

Handout

Savings & Investment & Interest Rates

In equilibrium, production equals expenditure. Production equals income and will be denoted Y . For now, we will assume that production can rise to meet any level of expenditure.

Expenditure depends upon current income (production) and the interest rate, which we will treat as exogenous for today.

$$\begin{aligned} \text{Expenditure} = & \text{Consumption} + \text{Investment Demand} \\ & + \text{Government Spending on Goods \& Services} + \text{Exports} - \text{Imports} \end{aligned}$$

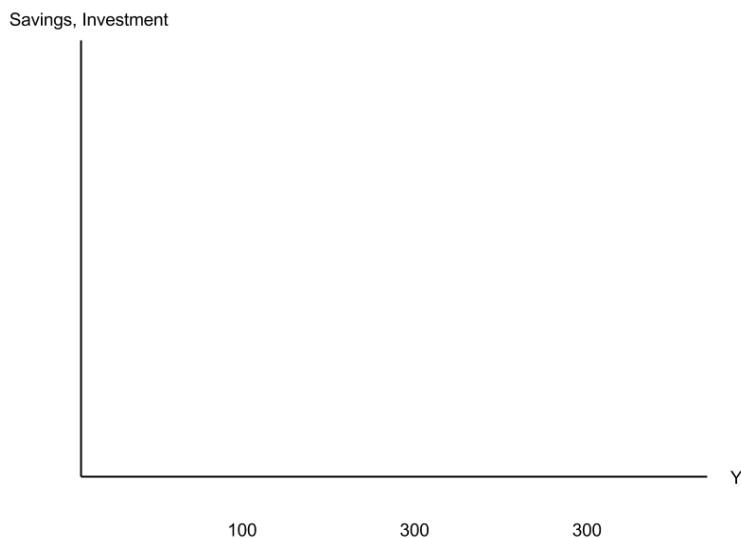
Most of these factors depend on current income Y (positively, $+$) and real interest rates r (either positively, $+$, or negatively, $-$). In particular, both Consumption and Investment depend positively on income (after taxes) and negatively on interest rates (Euler, Tobin).

Simplifying assumptions

- We will ignore Government Spending, Taxes, Exports and Imports today.
- We will ignore the effect of interest rates on Consumption (C).
- We will ignore the effect of income on Investment (I).
- $C = 0.8*Y \Rightarrow S = 0.2*Y$
- Investment is a decreasing function of r .

Savings

What will S look like as a function of Y ? **Graph** this and label what S is when $Y = 100$ (label this “A”), $Y = 200$ (label this “B”), and $Y = 300$ (label this “C”).



Investment

- Investment is a decreasing function of r . Let it have the following simple form.
 - $I = 20$ when $r = 6\%$
 - $I = 40$ when $r = 4\%$
 - $I = 60$ when $r = 2\%$

On the graph on the previous page, **show** what the equilibrium would be for $r = 6\%$, 4% , and 2% .

The IS Curve: Savings & Investment, r versus Y

For equilibrium in the Savings & Investment market, there will be a negative relationship between the real interest rate (r) and production (Y). **Graph** this relationship for the Savings and Investment functions above.

The IS Curve and Monetary Policy

The Federal Reserve tries to manage the level of economic activity (Y) by changing the nominal interest rate (i). (NOTE: Fiscal Policy operates by shifting the IS curve left or right for any given interest rate. More on that in future weeks.)

Recall the Fisher Equation:

Nominal Interest Rate = Real Interest Rate + Inflation Rate (or deflation if $\pi < 0$)

$$i = r + \pi$$

Suppose that inflation is 6% and stable. If the central bank wants output Y to be each of the following levels, what nominal interest rate i should it set? Graph this.

r	Target level of Y	Nominal interest rate i the central bank should set to achieve the desired real interest rate.
4%	90	$i = r + \pi = 4\% + 6\% = 10\%$
2%	110	$i = r + \pi =$
0%	130	$i = r + \pi =$
-2%	150	$i = r + \pi =$
-4%	170	$i = r + \pi =$

Suppose that inflation is 2% and stable. If the central bank wants output Y to be each of the following levels, what nominal interest rate i should it set? **Also, assume that we can't get i to be lower than -1%.** Graph this.

r	Target level of Y	Nominal interest rate i the central bank should set to achieve the desired real interest rate.
4%	90	$i = r + \pi =$
2%	110	$i = r + \pi =$
0%	130	$i = r + \pi =$
-2%	150	$i = r + \pi =$
-4%	170	$i = r + \pi =$

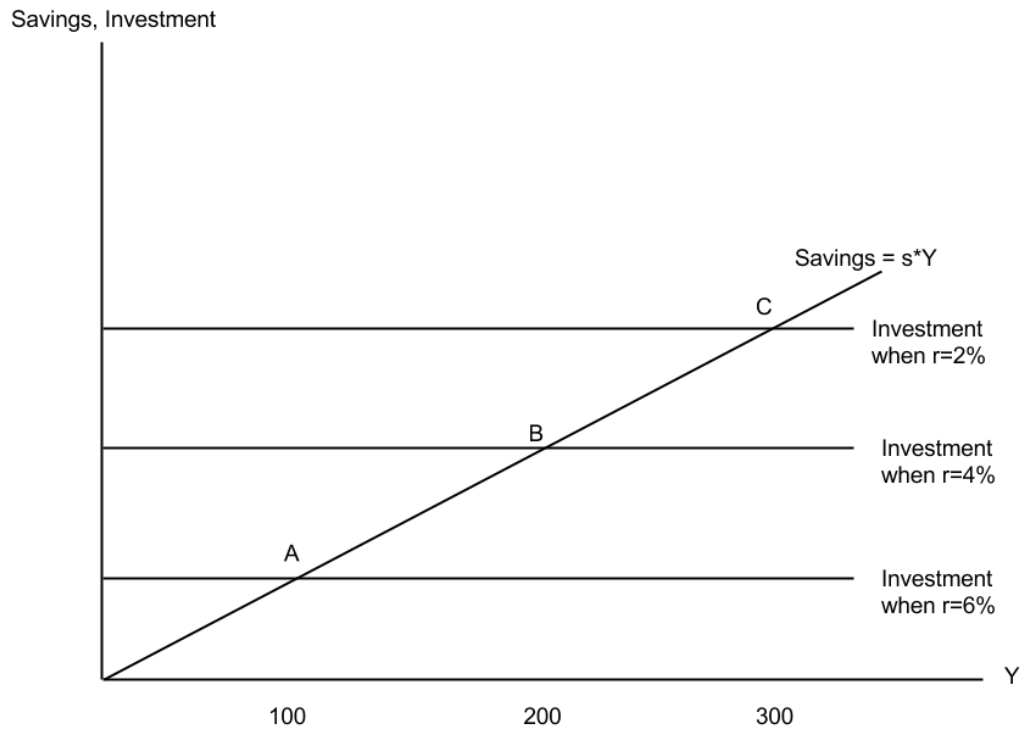
Suppose that inflation is -2% (deflation!) and stable. If the central bank wants output Y to be each of the following levels, what nominal interest rate i should it set? **Also, assume that we can't get i to be lower than -1%.** Graph this.

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ANSWERS

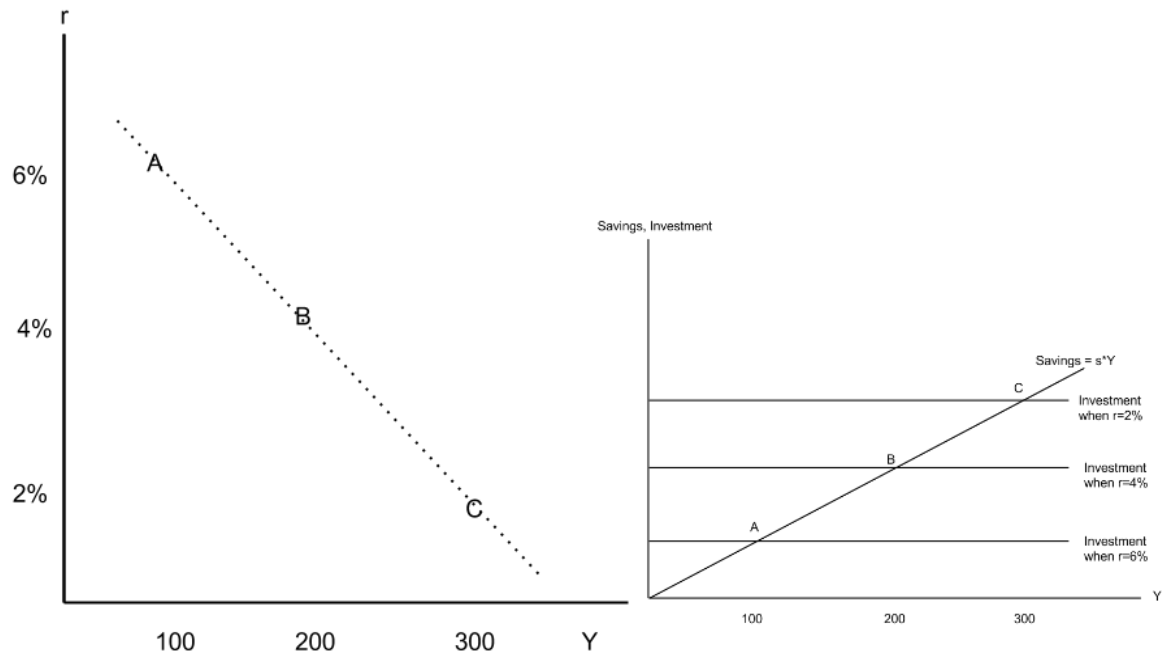
Savings: What will S look like as a function of Y ? Graph this and label what S is when $Y = 100$ (label this “A”), $Y = 200$ (label this “B”), and $Y = 300$ (label this “C”).

Investment: On the graph on the previous page, show what the equilibrium would be for $r = 6\%$, 4% , and 2% .



The IS Curve: Savings & Investment, r versus Y

For equilibrium in the Savings & Investment market, there will be a negative relationship between the real interest rate (r) and production (Y). **Graph** this relationship for the Savings and Investment functions above.



The IS Curve and Monetary Policy

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2%	110	$i = r + \pi = 2\% + 6\% = 8\%$
0%	130	$i = r + \pi = 0\% + 6\% = 6\%$
-2%	150	$i = r + \pi = -2\% + 6\% = 4\%$
-4%	170	$i = r + \pi = -4\% + 6\% = 2\%$

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-4%	170	$i = r + \pi = -4\% + 2\% = -2\%$ Impossible!

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-2%	150	$i = r + \pi = -2\% + -2\% = -4\%$ Impossible!
-4%	170	$i = r + \pi = -4\% + -2\% = -6\%$ Impossible!