

Intermediate Macroeconomics

Chapter 5 The Keynesian Model

The Keynesian Model

1. Simple Keynesian model
2. Aggregate expenditures
3. Equilibrium
4. Consumption function
5. Autonomous spending
6. Autonomous spending multiplier
7. Government fiscal policy
8. Automatic stabilizers

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1. Simple Keynesian Model

Macroeconomics in a recession:

- Classical macro theory:
 - Prices will fall thereby stimulating demand.
 - Interest rates will fall thereby stimulating investment.
- Keynesian macro theory:
 - Prices, wages and interest rate are fixed.
 - Government fiscal policy stimulus needed.

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2. Aggregate Expenditures

$$AE = C + I + G + NX$$

C = Consumption

I = Private Domestic Investment

G = Government Spending

NX = Net Exports (Exports - Imports)

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3. Equilibrium

$$Y = AE$$

Undesired Inventory Build: $Y > AE$

Undesired Inventory Draw: $Y < AE$

where, Y = National Income
 AE = Aggregate Expenditures

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4. Consumption Function

$$C = C_0 + c * Y$$

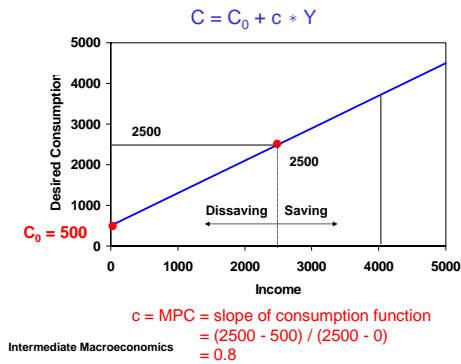
C_0 = Autonomous consumption

c = Marginal propensity to consume
out of income (MPC)

Y = Income

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4. Consumption Function



5. Autonomous Spending

Spending that is independent of any other variable (e.g., income, prices, interest rate)

- C_0 = Autonomous Consumption
- I_0 = Autonomous Investment
- G_0 = Autonomous Government Spending

Autonomous (*adj.*) - self-governing

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6. Autonomous Spending Multiplier Equilibrium model solution

- Step 1. Restate aggregate expenditures
- Step 2. State the equilibrium condition
- Step 3. Substitute aggregate expenditures from Step 1 into equilibrium condition in Step 2
- Step 4. Solve for Y (national income)

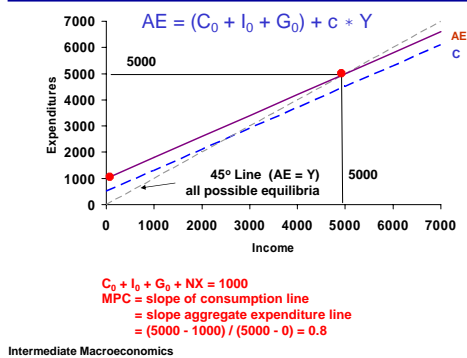
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6. Autonomous Spending Multiplier Step 1. Aggregate expenditures restated

- Given:
 - $AE = C + I + G + NX$
 - $C = C_0 + c * Y$
 - $I = I_0$
 - $G = G_0$
 - $NX = 0$
- **Step 1.** Substitute into equation for aggregate expenditures:
 - $AE = C_0 + c * Y + I_0 + G_0$

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6. Autonomous Spending Multiplier Aggregate expenditures curve



6. Autonomous spending multiplier Steps 2 and 3

Step 2. State the Equilibrium Condition:
 $Y = AE$

Step 3. Substitute AE from Step 1 into Step 2:

$$Y = C_0 + c * Y + I_0 + G_0$$

or

$$Y = (C_0 + I_0 + G_0) + c * Y$$

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6. Autonomous spending multiplier
Step 4. Solve for National Income (Y)

$$Y = (C_0 + I_0 + G_0) + c * Y$$

$$Y - c * Y = C_0 + I_0 + G_0$$

$$(1 - c) * Y = C_0 + I_0 + G_0$$

$$Y = \frac{1}{1 - c} * (C_0 + I_0 + G_0)$$

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6. Autonomous Spending Multiplier

Change in Y = Multiplier * Change in C_0 , I_0 , or G_0

Equilibrium model solution:

$$Y = \frac{1}{1 - c} * (C_0 + I_0 + G_0)$$

Autonomous Spending Multiplier:

$$\frac{1}{1 - c} \quad \text{or} \quad \frac{1}{1 - MPC}$$

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7. Government Fiscal Policy

Given Equations:

$$AE = C + I + G + NX$$

$$C = C_0 + c * YD$$

$$I = I_0, \quad G = G_0, \quad NX = 0$$

$$YD = Y - t * Y - T_0 + TR$$

YD = disposable income

t * Y = income tax revenues

T_0 = lump sum tax

TR = gov't transfer payments

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7. Government Fiscal Policy
Step 1. Restate aggregate expenditures

$$AE = C + I + G + NX$$

$$= C_0 + c * YD + I_0 + G_0$$

$$= C_0 + c * (Y - t * Y - T_0 + TR) + I_0 + G_0$$

$$= C_0 + I_0 + G_0$$

$$+ c * Y - c * t * Y - c * T_0 + c * TR$$

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7. Government Fiscal Policy
Steps 2 and 3

Step 2. State the Equilibrium Condition:

$$Y = AE$$

Step 3. Substitute AE from Step 1 into Step 2:

$$Y = C_0 + I_0 + G_0 + c * Y - c * t * Y - c * T_0 + c * TR$$

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7. Government Fiscal Policy
Step 4. Solve for National Income (Y)

$$Y = C_0 + I_0 + G_0 + c * Y - c * t * Y - c * T_0 + c * TR$$

$$Y = C_0 + I_0 + G_0 - c * T_0 + c * TR + (c - c * t) * Y$$

$$Y = C_0 + I_0 + G_0 - c * T_0 + c * TR + c * (1 - t) * Y$$

$$Y - c * (1 - t) * Y = C_0 + I_0 + G_0 + c * (TR - T_0)$$

$$[1 - c * (1 - t)] * Y = C_0 + I_0 + G_0 + c * (TR - T_0)$$

$$Y = \frac{1}{[1 - c * (1 - t)]} * [C_0 + I_0 + G_0 + c * (TR - T_0)]$$

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7. Government Fiscal Policy Multipliers

Assume c (marginal propensity to consume) = 0.8

	No Income Tax ($t = 0.0$)	Income Tax ($t = 0.3$)
Autonomous Spending	$\frac{1}{1-c} = 5$	$\frac{1}{1-c*(1-t)} = 2.3$
Transfer Payment	$\frac{c}{1-c} = 4$	$\frac{c}{1-c*(1-t)} = 1.8$
Lump Sum Tax	$-\frac{c}{1-c} = -4$	$-\frac{c}{1-c*(1-t)} = -1.8$

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7. Government Fiscal Policy Balanced budget multiplier

- \$1 increase in government spending
- matched by
- \$1 increase in lump sum taxes

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7. Government Fiscal Policy Balanced budget multiplier

- Spending multiplier (assume no income tax)
 $\frac{1}{1-c}$
- Lump Sum tax multiplier
 $-\frac{c}{1-c}$
- Balanced budget multiplier:
spending multiplier – lump sum tax multiplier
 $\frac{1}{1-c} - \frac{c}{1-c} = \frac{1-c}{1-c} = 1$

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7. Government Fiscal Policy Balanced Budget Multiplier

From Step 4 (assume $t = 0$):

$$Y = \frac{1}{1-c} * [C_0 + I_0 + G_0 + c * (TR - T_0)]$$

Multiplier (assume $\Delta C_0 = \Delta I_0 = \Delta TR = 0$):

$$\Delta Y = \frac{1}{1-c} * (\Delta G_0 - c * \Delta T_0)$$

Balanced Budget ($\Delta G_0 = \Delta T_0$):

$$\Delta Y = \frac{1}{1-c} * (\Delta G_0 - c * \Delta G_0)$$

$$= \frac{1}{1-c} * (1-c) * \Delta G_0$$

$$= 1 * \Delta G_0$$

Multiplier = 1

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8. Automatic Stabilizers

Desired Policy	Economy Moves Into	
	Recession	Inflation
Government Spending	Increase	Decrease
Taxes	Decrease	Increase
Actual Outcomes		
G - Defense Spending	n/c	n/c
TR - Social Security Benefits	n/c	n/c
TR - Unemployment Comp.	Increase	Decrease
TA - Lump Sum Tax	n/c	n/c
$t*Y$ - Income Tax Receipts	Decrease	Increase

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