Review: Small Open Economy, Pure Exchange

(No Production)
Budget Line:

\[ C_1 + \frac{C_2}{1+r} = Q_1 + \frac{Q_2}{1+r} + (1+r)B_0 \]

(Slope = - (1+r))
Available choices for the household

\[ C_1 + \frac{C_2}{1+r^*} = Q_1 + \frac{Q_2}{1+r^*} + (1 + r^*)B_0^* \]

\[ C_1 + \frac{C_2}{1.1} = 5 + \frac{10.2}{1.1} + 1 = 6 + \frac{10.2}{1.1} \]
Equilibrium in Small Economy
Optimal Consumption Choice

Recall that the slope of an indifference curve is

$$MRS_{xy} = \frac{MU_x}{MU_y},$$

so

$$MRS = \frac{1}{\beta} \sqrt{\frac{C_2}{C_1}} = 1 + r^*$$

$$\Rightarrow C_1 = C_2$$
• Hence consumption is just the solution of the two previous equations:

\[ C_1 + \frac{C_2}{1.1} = 5 + \frac{10.2}{1.1} + 1 = 6 + \frac{10.2}{1.1} \]

\[ C_1 = C_2 \]

• Solving these two equations one gets \( C_t = 8 \), \( t = 1,2 \).
• The rest of the analysis is just about applying accounting definitions.
• For example, the *trade* balance in period 1 is the difference between domestic production and domestic consumption:

\[ Q_1 - C_1 = 5 - 8 = -3 \]
Trade Deficit in Period 1 (if $r^*B^*_0 = 0$)
• The *current account balance* is the difference between national income and consumption:

\[ CA = r^*B_0^* + Q_1 - C_1 \]

• Note that *CA* = *r*^*B_0^* + *TB*
Suppose that this is the outcome under free capital mobility.
Capital controls mean that agents cannot borrow in the world market, that is, points in the budget set for which $C_1 > Q_1$ are not available.
The resulting budget set is below and to the left of the red line.
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• We had seen that, without capital controls, the household would have wanted to borrow at the world interest rate. Hence capital controls will induce the household to consume exactly what is available in each period: 6 in the first, 10.2 in the second.

• What happens with the interest rate?
The *domestic* interest rate must *increase* to $r_A$ so that home residents are happy consuming their endowments.
• This requires:

\[ MRS = \frac{\partial U/\partial C_1}{\partial U/\partial C_2} = \frac{1}{\beta} \sqrt{\frac{C_2}{C_1}} = 1 + r \]

With \( \beta = 1/1.1 \), \( C_1 = 6 \), and \( C_2 = 10.2 \), we get \( r = 0.43 \) approx.
Suppose instead that this is the outcome under free capital mobility.
A prohibition on foreign *borrowing* does not affect agents’ choices here.
A Fall in Future Income

Future C (C2)

I (1+r)

Q2

Q2 - Δ

A

A'

Q1

Current C (C1)
Suppose the CA was originally zero. C is the new consumption point: the CA is now in surplus.
Review: Production and Investment
Optimal Investment In the Open Economy

MPK = F'(K)

r* + δ

K(2) = K*

Capital
Part III: Optimal Investment

The MPK is:

\( \frac{\partial Q_2}{\partial K_2} = F'(K_2) = \frac{1}{2} \sqrt{K_2} \)

This must be equal to the cost of capital, hence:

\[ \frac{1}{2} \sqrt{K_2} = 1.1 \implies K_2 = 0.21 = I_1 \]
• Now you can calculate the firm’s profits:

\[ \Pi_2 = \sqrt{K_2} - (1 + r^*)I_1 \]
• With this, you can find the household’s budget constraint:

\[ C_1 + \frac{C_2}{1+r^*} = Q_1 + \frac{\Pi_2}{1+r^*} \]
• Note that the previous budget constraint is equivalent to:

\[ C(1) + \frac{C(2)}{1+r^*} = Y(1) - K^* + \frac{F(K^*)}{1+r^*} \]

As we had derived before.
Equilibrium consumption is at Point A.
• Note that the analysis of the *open* economy is somewhat easier than the analysis of the *closed* economy.
Equilibrium in the Closed Economy:
\( r(2) \) adjusts to ensure the equality of production and consumption in equilibrium.

Slope = \(-(1+r(2))\)
World Equilibrium
The **Current Account** Diagram

\[ \text{CA} = S - I \]
The world interest rate is $r^*$.

US CA deficit = ROW CA surplus
• This apparatus is useful to examine effects of changes in variables that affect savings and investment.

• For example, suppose that the current income of the US falls.

• This implies a reduction in US savings.
A Fall in Savings

Interest Rate

S', I

S, I

Interest Rate

CA

CA = S - I
A Fall in Savings

Interest Rate

S', I

S

I

S, I

Interest Rate

CA'

CA

CA = S - I

0
A fall in the US savings rate causes the CA schedule to move to the left.

\[ \text{US CA deficit} = \text{ROW CA surplus} \]
The US CA deficit increases, and the world interest rate goes up.