

IS-LM & Beyond

EC6012 Lecture 2

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Today

Introduction

The Model

The Output Market

Equilibrium in the product and money markets

Examples

Aggregate supply

The Phillips curve

Dynamics of asset accumulation

Expectations

Last Week

- ▶ 1815-1873, Bimetallism. Relative price ratio of gold and silver varied only between 15:1 and 16:1
- ▶ 1873-1896, Price level falling everywhere. (Cross of Gold)
- ▶ 1914, Everyone off gold to finance war spending
- ▶ 1914-1924, Anchored Gold standard to dollar.
- ▶ 1925/26, Everyone on gold again, massive price deflation into the 1930's.
- ▶ 1936-1971, Tripartite Monetary Agreement established a new int'l monetary system → dollar standard, where the dollar was the only currency anchored to gold.
- ▶ Since 1973, a flexible exchange rate regime
- ▶ 1985, Plaza Accord. Moves the system into a kind of managed dollar system relative to European currencies.
- ▶ Present Day: Euro, Dollar, Yen.

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Basic Idea

- ▶ **IS Curve: Describes goods market equilibrium**
- ▶ LM Curve: Shows choice between liquid assets & illiquid assets.
- ▶ Money supply is supplied by Central Bank, assumed exogenous.
- ▶ CB chooses M/P .
- ▶ Interest Rate Targeting/MS Targeting?

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A Macro Model with Four Sectors

- ▶ The product market,
- ▶ The money market,
- ▶ The bond market,
- ▶ The labour market.

Setup

$$GDP = C + I + G, \quad (1)$$

$$GNP = C + I + G + (X - M). \quad (2)$$

$$GDP = C + S + T. \quad (3)$$

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The Output Market

$$Y = C + I + G \quad (4)$$

(Caution)

$$C = C(Y). \quad (5)$$

$$Y = C(Y) + \bar{I} + \bar{G}. \quad (6)$$

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Derivation

$$C = C(YD). \quad (7)$$

$$C = C(YD, A, r). \quad (8)$$

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$$A = \frac{M + P_k B + P_k K}{P}. \quad (9)$$

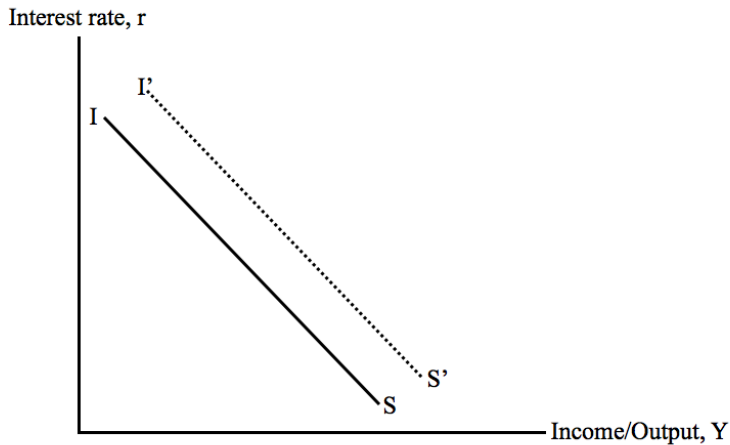
The Investment Function

$$I = I(r - \pi). \quad (10)$$

Put it all together

$$Y = C\left(T - T, r - \pi, \frac{M + B + P_k K}{P}\right) + I(r - \pi) + G. \quad (11)$$

The IS Curve



Shifts in IS Curve

1. an increase the expected rate of inflation, or
2. a fall in the price of output, or
3. a rise in the stock of assets, or
4. an increase in the price of capital, or
5. a reduction in the level of taxes.

Money Markets

$$\frac{M^D}{P} = L \left(Y, -\pi, r - \pi, r_k, \frac{M + B + P_k K}{P} \right) \quad (12)$$

$$\frac{B^D}{P} = J \left(Y, -\pi, r - \pi, r_k, \frac{M + B + P_k K}{P} \right) \quad (13)$$

$$\frac{P_k K}{P} = N \left(Y, -\pi, r - \pi, r_k, \frac{M + B + P_k K}{P} \right) \quad (14)$$

$$\frac{M^D + B^D + P_k K^D}{P} = \frac{M + B + P_k K}{P} = A \quad (15)$$

$$r_k = \frac{P \times R \left(\frac{Y}{K} \right)}{P_k} \quad (16)$$

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Put this all together

$$\frac{M}{P} = L \left[Y, -\pi, r - \pi, r_k, \frac{M+B}{P} + \frac{RK}{r_k} \right] \quad (17)$$

$$\frac{B}{P} J \left[Y, -\pi, r - \pi, r_k, \frac{M+B}{P} + \frac{RK}{r_k} \right] \quad (18)$$

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Edging towards LM

$$r_k = r - \pi. \quad (19)$$

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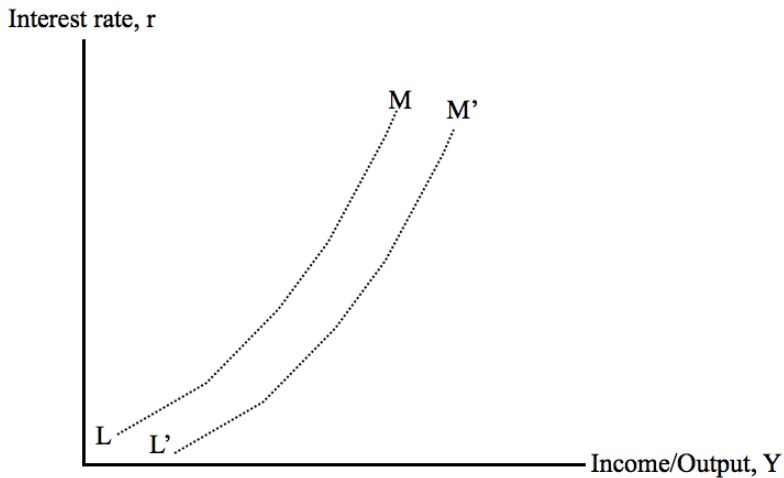
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LM Curve

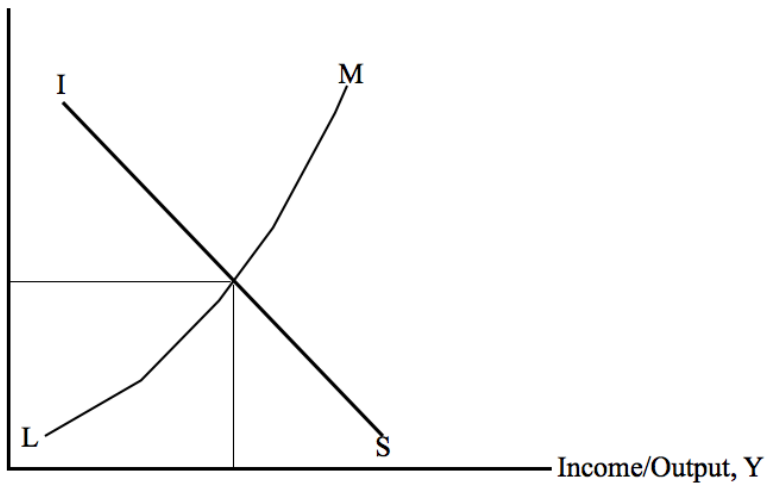


Slot IS into LM to get

$$Y = Y(P; M, B, K, \pi, G, T). \quad (21)$$

Which looks like

Interest rate, r



[Bush's fiscal stimulus]

Exercise

Consider a standard IS-LM model in equilibrium. Graphically analyse the effects of a large increase in government expenditure financed through taxation on output/income and the interest rate, and briefly explain your reasoning.

[The credit crunch]

Exercise

Consider a standard IS-LM model in equilibrium. Graphically analyse the effects of a large decrease in the supply of money on output/income and the interest rate, and briefly explain your reasoning.

[Numerical example]

Exercise

Imagine a closed economy with equilibrium output given by $Y = C + I + G$. Total supply is given by $Y = 5,000$. Consumption is determined by $C = 250 + 0.75(Y - T)$. Investment is given by $I = 1000 - 50r$. Initially, fix G and T at $G = 1,000, T = 1,000$. Suppose the government pursues an expansionary policy, driving G from 1000 to 1250. What happens to national savings? Is there a deficit? How much of one? Will the interest rate decrease or increase? By how much?

Aggregate Supply

This aggregate production function relates the labour input L and the level of the capital stock employed to the level of output in the economy.

$$Y = F(K, L). \quad (22)$$

Labour/Leisure Tradeoff

$$\Sigma = Pf(L^D) - wL. \quad (23)$$

$$\frac{W}{P} = \theta L^D, \quad (24)$$

Household utility maximisers

$$\max(Y, Le) \tag{25}$$

subject to

$$Le = Tot - L^S, \tag{26}$$

$$Y = \frac{W}{P} L^S. \tag{27}$$

$$L^S = L^D = L. \tag{28}$$

Household utility maximisers

$$\frac{W}{P} = \theta(L) = \phi(L). \quad (29)$$

[Lifetime earnings and the budget constraint]

Exercise

Jill earns 200 in period 1, and 50 in period two. Jill wants to consume the same amount throughout her life. Without access to a credit market, Jill's consumption stream is $\{200, 50\}$. With a credit market, Jill can consume $200+50/2 = 125$ per period, so her consumption stream at $\{c_1, c_2\}$, which is $\{125, 125\}$. In reality, Jill would buy a bond or a treasury bill to achieve consumption patterns like this. What would her consumption set look like?

The Phillips Curve

The Phillips curve relates changes in inflation to changes in unemployment.

$$\dot{p} = \frac{\dot{P}}{P} = \alpha(Y - \bar{Y}) + \pi \quad (30)$$

Govt. Budget Constraint; Growth theory

$$\dot{M} + \dot{B} = P[G - T] + rB. \quad (31)$$

$$\dot{K} = I. \quad (32)$$

Expectations

$$\dot{\pi} = \gamma(\rho - \pi). \quad (33)$$

$$\pi = \rho. \quad (34)$$

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Reading

1. Lecture notes
2. Readings on Jstor
3. Examples, etc, on www.stephenkinsella.net.