Topics for Today

1.) Equilibrium in Small Open Economies with Production

2.) The "Separation Theorem"

3.) Comparative Statics
   - Productivity Shocks
   - World Interest Rate Shocks

4.) A Useful ShortCut - S/I/CA Graphs
   - Interest Rate Shocks
   - Productivity Shocks
   - Risk Premia

5.) Current Acct. Dynamics in "Large" Open Economies

Equilibrium in Small Open Economies

- Small open economies differ in two important ways:

1.) The interest rate is exogenous (or given)

2.) Households now confront a portfolio allocation problem, i.e, they can invest in either domestic capital or foreign bonds.

- That is, household wealth now consists of claims on foreigners, B^*, and claims to domestic capital, K.

$$W_0 \$ = K_1 + B_0^*$$
$$W_1 = K_2 + B_1^*$$

- However, with no uncertainty or default risk, the two assets become perfect substitutes. No arbitrage implies they must therefore offer the same return. Hence, domestic investment occurs up until the point

$$\boxed{F'(K_2') = r^* + \delta}$$

Beyond this point all domestic saving gets channelled into foreign bonds.

Comments

1.) Later we discuss a more interesting and realistic portfolio allocation problem. [Ventura (2002)].

2.) The fact that domestic capital + foreign bonds are perfect substitutes means there is no loss in generality in ruling out FDI, and assuming domestic residents own the entire domestic capital stock.

Resource Constraint

- To characterize the equilibrium, we need to combine the PPF with the aggregate resource constraint.

- For notational simplicity assume $\delta=1$ and $B_0^* = 0$.

- As before, the household budget constraint is,

$$c_1 + \frac{c_2}{1+r^*} = (1+r^*)W_0 + \Pi_1 + \frac{\Pi_2}{1+r^*}$$

Substituting for $\Pi_1 + \Pi_2$ gives

$$c_2 = (1+r^*)(Q_1 - c_1 - K_2^*) + F(K_2^*)$$

- This says that households consumption in period 2 is equal to output plus the interest and principal on net foreign assets.

- Combining the PPF + Resource Constraint gives the following picture –

Figure 3.8: Equilibrium in the production economy: the small open economy
case
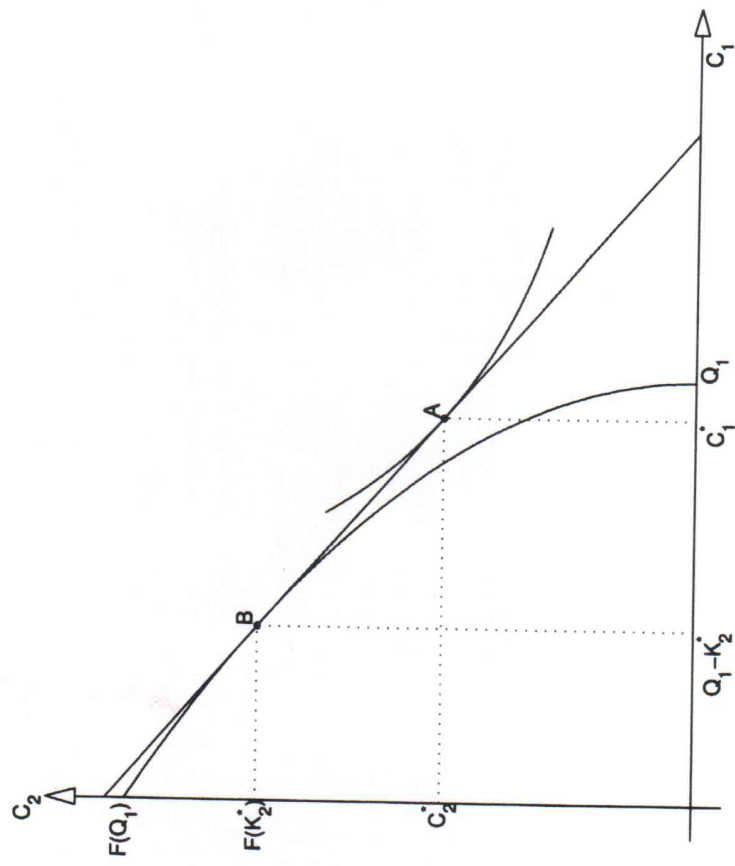
The "Separation Theorem"

- Note that finding the equilibrium in small open economies consists of 2 distinct steps:

1.) Pick the production point (pt. B in previous graph) that maximizes the economy's wealth (evaluated at world prices). That is, find the point on the PPF that is tangent to the resource constraint.

2.) Pick the best point on the Resource Constraint (pt. A in previous graph). That is, find the point tangent to an Indifference Curve.

- Hence, in contrast to closed economies, in open economies production decisions are completely separated from consumption decisions. Optimal production + investment is independent of preferences. All that matters is the world interest rate + the domestic production function.

Comments

1.) **Warning** - the Separation Theorem will break down if labor enters the production function and consumption & leisure enter non-separably in the utility function.

2.) The converse does not apply - consumption decisions will of course depend on investment decisions, since investment affects the total resources available to be consumed.

3.) The Separation Theorem is the key intuition behind the Feldstein-Horioka Puzzle. According to the Separation Theorem, there is no necessary relationship between S & I. Regressing I on S should produce a low R^2 and insignificant t-stats. Feldstein & Horioka found the opposite.

Comparative Statics

- Suppose $Q_1 = A_1 F(K_1)$ and $Q_2 = A_2 F(K_2)$
- Let's consider 3 types of shocks:

 1.) Temporary Productivity Shock $[A_1 \downarrow]$

 2.) Permanent Productivity Shock $[A_1 \downarrow$ and $A_2 \downarrow]$

 3.) World Interest Rate Shock $[r^* \downarrow]$.

Temporary Productivity Shock (see fig. 3.9 in following graph).

1.) Leftward parallel shift of PPF

2.) r^* doesn't change

 $\Rightarrow$ investment and Q_2 don't change

3.) Consumption·smoothing implies $C_1 \downarrow$ less than $Q_1 \downarrow$

 $\Rightarrow CA \downarrow$ (since $S \downarrow$ and I is constant)

(How would a closed·economy respond?)

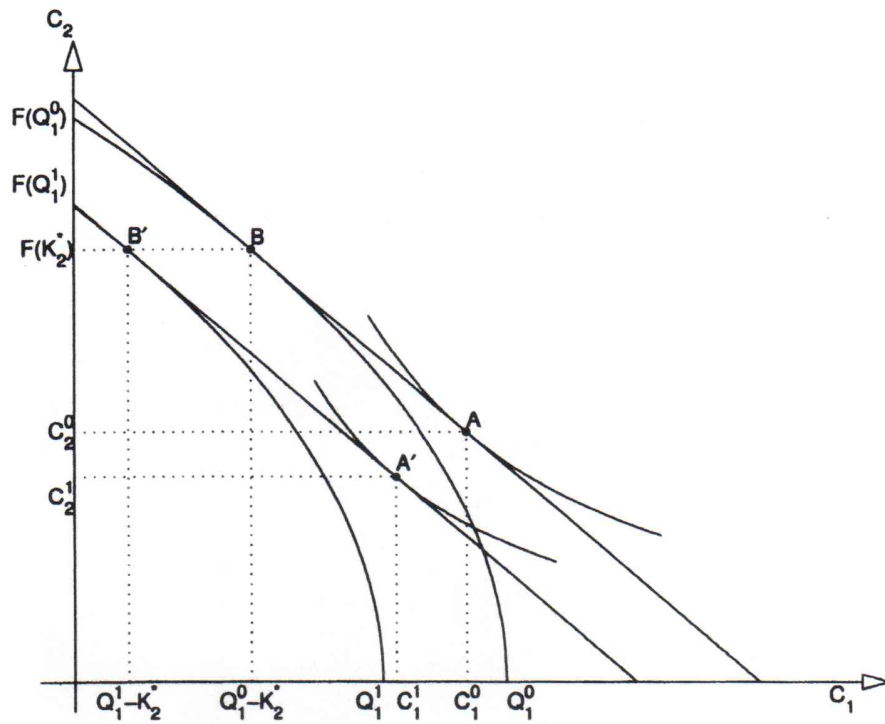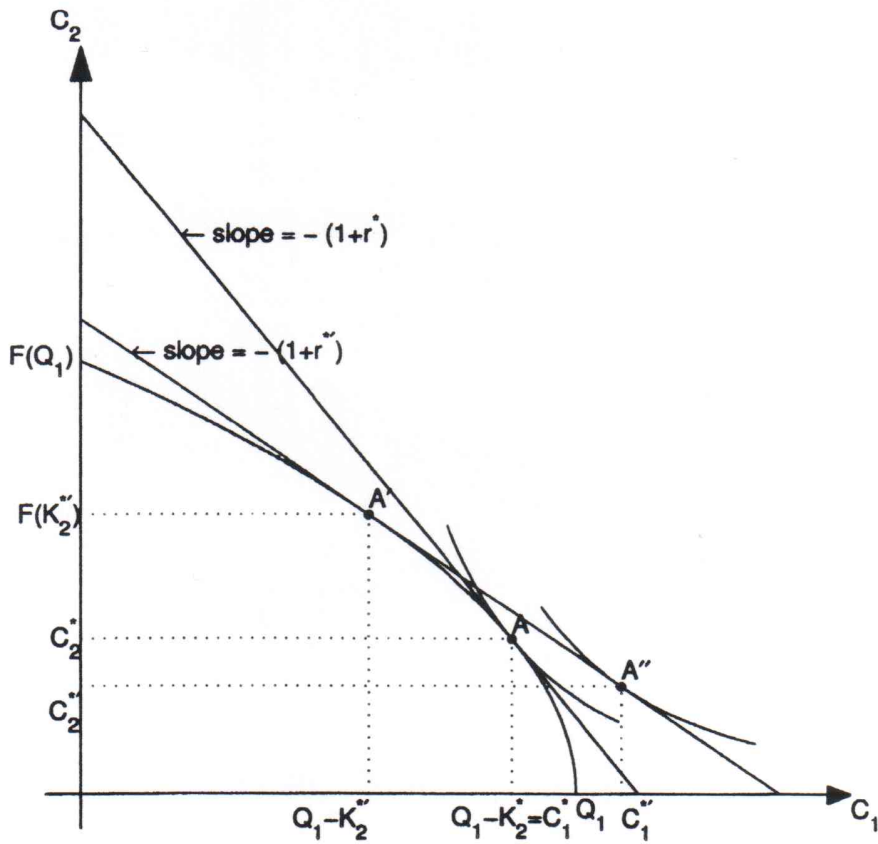Figure 3.9: The effect of a temporary output decline in the small-open economy with production

Figure 3.10: A decline in the world interest rate from r^* to $r^{*\prime}$

Permanent Productivity Shock

1.) Now $A_2 \downarrow$ too $\Rightarrow K_2 \downarrow$ $(A_2 F'(K_2) = 1 + r^v)$

$\Rightarrow I_1 \downarrow$

2.) $Q_2 \downarrow$ for <u>two</u> reasons : 1.) $A_2 \downarrow$

                                    2.) $K_2 \downarrow$

3.) Therefore, $Q_2 \downarrow$ <u>more</u> than Q_1

$\Rightarrow S \uparrow$

$\Rightarrow CA \uparrow$ $(S \uparrow$ and $I \downarrow)$.

World Interest Rate Shock (see fig. 3.10 in previous graph).

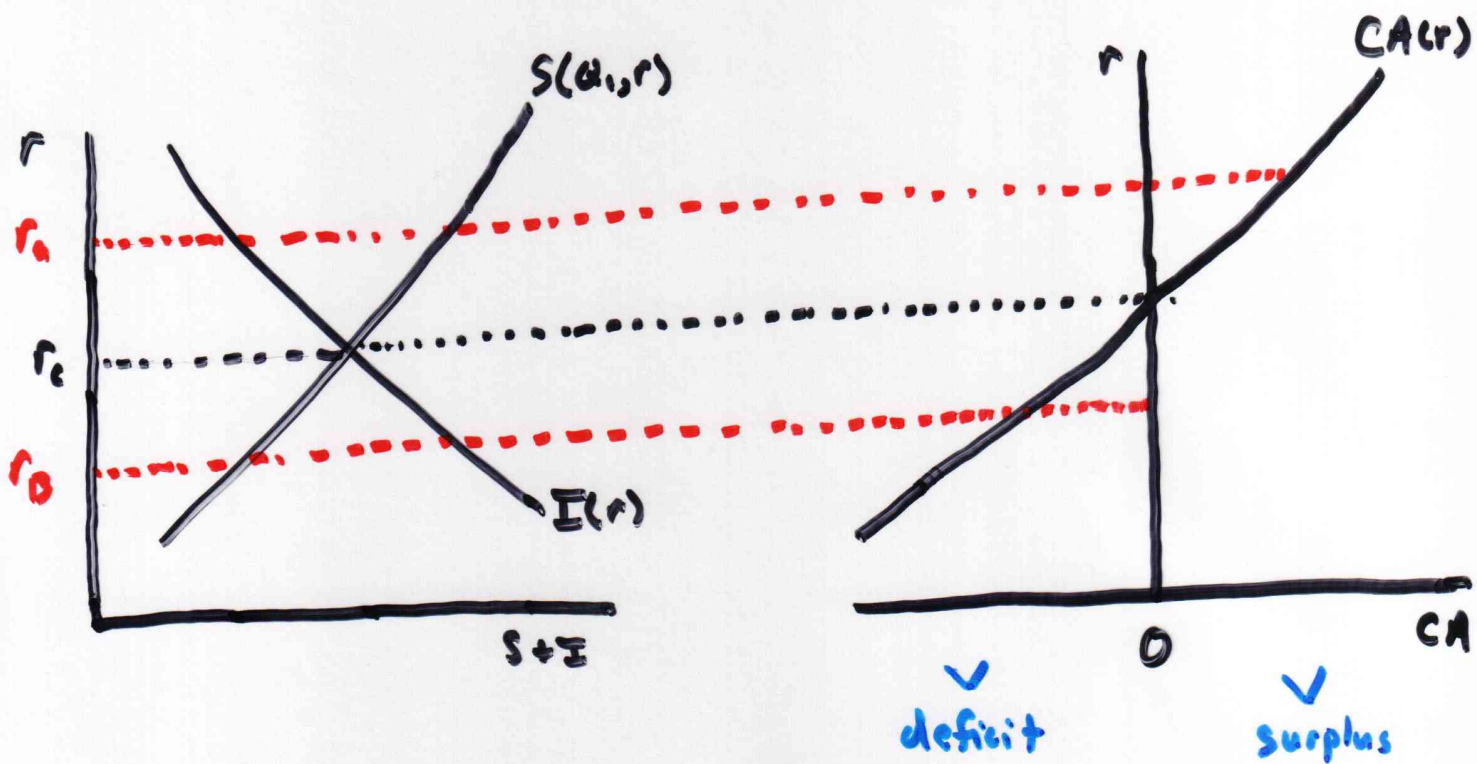1.) $r^* \downarrow \Rightarrow K_2$ and $I_1 \uparrow$ $(F'(K_2) = 1 + r^v)$

2.) Substitution effect $\Rightarrow C_1 \uparrow$

$\Rightarrow S \downarrow$ $(Q_1$ is given$)$
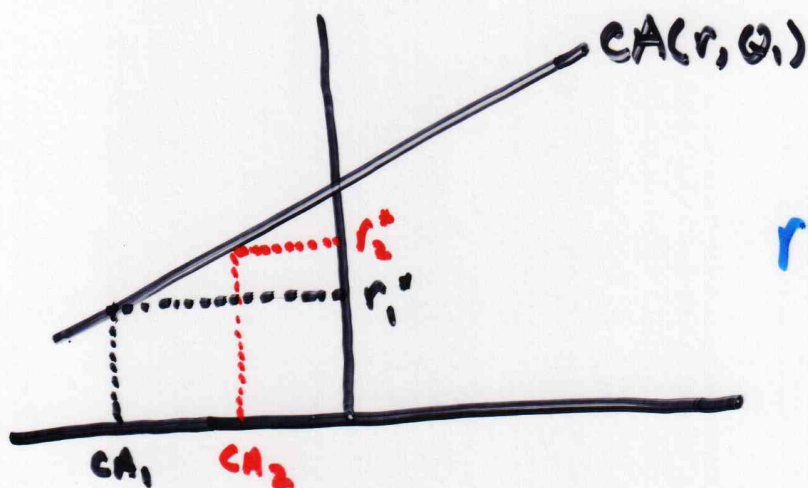
3.) $CA \downarrow$ $(S \downarrow, I \uparrow)$

(How does this compare to response of endowment economy?

A Useful Shortcut

- Although examining changes in the PPF, Resource Constraint, and Indifference Curves is quite informative, for many questions we don't need that much detail. Often it is sufficient to work directly with S & I graphs. These can easily be combined to illustrate the CA.

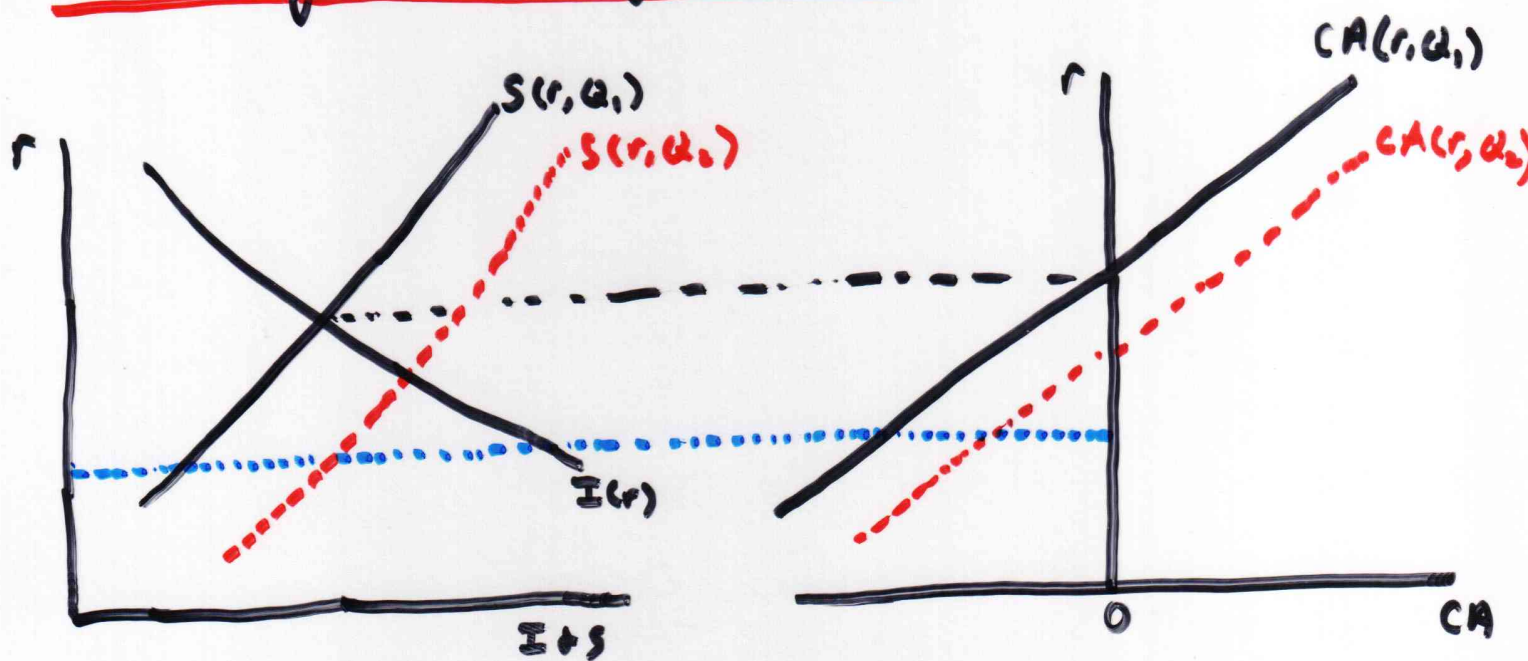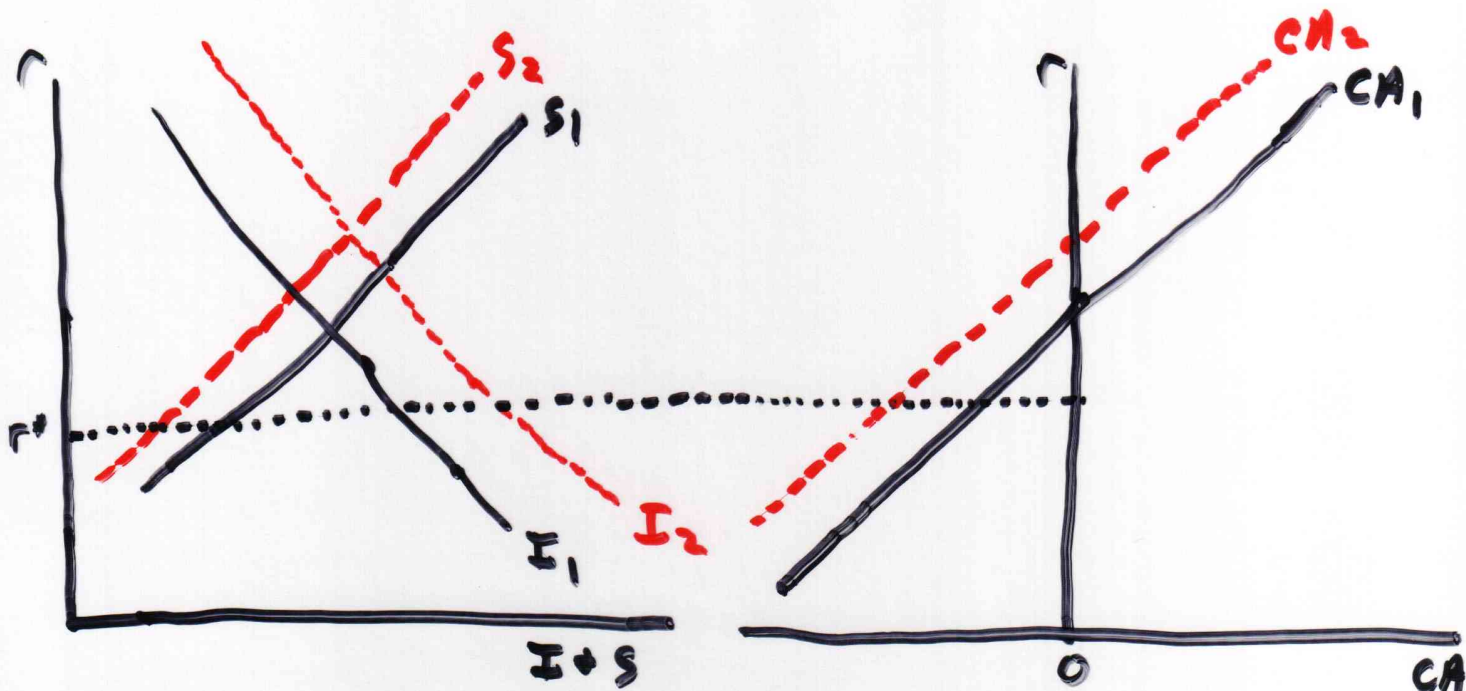# World Interest Rate Shock ($r^* \uparrow$)

$CA(r, Q_1)$

r_2^*

r_1^*

CA_1 CA_2

$r \uparrow \Rightarrow CA \uparrow$
(deficits shrinks)

Temporary Productivity Increase ($A_1 \uparrow$)

$S(r, Q_1)$

$S(r, Q_2)$

$I(r)$

$I + S$

$CA(r, Q_1)$

$CA(r, Q_2)$

0

CA

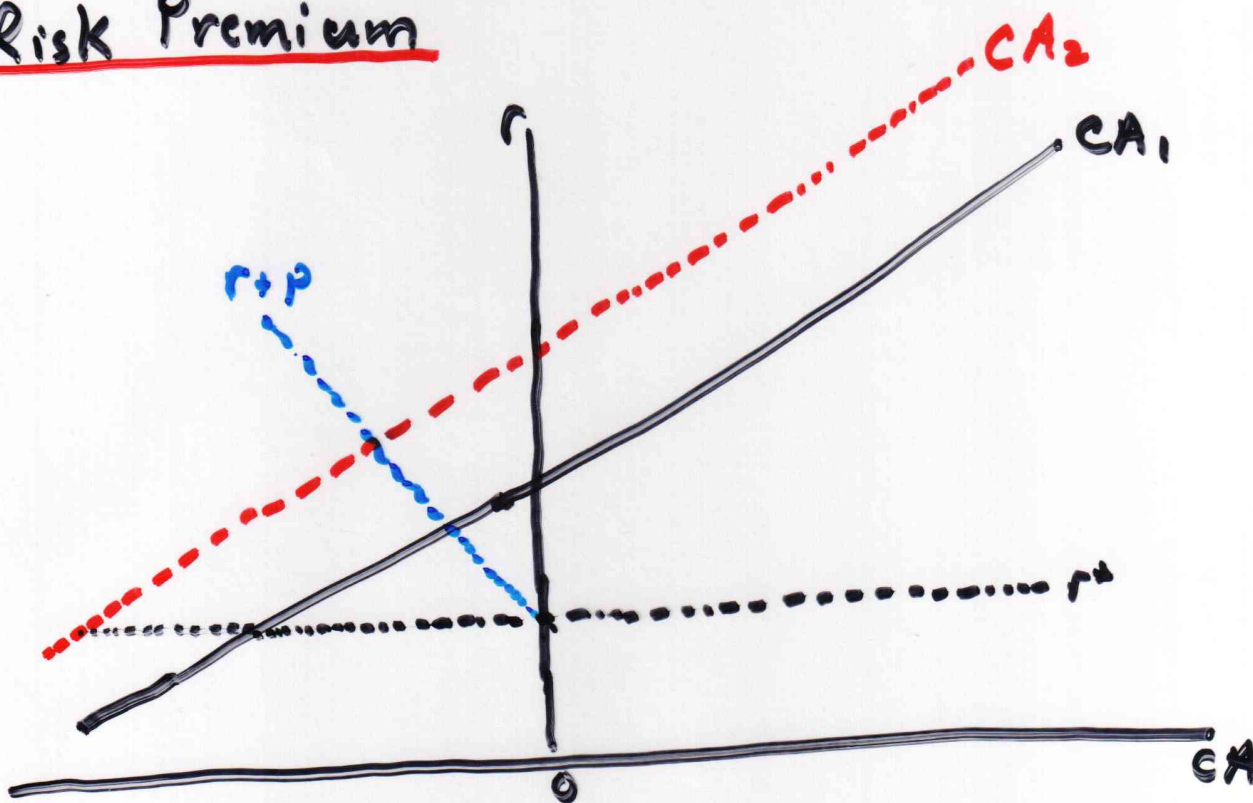$A_1 \uparrow \Rightarrow S \uparrow, I$ constant
$\Rightarrow CA \uparrow$ (deficit shrinks)

Future Productivity Increase (A₂↑)

Risk Premium

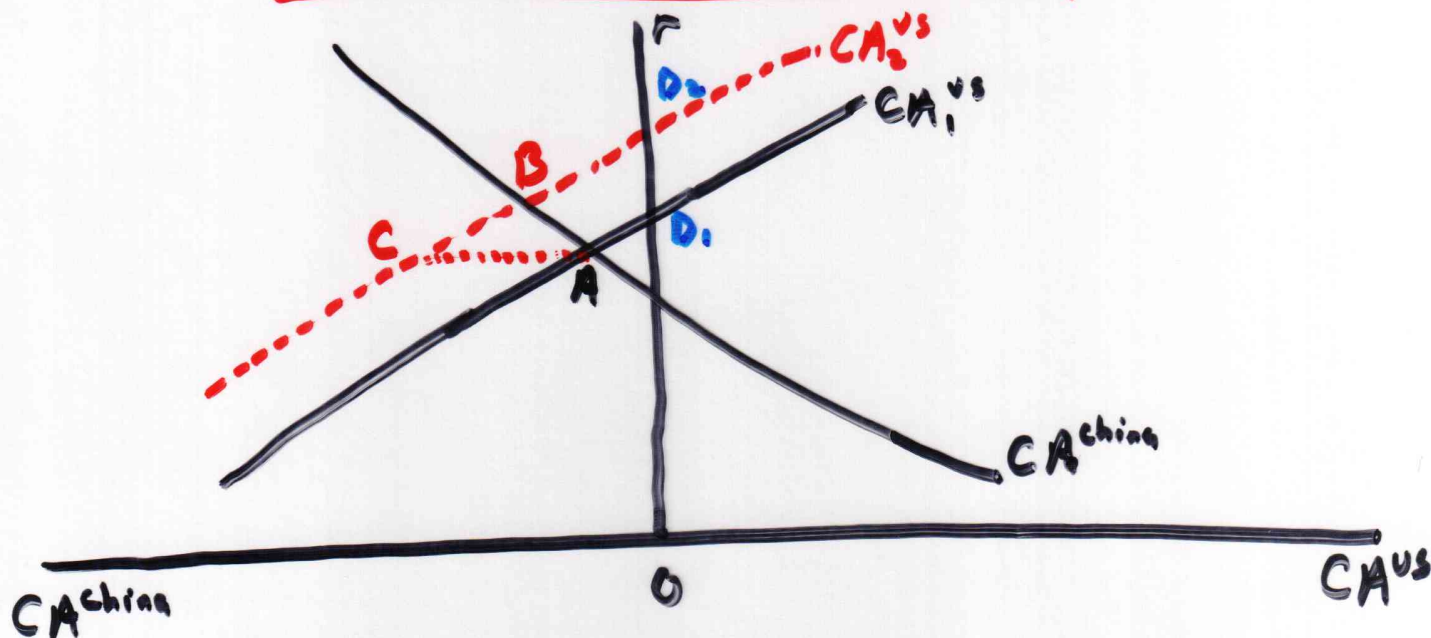

Now CA is less reponsive, since domestic interest rate rises.

Large Countries

- The sum of all CAs must be zero. Let's suppose the world just consists of the U.S. + China.

$$CA^{U.S.} + CA^{China} = 0$$

1.) A = initial equil. (U.S. deficit, China Surplus)

A→B : Equil. after $A_2^{U.S} \uparrow$ (Note: $r^* \uparrow$)

A→C : Response in "small" economy

$D_1 → D_2$: Response in closed economy

Punchline : Response of large country lies between that of closed + small open economies.