

- Example: $T = 100 + 0.2Y$.
- 100 is the lump-sum tax.
- 0.2Y is the income tax with the tax rate of 20%.

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Example – Income Tax

Example Find the equilibrium.

$C = 300 + 0.5(Yd)$

$I = 50$

$G = 50$

$T = 0.2Y$ (i.e. 20% tax rate)

$X = 50$

$M = 100 + 0.1Y$

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Example – Income Tax

We start with the equilibrium condition:

$$Y = AE = C + I + G + (X - M)$$

$$Y = 300 + 0.5(Y - 0.2Y) + I + G + X - (100 + 0.1Y)$$

$$Y = 300 + 0.5(0.8Y) + 150 - (100 + 0.1Y)$$

$$Y - 0.4Y + 0.1Y = 450 - 100$$

$$0.7Y = 350$$

$$Y^* = 500$$

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Example – Income Tax

- Drawing the Keynesian Cross

$AE = C + I + G + (X - M)$

$AE = 300 + 0.5(Y - 0.2Y) + 150 - (100 + 0.1Y)$

$AE = 350 + 0.3Y$

Intercept = 350

Slope $= 0.3 = 0.5 - (0.5)(0.2) - 0.1$

$= MPC - (MPC)(MPT) - MPM$

***** MPM and MPT reduce the slope of the AE *****

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Multipliers with Income Tax

$Y = C + I + G + (X - M)$

Let $C = C_0 + C_1(Y - T)$, $M = M_0 + M_1(Y)$, and $T = T_1 Y$

$Y = C_0 + C_1(Y) - C_1 T_1(Y) + I + G + X - (M_0 + M_1(Y))$

$Y = C_0 + C_1(Y) - C_1 T_1(Y) + I + G + X - M_0 - M_1(Y)$

$Y - C_1(Y) + C_1 T_1(Y) + M_1(Y) = C_0 + I + G + X - M_0$

$(1 - C_1 + C_1 T_1 + M_1)Y = C_0 + I + G + X - M_0$

$$Y = \frac{1}{1 - C_1 + C_1 T_1 + M_1}(C_0 + I + G + X - M_0)$$

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Multipliers with Income Tax

From $Y = \frac{1}{1-C_1+C_1T_1+M_1}(C_0 + I + G + X - M_0)$, we have

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-C_1+C_1T_1+M_1} = \frac{1}{1-MPC+MPC\cdot MPT+MPM}$$

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1-C_1+C_1T_1+M_1} = \frac{1}{1-MPC+MPC\cdot MPT+MPM}$$

- **NOTE we cannot find "tax multiplier" in this case.**

- **As MPT (T_1) increases, multipliers fall.**
- **As MPM (M_1) increases, multipliers fall.**

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Multipliers with Income Tax

- When the multiplier is LARGE,
  - an **increase** in G or I leads to a **large increase** in Y.
  - a **decrease** in G or I leads to a **large decrease** in Y.

- e.g. m = 5 and $\Delta G = -10 >>> \Delta Y = -50$
- e.g. m = 1 and $\Delta G = -10 >>> \Delta Y = -10$

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Multipliers with Income Tax

- Therefore, **income tax** and/or **import** can **REDUCE** the size of the multipliers.
- **Small multiplier is good when the economy is bad.**

- Consider the previous example:

  $m = 5$ and $\Delta G = -10 >>> \Delta Y = -50$

  $m = 1$ and $\Delta G = -10 >>> \Delta Y = -10$

- Given the small multiplier of 1, we can see that if G falls by 10, Y will fall by a little. This is good in a recession.

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Automatic Stabilizers

- **automatic stabilizers** "components" in the AE that automatically change with the state of the economy in such a way as to stabilize GDP. **Import and Income Tax are automatic stabilizers.**

- "**To stabilize**" means to reduce "fluctuations" of output in business cycles. That is,
  - preventing output from being too high in an expansion.
  - preventing output from being too low in a recession.

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Automatic Stabilizers

- When economy is bad, Y is low, so T and M are small.
  - Small T and M means that people have more income to spend domestically, which help boost the economy during the bad times.
- When economy is good, Y is high, so T and M are large.
  - Large T and M means that people have less income to spend domestically, which help slow down the economy during the good times.
- **Automatic stabilizers <u>automatically</u> reduce fluctuations in the economy.**

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Short Summary – 1

- We have two approaches to find the equilibrium in the Keynesian Cross.
  - Y = AE Approach
  - Saving/Investment Approach (FOR THIS TIME)

- Y = AE is also called “income = expenditure”.
- “Saving/Investment” is also called **“leakage = injection”** approach.

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Short Summary – 2

The Equilibrium Condition of the Saving/Investment Approach:

- Closed Econ w/o Govt: $S = I$
- Closed Econ w/ Govt $S + T = I + G$
- Open Econ w/ Govt $S + T + M = I + G + X$
- The left-hand side is called “leakages”.
- The right-hand side is called “injections”.

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Short Summary – 3

Saving Function (used in S/I Approach)

- If there is no Govt, **Y = C + S**.

  That is, income is divided into C and S.

- If there is Govt, **Yd = C + S**.

  We rewrite Y – T = C + S or **Y = C + S + T**.

  That is, income is divided into C, S, and T.

  You spend, save, and pay taxes.

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Leakages = Injections Approach – 1

Example Find the equilibrium output Y*.

C = 300 + 0.75(Yd) I = 50

G = 50 T = 50 X = 50 M = 100 + 0.25Y

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Leakages = Injections Approach – 2

We start with the equilibrium condition:

$S + T + M = I + G + X$ (*)

Now, we need to find S.

Note that $Y = C + S + T$ (from Page 16)

$S = Y – C – T$; we substitute this back to (*)

$Y – C – T + T + M = I + G + X$

$Y – C + M = 150$

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Leakages = Injections Approach – 3

$Y - C + M = 150$

From $C = 300 + 0.75(Y - T)$ and $M = 100 + 0.25Y$,

we have

$Y - 300 - 0.75(Y - 50) + 100 + 0.25Y = 150$

$Y - 0.75Y + 0.25Y = 150 + 300 - 100 - 0.75(50)$

$0.5Y = 312.5$

$Y^* = 625$

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