

Assignment Project Exam Help

ECOS2002 - Intermediate Macroeconomics
Week 2: 'The Goods and Financial Market'

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Semester 2 - 2022

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Class Outline

- The Goods Market

- ▶ Composition of GDP

- ▶ Keynesian Cross Review

- ▶ Investment-Saving Relationship

- The Financial Market

- Outlook

Readings: Blanchard and Sheen Chapters 3 and 4, Atkin and LaCava (2017)

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- Let's start with the goods market <https://powcoder.com>

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The Composition of GDP

- **Consumption (C):**

- ▶ Goods and services purchased by consumers

- ▶ By far the largest component of GDP (2011: 56% of Australian GDP)

- **Investment (I):**

- ▶ Also called fixed investment to distinguish it from inventory investment

- ▶ It is the sum of nonresidential investment, the purchase by firms of new plants or new machines, and residential investment, the purchase by people of new houses or apartments.

- ▶ Together, nonresidential and residential investment accounted for 23.5 per cent of Australian GDP in 2011.

The Composition of GDP

- **Government Spending (G):**

- ▶ Purchases of goods and services by the federal, state and local governments
- ▶ It does not include government transfers nor interest payments on the government debt
- ▶ In 2011: 24.1 per cent of Australian GDP

- **Imports (IM):**

- ▶ The purchases of foreign goods and services by Australian consumers, firms and the government

- **Exports (EX):**

- ▶ The purchases of Australian goods and services by foreigners.

The Composition of GDP

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• Net Exports (NX)

- ▶ The difference between exports and imports ($X-IM$) is called net exports, or the trade balance
- ▶ If exports $>$ imports, the country is said to run a trade surplus
- ▶ If exports $<$ imports, the country is said to run a trade deficit
- ▶ In 2011, Australian exports accounted for 19.1 per cent of GDP, and Australian imports were equal to 22.8 per cent of GDP, so Australia was running a trade deficit equal to 3.7 per cent of GDP

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Keynesian Cross Review

- Denote the total demand for goods by Z

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$$Z \equiv C + I + G + (EX - IM) \quad (1)$$

- A model of the demand for goods and services

- Assumptions

- ▶ All firms produce the same good
- ▶ Firms are willing to supply any amount of the good at a given price level
- ▶ The economy is closed ($NX = EX - IM = 0$)

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$$Z \equiv C + I + G \quad (2)$$

- **What determines output?**

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Consumption (C):

- ▶ Consumption depends positively on disposable income $Y^D \equiv Y - T$
- ▶ The consumption function

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$$C = F(Y^D)$$

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- ▶ When disposable income increases, so does consumption
 - ▶ This is called a *behavioural equation*

Keynesian Cross Review

- The consumption function can be defined as a linear relationship:

$$C = c_0 + c_1(Y - T) \quad (3)$$

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- c_0 : **Autonomous consumption**

- ▶ Changes in c_0 reflect changes in consumption for a given level of disposable income.
- ▶ How can people have positive consumption if their income is equal to zero? Answer: They dissave.

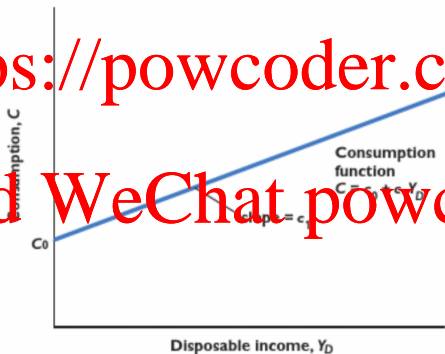
- c_1 : **Marginal propensity to consume**

- ▶ It gives the effect an additional dollar of disposable income has on consumption
- ▶ If c_1 is equal to 0.6, then an additional dollar of disposable income increases consumption by $1 \times 0.6 = 60$ cents.
- ▶ c_1 is positive but smaller than one: $0 < c_1 < 1$

Keynesian Cross Review

- Higher income increases consumption, but less than one for one

- Higher taxes decrease consumption, also less than one for one



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Keynesian Cross Review

- For now let investment, government spending, and taxes be exogenous

Investment (I): $I = \bar{I}$

- Investment does not respond to changes in production
- Is this realistic?

Government spending (G): $G = \bar{G}$

Taxes (T): $T = \bar{T}$

- G and T describe *fiscal policy*
- Governments typically follow not the same behavioural equations as households and firms
- Helpful to discuss the implication of spending and tax decisions

Keynesian Cross Review

Equilibrium Condition:

$$Z = c_0 + c_1(Y - \bar{T}) + \bar{I} + \bar{G} \quad (4)$$

In equilibrium, supply equals demand ($Y = Z$):

$$Y = c_0 + c_1(Y - \bar{T}) + \bar{I} + \bar{G} \quad (5)$$

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- Move $c_1 Y$ to the left side and reorganise the right side:

$$(1 - c_1)Y = c_0 - c_1\bar{T} + \bar{I} + \bar{G}$$

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- Divide both sides by $(1 - c_1)$:

$$Y = \underbrace{\frac{1}{1 - c_1}}_{\text{Multiplier}} \underbrace{[c_0 - c_1\bar{T} + \bar{I} + \bar{G}]}_{\text{Autonomous Spending}} \quad (6)$$

Keynesian Cross Review

The Multiplier: $\frac{1}{1-c_1}$

- The propensity to consume c_1 is between zero and one, $\frac{1}{1-c_1}$ is larger than one.

- Example:

- ▶ Assume that c_0 increases by $\Delta YD = 1000$.
- ▶ Furthermore, $c_1 = 0.6$: out of each dollar 60 cents are used for spending
- ▶ $\frac{1}{1-0.6} = 2.5$
- ▶ Output increases by $1000 \times 2.5 = 2,500$ dollars.

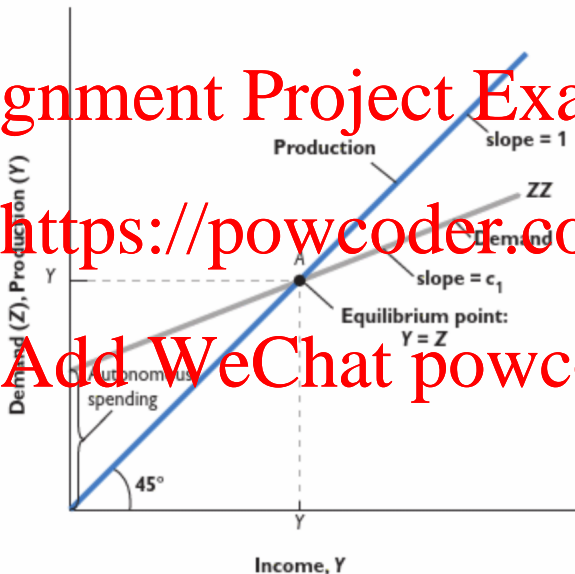
- Intuition: One person's spending is another person's income
- Geometric series: $1 + c_1 + c_1^2 + \dots + c_1^n$

Keynesian Cross Review

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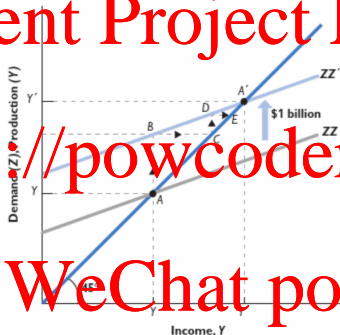
Keynesian Cross Review

- The Effects of an Increase in Autonomous Spending

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- Equilibrium output increases from Y to Y' . The increase in output is larger than the initial increase in consumption. This is the multiplier effect.

Investment-Saving Relationship

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- Saving is the sum of private saving and public saving

- **Private saving (S):** Saving can be defined as remaining disposable income after spending

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- **Public saving** is equal to taxes minus government spending

- ▶ If taxes $>$ government spending, the government is running a budget surplus, so public saving is positive
- ▶ If taxes $<$ government spending, the government is running a budget deficit, so public saving is negative

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Investment-Saving Relationship

- So far we have discussed the equilibrium in the goods market in terms of production and demand

- Saving can be defined as remaining disposable income after spending

$$S \equiv Y_D - C = Y - T - C \quad (7)$$

- Recall the equilibrium condition in the goods market

$$Y = C + I + G \quad (8)$$

- Combine the two equations

$$S = C + I + G - T - C \Rightarrow S = I + G - T \quad (9)$$

- This can be simplified to:

$$I = \underbrace{S}_{\text{private saving}} + \underbrace{(T - G)}_{\text{public saving}} \quad (10)$$

Investment-Saving Relationship

- Two equivalent ways of stating the condition for equilibrium in the goods market which deliver the same result:

Production = Demand
Investment = Saving

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$$S = Y - T - C = Y - \bar{T} - c_0 - c_1(Y - \bar{T}) \quad (11)$$

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- Rearranging, we get

$$S = -c_0 + (1 - c_1)(Y - \bar{T}) \quad (12)$$

- In equilibrium, investment must be equal to saving (private + public)

$$I = -c_0 + (1 - c_1)(Y - \bar{T}) + (\bar{T} - \bar{G}) \quad (13)$$

$$Y = \frac{1}{1 - c_1} [c_0 - c_1 \bar{T} + \bar{I} + \bar{G}] \quad (14)$$



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Assume that everyone in the economy starts to save more by reducing autonomous consumption c_0 . What do you think does the model predict about the effect on aggregate saving in the short run?

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- a Aggregate saving will increase.
- b The effects depend on the current state of the economy.
- c Aggregate saving will decrease.
- d There will be no effect on aggregate saving.

Paradox of Thrift

An increase in autonomous saving leads to a decline in aggregate output and to no additional aggregate savings in equilibrium.

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- Assume that everyone decided to save more and represent this by decreasing c_0 .

- From equation 14, we see that output decreases.

- Lower consumptions means less aggregate demand and hence less output.

- What happens to saving?

$$S = -c_0 + (1 - c_1)(Y_+ - \bar{T}) \quad (15)$$

- Ambiguous effects: Lower c_0 increases saving, lower Y decreases saving

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- Recall equation 10:

$$\bar{I} = S + (\bar{T} - \bar{G})$$

- By assumption, \bar{I} , \bar{G} , and \bar{T} do not change, so S cannot change either

$$\Delta S = 0$$

- This is a short run result, we will discuss long run effects later in the course

The Financial Market

- In this market we look at people's liquidity preferences

- ▶ Do people hold money in cash, saving accounts, money market, cd's, bonds, other financial assets?

- For simplicity, consider just two choices

- ▶ One can hold money as M1 or one can hold bonds that pay the nominal interest rate i .

- Money: Used for transactions but pays no interest

- Bonds: Pays a positive interest rate, i , but cannot be used for transactions

Money Demand

- The demand for money is based on:

- ▶ Prices

- ▶ Income

- ▶ Nominal interest rates

- ★ Money does not earn interest

- ★ The opportunity cost of holding money is the nominal interest rate

- Money demand is a function of income (Y) and the nominal interest rate (i)

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- In linear form:

$$\left(\frac{M}{P}\right)^D = L_0 Y - L_1 i \quad (16)$$

Money Supply

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- We assume supply of money is fixed
- The central bank decides to supply a certain amount of money
- This is a simplifying assumption and not how modern monetary policy works

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$$\text{Add WeChat } \left(\frac{M^S}{P}\right) = \left(\frac{M}{P}\right) \quad (17)$$

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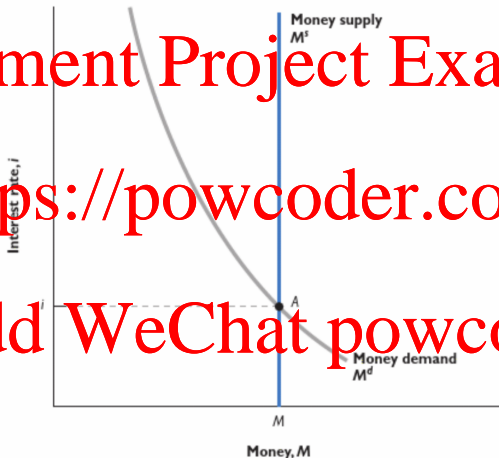
- In equilibrium, money supply has to be equal to money demand

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$$\left(\frac{M}{P}\right)^S = \left(\frac{M}{P}\right)^D \quad (18)$$

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Money Market Equilibrium



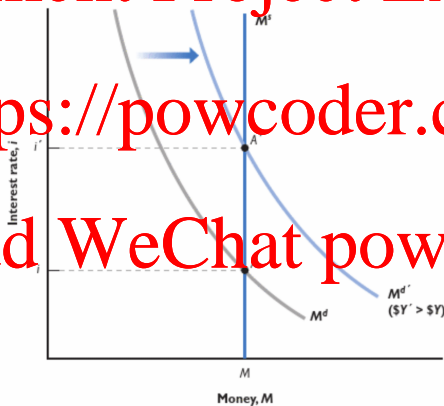
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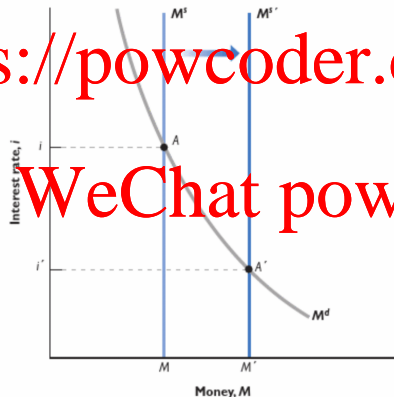
Money Market Dynamics

- Increase in nominal income increases the level of transactions, which increases the demand for money at any interest rate



Money Market Dynamics

- An increase in the supply of money by the central bank leads to a decrease in the interest rate. The decrease in the interest rate increases the demand for money so it equals the now larger money supply.



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Monetary Policy

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- In this model, the central bank is conducting **quantity setting** monetary policy

- We describe the central bank as choosing the money supply and letting the interest rate be determined at the point where money supply equals money demand

- Instead, we could have described the central bank as choosing the interest rate and then adjusting the money supply to match that rate

- Modern central banks typically conduct monetary policy by setting interest rates

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Monetary Policy

- Transmission of monetary policy in two stages:

- ▶ Changes to the policy rate influence other interest rates in the economy (yield curve)

- ▶ Changes in market interest rates affect the economy and inflation

- Central banks (CB) change the amount of money in the economy by buying or selling bonds in the bond market

- This is called open market operations (OMO):

- ▶ Expansionary policy: CB buys bonds and expands money supply which leads to lower nominal interest rates
 - ▶ Contractionary policy: CB sells bonds and reduces money supply which leads to higher nominal interest rates

The Yield Curve

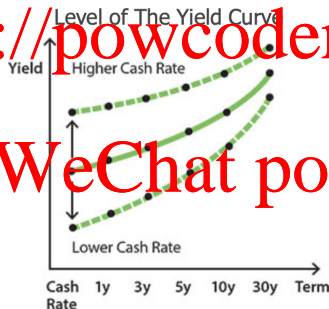
- The yield curve (term structure of interest rates) is a representation of yields on bonds over different terms to maturity

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- The level of the yield curve measures the general level of interest rates in the economy and is heavily influenced by policy rate

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Source: RBA, n.d.

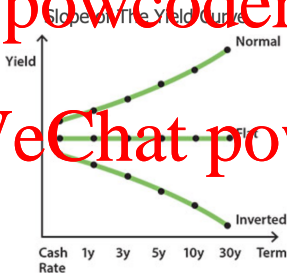
The Yield Curve

- The slope represents the difference between yields on short-term bonds (e.g. 1 year) and long-term bonds

- ▶ **Normal:** Longer term yields are associated with more uncertainty
- ▶ **Inverted:** Interest rates are expected to fall
- ▶ **Flat:** Short-term yields are similar to long-term yields

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Source: RBA, n.d.

Summary

- In the short run, demand determines production. Production is equal to income. Income in turn affects demand.

• Equilibrium output is the level of output at which production equals demand. In equilibrium, output equals autonomous spending times the multiplier.

- An alternative way of stating the goods-market equilibrium condition is that investment must be equal to saving—the sum of private and public saving \Rightarrow IS relation

- The demand for money depends positively on the level of transactions in the economy and negatively on the interest rate.

- The way the central bank changes the supply of money is through open market operations.

- Modern monetary policy is conducted by setting interest rates which transmit through the economy

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- Next week we will discuss a model that combines the goods and money market
- Mathematical representation of Keynesian macroeconomic theory
- **Static IS-LM model**

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Reading: Textbook Chapter 5