Finding an Equation for the Intertemporal BC

Use B to find feasible combinations of C_0 and C_1 (could also use S)

Suppose person borrows B dollars and consumes it at 0

$$C_0 = I_0 + B$$

Must repay $B(1 + r)$ in period 1

$$C_1 = I_1 - B(1 + r)$$

Solving the C_1 equation for B

$$C_1 - I_1 = -B(1 + r)$$

$$B = \frac{I_1 - C_1}{1 + r}$$

Insert into C_0 equation to

$$C_0 = I_0 + \frac{I_1 - C_1}{1 + r}$$

Regroup by date of variable:

$$(C_0 - I_0)(1 + r) = I_1 - C_1$$

Interpretation: must repay all loans

Regroup by type of variable:

$$C_0 + \frac{C_1}{1+r} = I_0 + \frac{I_1}{1+r}$$

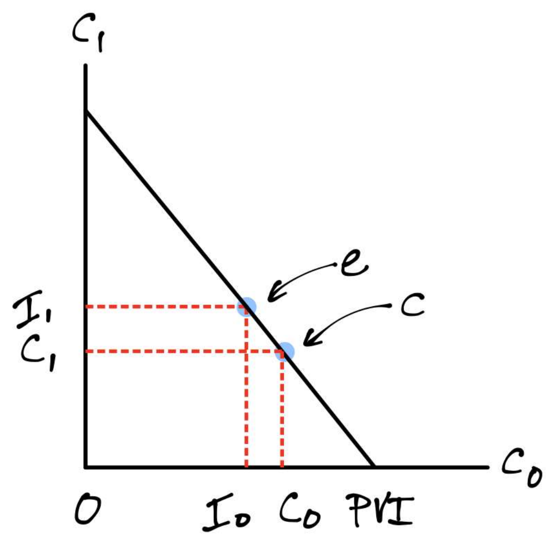
$$C_0 + \frac{C_1}{1+r} = PVI$$

Interpretation: present value of C equals present value of I

From here on, we'll use this version of the BC:

$$C_0 + \frac{C_1}{1+r} = PVI$$

Gives feasible bundles in terms of PVI:



e = endowment
c = consumption

To use, convenient to rewrite it slightly:

$$1 * C_0 + \left(\frac{1}{1+r}\right) * C_1 = PVI$$

Compare to the previous BC:

$$P_x * Q_x + P_y * Q_y = M$$

Lining up the terms:

Two goods	Two periods
P_x	$P_0 = 1$
Q_x	C_0
P_y	$P_1 = 1/(1+r)$
Q_y	C_1
M	PVI

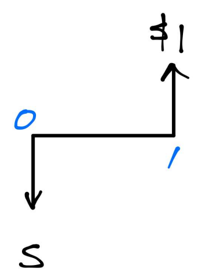
Prices are period 0's view when decision is made:

$P_0 = 1$ Price of \$1 of period-0 consumption in 0

$P_1 = 1/(1+r)$ Price of \$1 of period-1 consumption at 0

Intuition behind P_1:

To get extra \$1 in 1, deposit S in 0:



S needs to be large enough to grow to \$1 in period 1:

$$S(1+r) = \$1$$

$$S = \frac{\$1}{1+r} = P_1$$

Example:

$$r = 5\% = 0.05$$

$$P_1 = \frac{1}{1.05} = 0.9524$$