

ECON 222A

Macroeconomic Theory I

Saving and Investment
in the Open Economy
Lecture 10

Announcements

- Problem set 2 due on the 11th
- Tutorial on February 28th 7.00-8.30pm in Dunning 14: only exercises
- Midterm on March 1st 6.30-8.30pm WLH 205
- Class on March 2nd is cancelled
- Room change for March 4: Dupuis 215
- First Problem set is ready to collect

Today's Lecture

- Saving and Investment in a Small Open Economy
- Saving and Investment in a Large Open Economy

Open Economy

- Canada :
 - 369 billions of exports in 2009 (2007: 463)
 - 379 billions of imports in 2009 (2007: 415)
 - NFP : -24 billions in 2009 (2007 : -19)
- With our current model, we have been assuming that *all* those numbers are close to zero (small share of GDP).

Open Economy

- Our macro model cannot account for those variables (quantitatively important).
- *Worse*: we cannot predict the impact those variables can have on labor and goods markets (hence on output and growth).
- We need a theory for an open economy.

Saving and Investment in a Small Open Economy

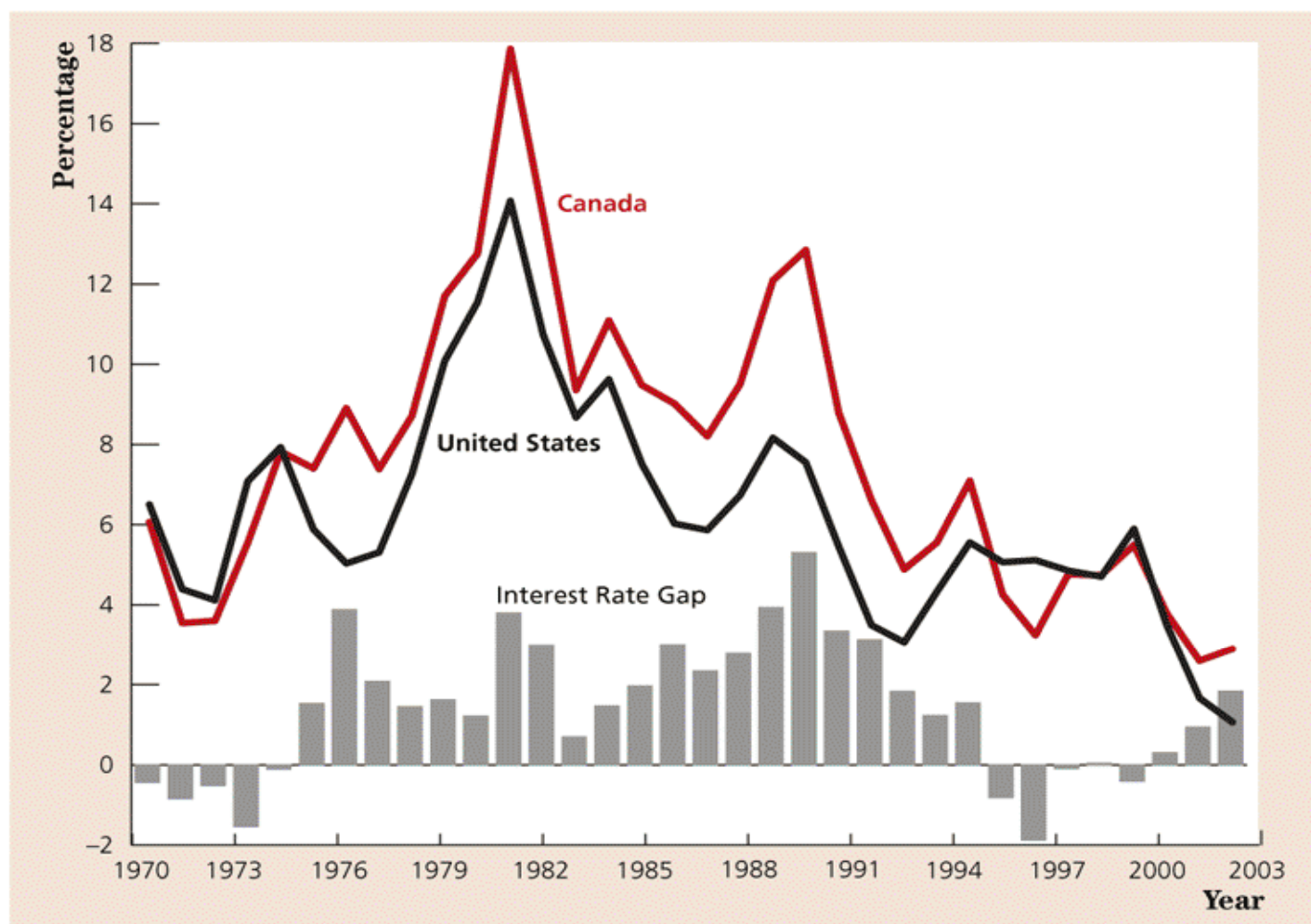
- **World real interest rate**: interest rate that prevails in the international capital markets – the market in which economic agents borrow and lend across national borders.
- A **small open economy** is an economy that is too small to affect the world real interest rate.

FIGURE 5.1

INTEREST RATES IN CANADA AND THE US

The graph shows nominal interest rates paid on Canadian and US government 3-month Treasury bills and the difference between them. Note that the Canadian interest rate tends to move with changes in the US interest rate. This reflects the fact Canadian savers are able to freely choose between owning Canadian and US financial assets. Note as well that the gap between Canadian and US interest rates was considerably larger between 1975 and 1995 than it had been either before or after. This suggests some influence unique to that period was causing savers to demand that Canadian borrowers offer a more attractive interest rate to compensate them for purchasing Canadian assets. We return to this issue in Chapter 10.

Sources: Adapted from the Statistics Canada CANSIM database <<http://cansim2.statcan.ca>>, Series V122531 and the *Economic Report of the President*, Table B73.



A Small Open Economy: Assumptions of the Model

- The world real interest rate is **fixed** for the small open economy.
- The markets for financial assets are **open to all** savers and borrowers regardless of where they live.
- Thus, for a small open economy the domestic real interest rate will adjust to the (expected) **world** interest rate.

A Small Open Economy: Assumptions of the Model

- Small open economy: too small to affect the world real interest rate r_w
(take it as given, e.g. Jamaica)
- Can borrow or lend at r_w
- Equilibrium doesn't require $S^d = I^d$
- Recall: $S^d = I^d + CA$ or $S^d = I^d + NX$ when $NFP=0$

Equilibrium? Three Possibilities

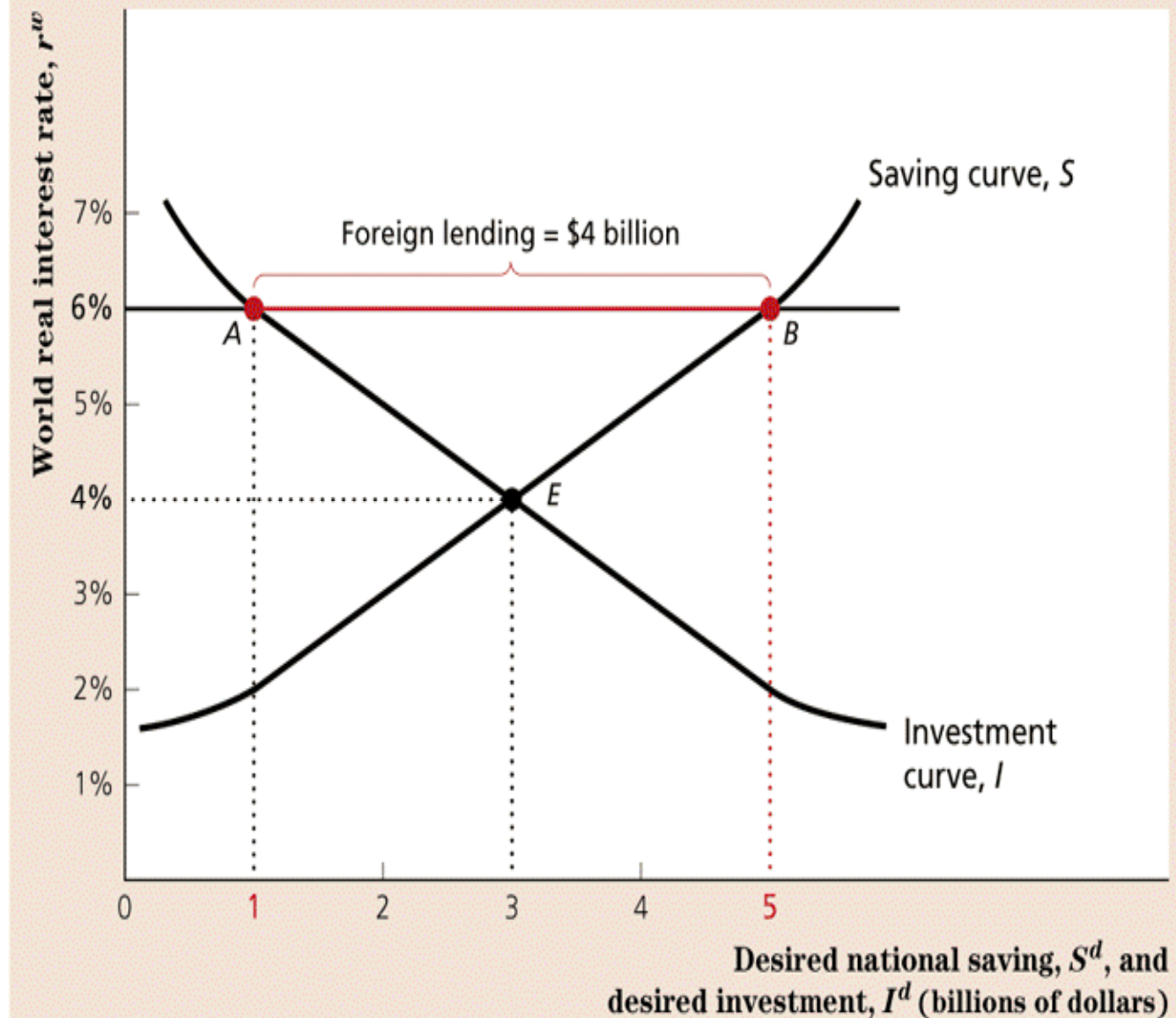
1. $r_w = r_1 > r^*$, then $S^d > I^d$

- world interest rate higher than the one which would clear the domestic savings market.
(savers happy)
- In a closed economy, r would have to fall, but now savers can lend abroad.
- Excess of S^d over I^d is lent internationally (net foreign lending is positive), and $CA > 0$, $KA < 0$

FIGURE 5.2

**A SMALL OPEN ECONOMY
THAT LENDS ABROAD**

The graph shows the saving–investment diagram for a small open economy. The country faces a fixed world real interest rate of 6%. At this real interest rate national saving is \$5 billion (point *B*) and investment is \$1 billion (point *A*). The part of national saving not used for investment is lent abroad, so foreign lending is \$4 billion (distance *AB*).



Equilibrium? Three Possibilities

- In an open economy desired national saving need not equal desired investment.
- High values of the world real interest rate (r_w) imply:
 - low levels of desired consumption (people save more);
 - low desired investment (high uc).

Equilibrium? Three Possibilities

2. $r_w = r_2 = r^*$, then $S^d = I^d$

- world interest rate equal to the one which would clear the domestic savings market.
- No net foreign lending, and $CA = 0$

Equilibrium? Three Possibilities

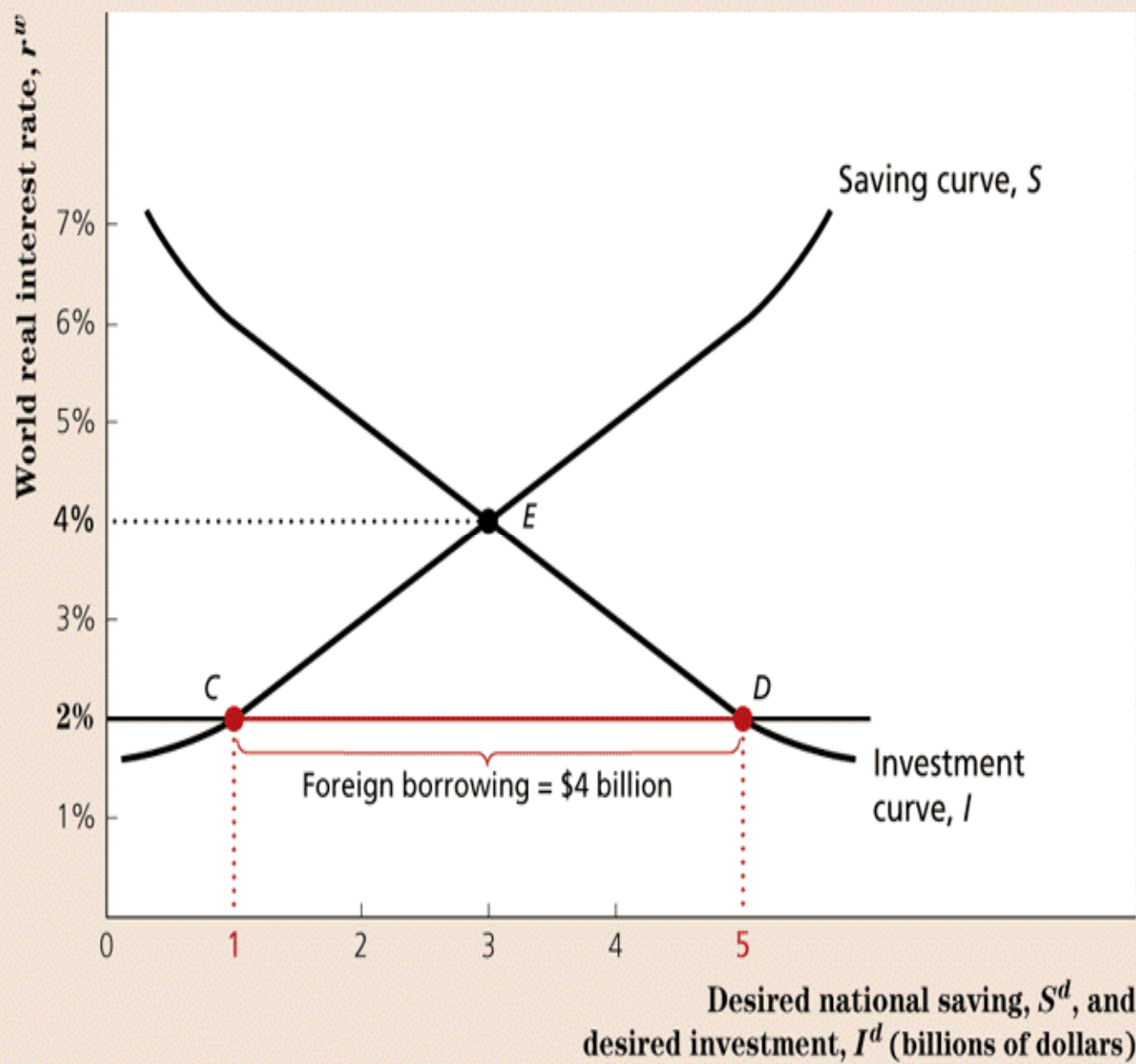
3. $r_w = r_3 < r^*$, then $S^d < I^d$

- World interest rate lower than the one which would clear the domestic savings market.
(firms happy)
- Excess of I^d over S^d is financed by borrowing internationally (net foreign lending negative), and $CA < 0$, $KA > 0$

FIGURE 5.3

A SMALL OPEN ECONOMY THAT BORROWS ABROAD

The same small open economy shown in Figure 5.2 now faces a fixed world real interest rate of 2%. At this real interest rate, national saving is \$1 billion (point C) and investment is \$5 billion (point D). Foreign borrowing of \$4 billion (distance CD) makes up the difference between what investors want to borrow and what domestic savers want to lend.



What Else?

- Apart from the interest rate, other factors affect the expected rate of return on international investments:
 - transaction costs
 - tax rates on interest income
 - exchange rate risk
 - political risk

Economic Shocks in a Small Open Economy

- Anything that increases desired national saving ($\uparrow Y$, \downarrow future Y , $\downarrow G$) relative to desired national investment ($\downarrow MPK^f$, $\uparrow t$) at a given world real interest rate (r_w) will:
 - increase net foreign lending;
 - increase the current account balance;
 - increase net exports.

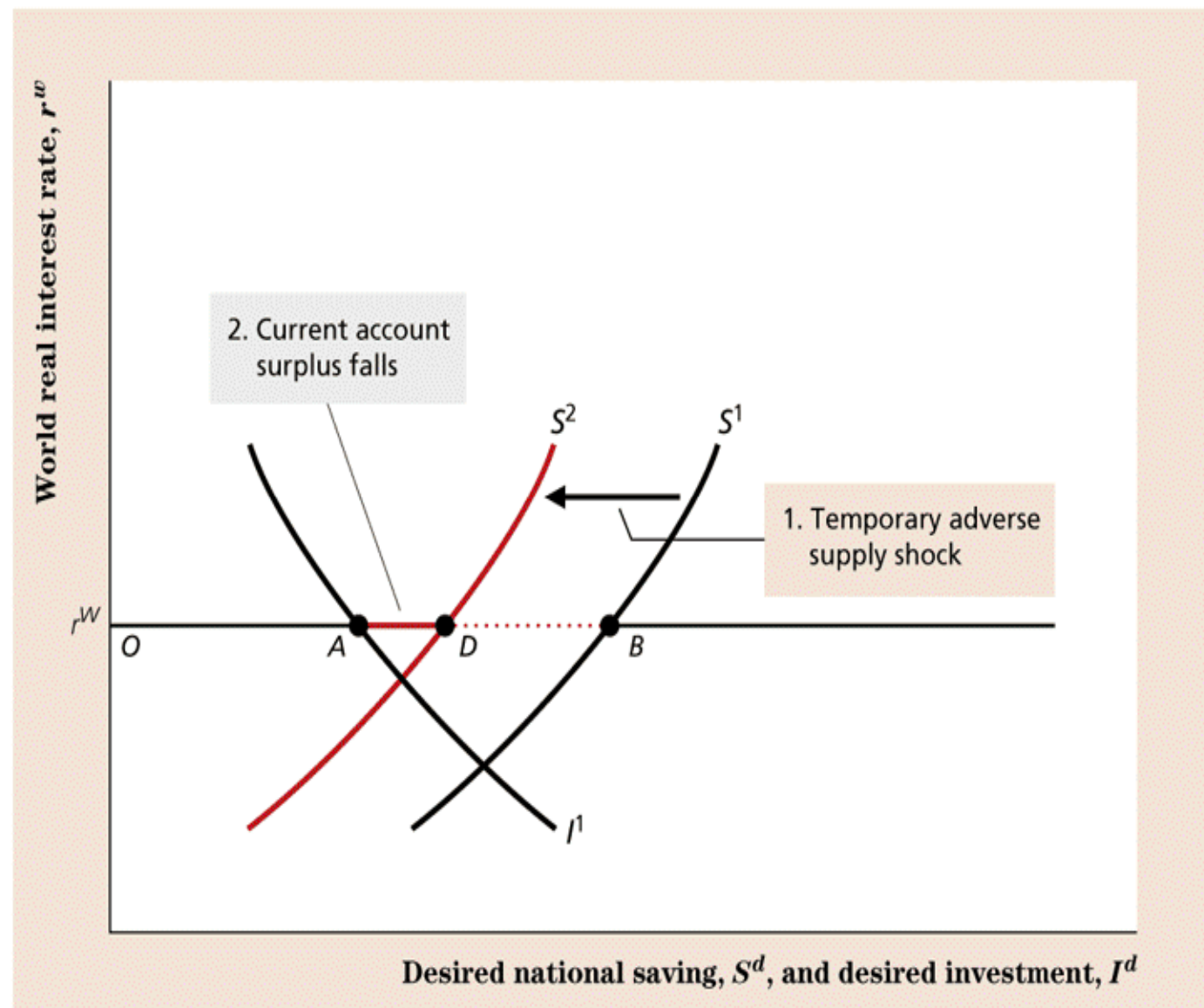
Ex 1: Temporary Supply Shock

- Mild hurricane ($CA > 0$ to start):
 1. Current Y falls, no change in future Y
 2. To smooth C , S^d shifts left
 3. I^d unaffected: no change in future Y , MPK^f
(Fall in marginal products is temporary)
 4. Net foreign lending and CA shrink

FIGURE 5.4

**A TEMPORARY ADVERSE
SUPPLY SHOCK IN A SMALL
OPEN ECONOMY**

Curve S^1 is the initial saving curve, and curve I^1 is the initial investment curve of a small open economy. With a fixed world real interest rate of r^w , national saving equals the distance OB and investment equals distance OA . The current account surplus (equivalently, net foreign lending) is the difference between national saving and investment, shown as distance AB . A temporary adverse supply shock lowers current output and causes consumers to save less at any real interest rate, which shifts the saving curve left, from S^1 to S^2 . National saving decreases to distance OD , and the current account surplus decreases to distance AD .



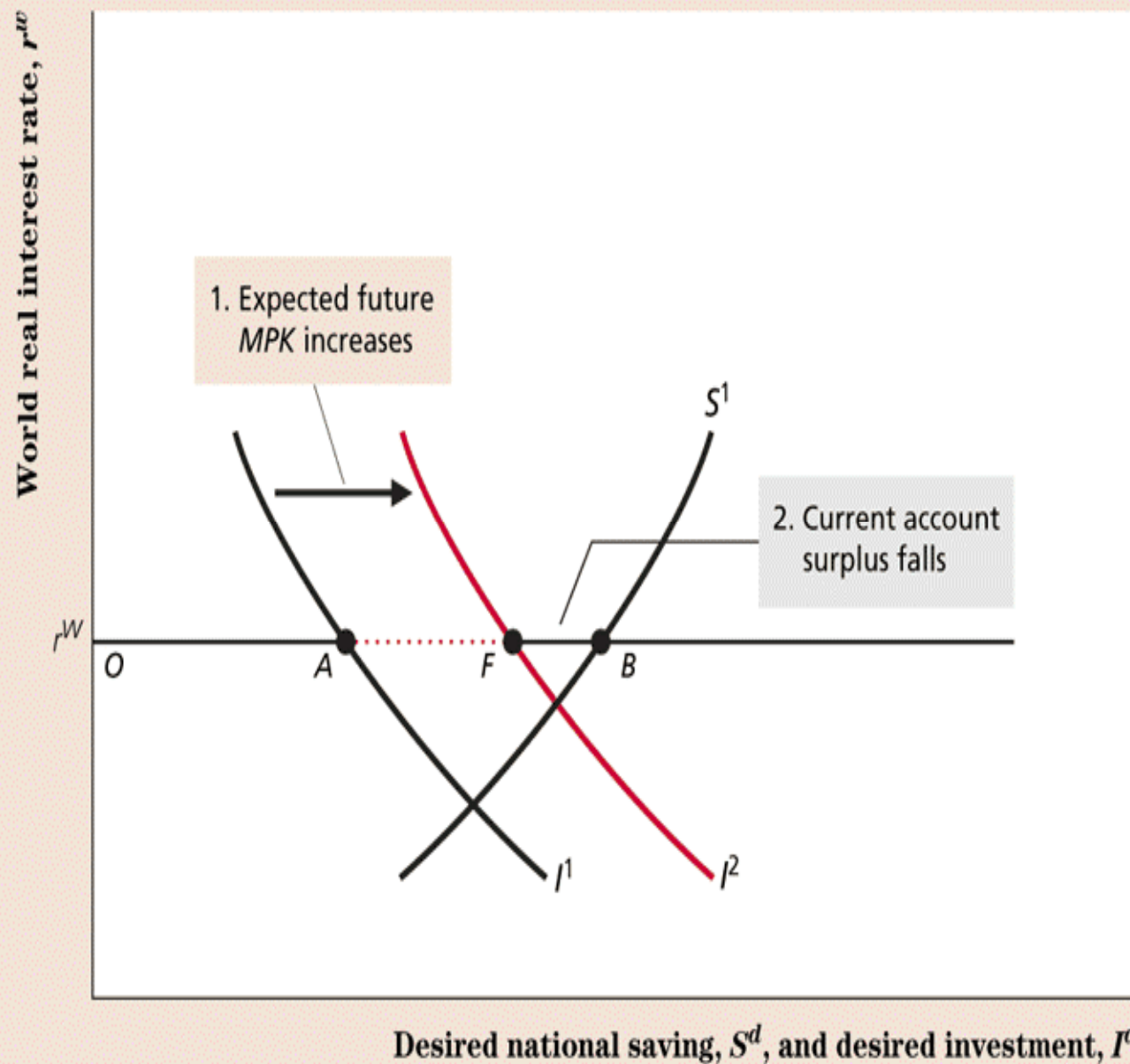
Ex 2: Permanent Positive Supply Shock

- Invention that makes machines more productive, e.g. a faster processor ($CA > 0$ to start):
 1. S^d unaffected
 2. Expected future MPK^f increases
 3. I^d rises at every r
 4. Domestic K increases
 5. Net foreign lending increases, CA shrinks, absorption increases ($C^d + I^d + G$)

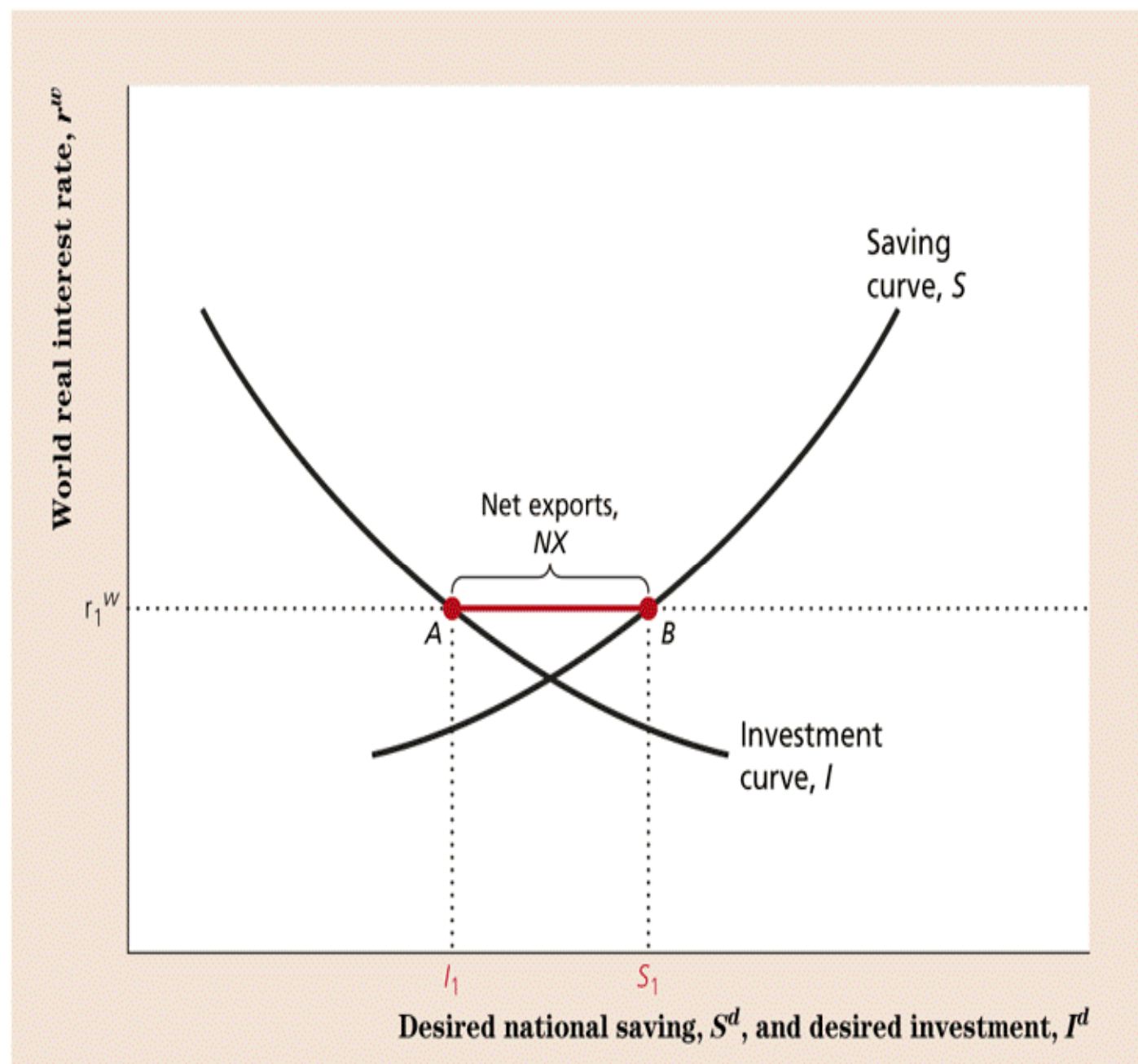
FIGURE 5.5

AN INCREASE IN THE EXPECTED FUTURE *MPK* IN A SMALL OPEN ECONOMY

As in Figure 5.4, the small open economy's initial national saving and investment curves are S^1 and I^1 . At the fixed world real interest rate of r^w , there is an initial current account surplus equal to the distance AB . An increase in the expected future marginal product of capital (MPK^f) shifts the investment curve right, from I^1 to I^2 , causing investment to increase from OA to distance OF . The current account surplus, which is national saving minus investment, decreases from distance AB to distance FB .



This open-economy version of the saving–investment diagram shows the determination of national saving, investment, and the current account balance in a small open economy that takes the world real interest rate as given.



Open Economies - Data

Economy imports/exports	Value (billions, 2008)	Share of the world
World	16070/16422	1/1
Canada	456.5/418.3	0.03/0.03
US	1287.4/2169.6	0.08/0.13
China	1428.3/1132.5	0.08/0.06
Germany	1461.9/1203.9	0.09/0.07

Source : IMF (2010)

Open Economy

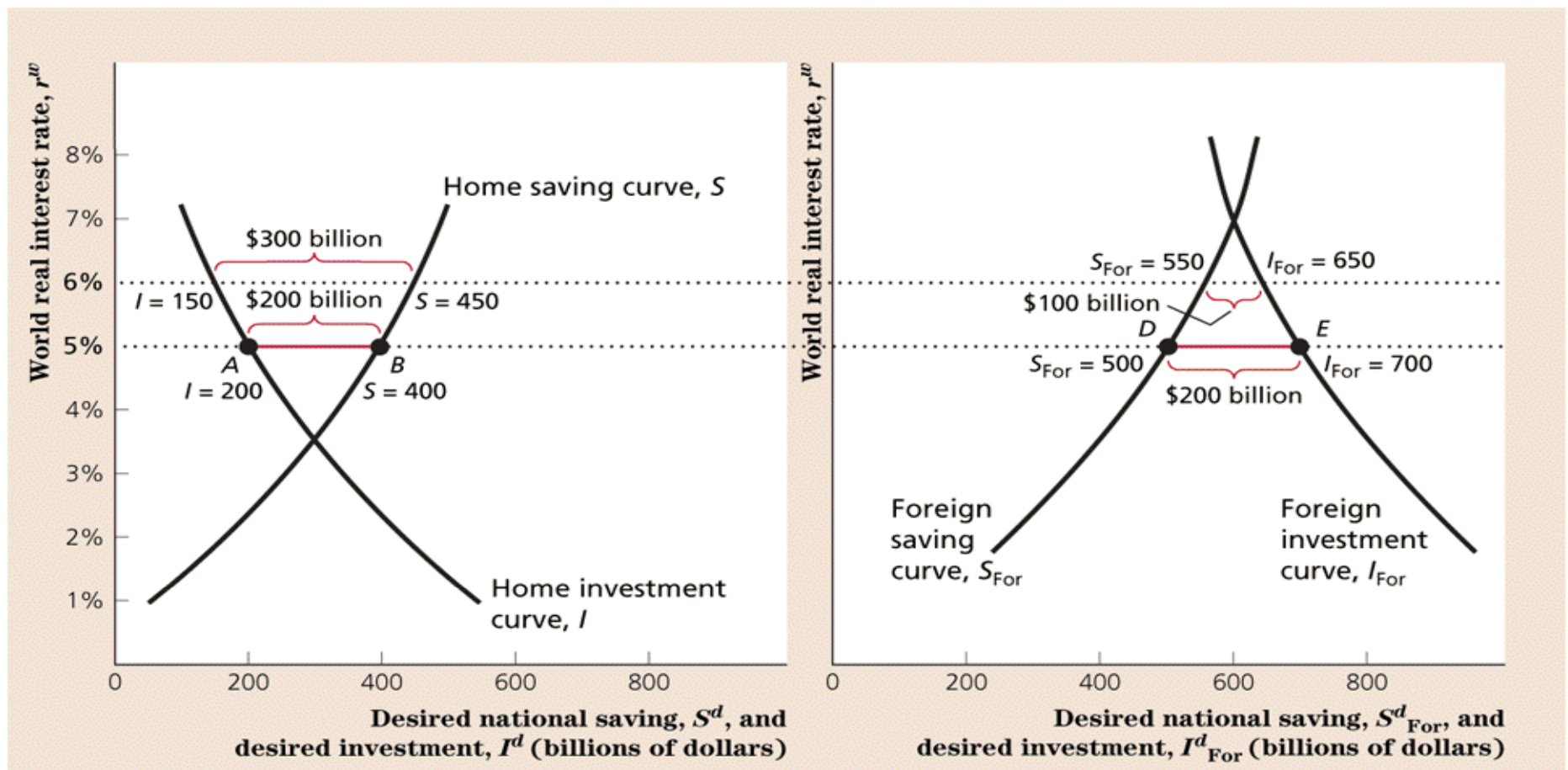
- A small economy model seems reasonable for Canada (3%)
- But what about US, China or Germany (leading exporters/importers)?
- 1 dollar out of ten exported is bought by the US.
 - 10% can affect the world interest rate.
- We need a large open economy setup.

A Large Open Economy: Assumptions of the Model

- A **large** open economy is an economy large enough to **affect** the world real interest rate.
- To illustrate how the model now works, let the world be **only two** large economies: the domestic and the foreign economy.

A Large Open Economy: The World Real Interest Rate

- The **world real interest rate** is determined within the model. It **is not fixed**.
- The world interest rate will be such that **desired international lending** by one country **equals desired international borrowing** by the other country.



(a) Home country

(b) Foreign country

FIGURE 5.7

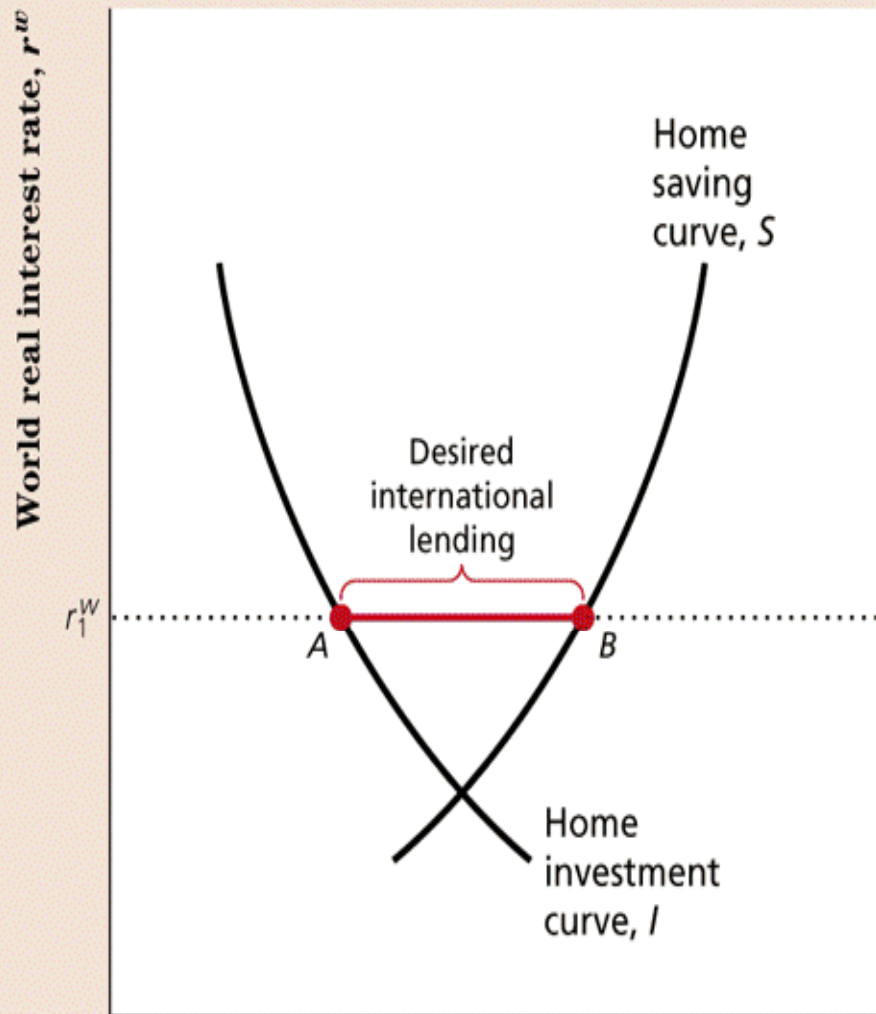
THE DETERMINATION OF THE WORLD REAL INTEREST RATE WITH TWO LARGE OPEN ECONOMIES

The equilibrium world real interest rate is the real interest rate at which desired international lending by one country equals desired international borrowing by the other country. In the figure, when the world real interest rate is 5%, desired international lending by the

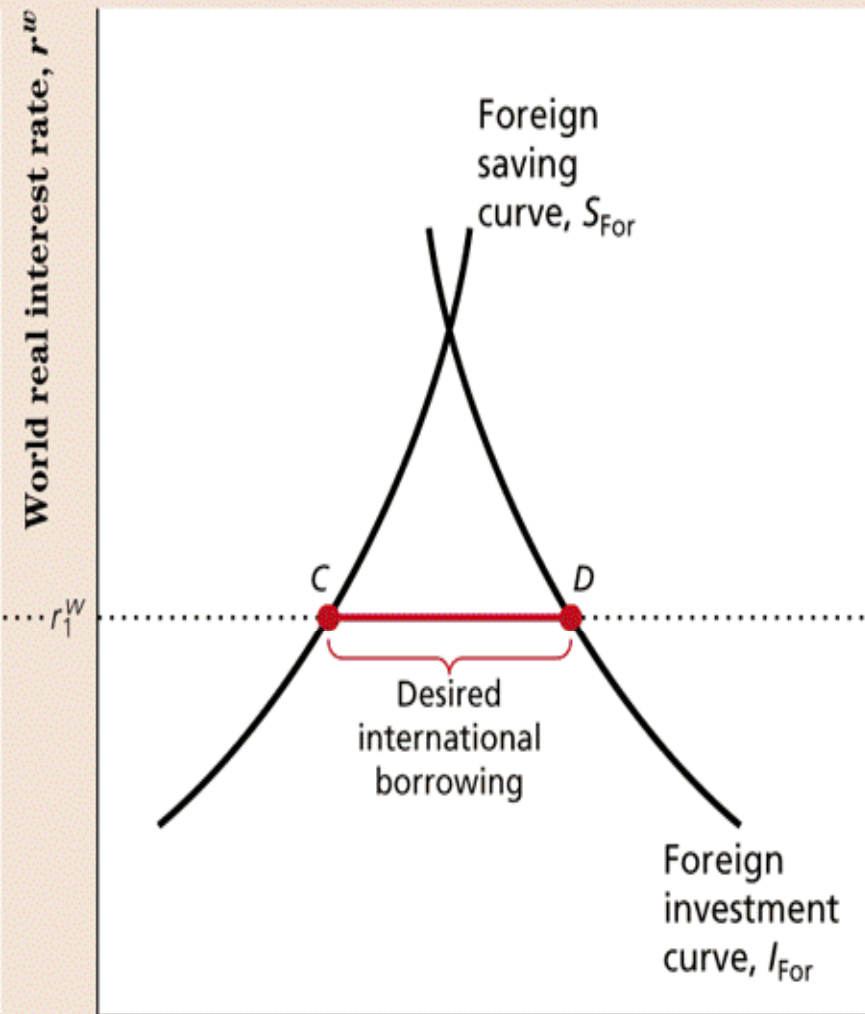
home country is \$200 billion (\$400 billion desired national saving less \$200 billion desired investment, or distance AB), which equals the foreign country's desired international borrowing of \$200 billion (\$700 billion desired investment less \$500 billion desired national saving, or distance DE). Thus, 5% is the equilibrium world real interest rate. Equivalently, when the interest rate is 5%, the current account surplus of the home country equals the current account deficit of the foreign country (both are \$200 billion).

A Large Open Economy: Equilibrium

- Another way of putting it is that the lending country's *CA* surplus will be equal the borrowing country's *CA* deficit.
- The world desired saving will be equal to the world desired investment.
- Changes in the r_w : for example, any factor that increases desired international lending of a country relative to desired international borrowing causes the world real interest rate to fall.



Desired national saving, S^d ,
and desired investment, I^d



Desired national saving, S_{For}^d ,
and desired investment, I_{For}^d

(a) Home country

(b) Foreign country

A Large Open Economy: The World Real Interest Rate

- Large open economy: changes in desired saving and desired investment affect r_w
- With only two economies:
 - i) Home economy (S^d, I^d)
 - ii) Foreign economy, Rest of the World ($S_{\text{For}}^d, I_{\text{For}}^d$)
- Shocks to the home economy are going to have spill-over effects on the R-o-W, and viceversa

Fiscal Policy and the CA

- Are government budget deficits necessarily accompanied by CA deficits? That is, are there “twin deficits”?
- We know that an increase in the government budget deficit will raise the CA deficit only if this increase reduces S^d . Then, less saving would be sent abroad and the current account would fall.
- How can the budget deficit increase? Either by increasing G or decreasing T .

The Government Budget Deficit and National Saving

- The deficit caused by increased government purchases reduces desired national saving

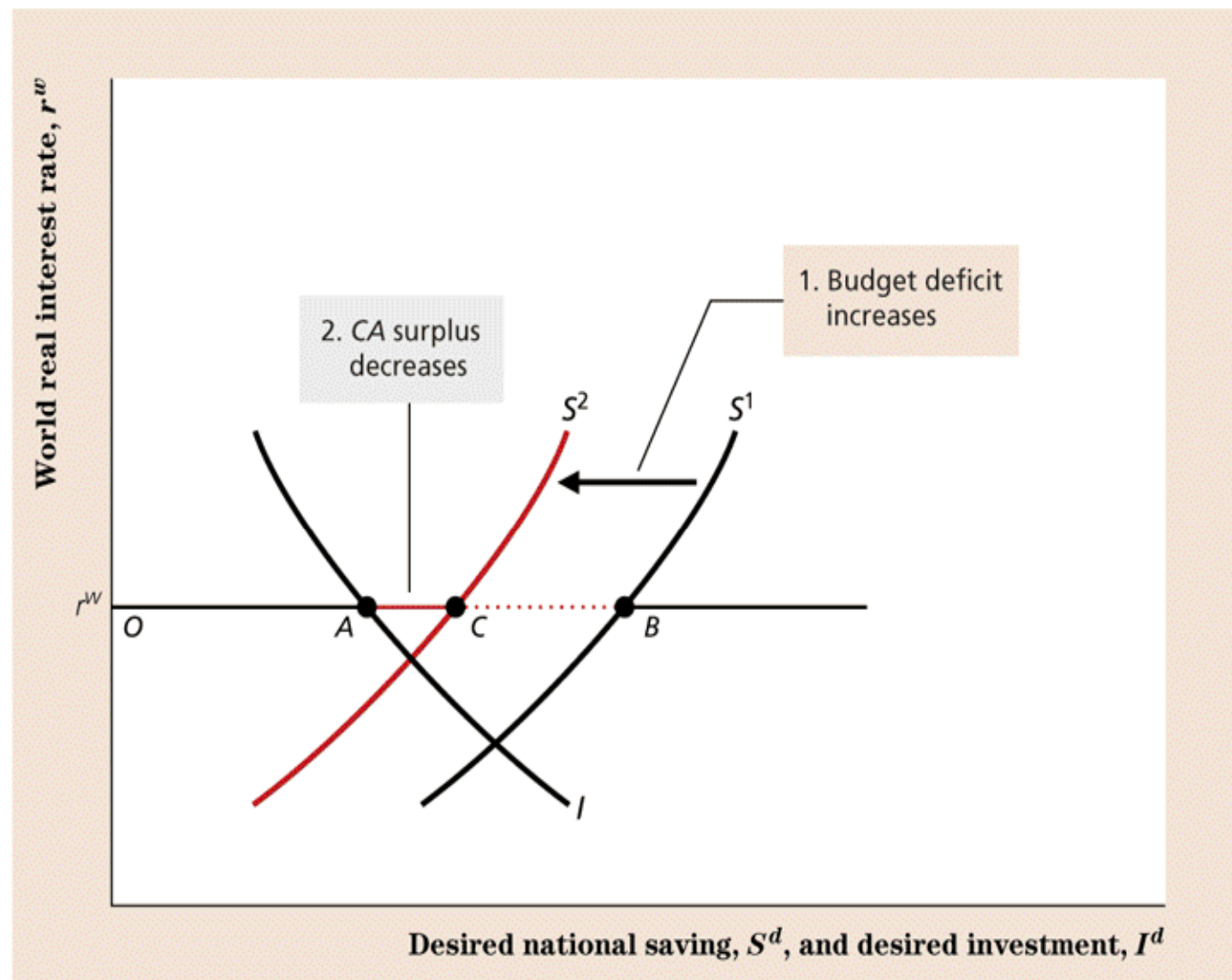
$$S^d = Y - C^d - G$$

- The current account balance declines.
- We have a twin deficit.
- In contrast, if the increase in the budget deficit has no effect on the national saving, the *CA* is also unaffected: there is no twin deficit.

FIGURE 5.8

THE GOVERNMENT BUDGET DEFICIT AND THE CURRENT ACCOUNT IN A SMALL OPEN ECONOMY

An increase in the government budget deficit affects the current account only if the increased budget deficit reduces national saving. Initially, the saving curve is S^1 and the current account surplus is distance AB . If an increase in the government budget deficit reduces national saving, the saving curve shifts left, from S^1 to S^2 . With no change in the effective tax rate on capital, the investment curve I does not move. Thus, the increase in the budget deficit causes the current account surplus to decrease from distance AB to distance AC . In contrast, if the increase in the budget deficit has no effect on national saving, the current account is also unaffected and remains equal to distance AB .



The Budget Deficit and National Saving (continued)

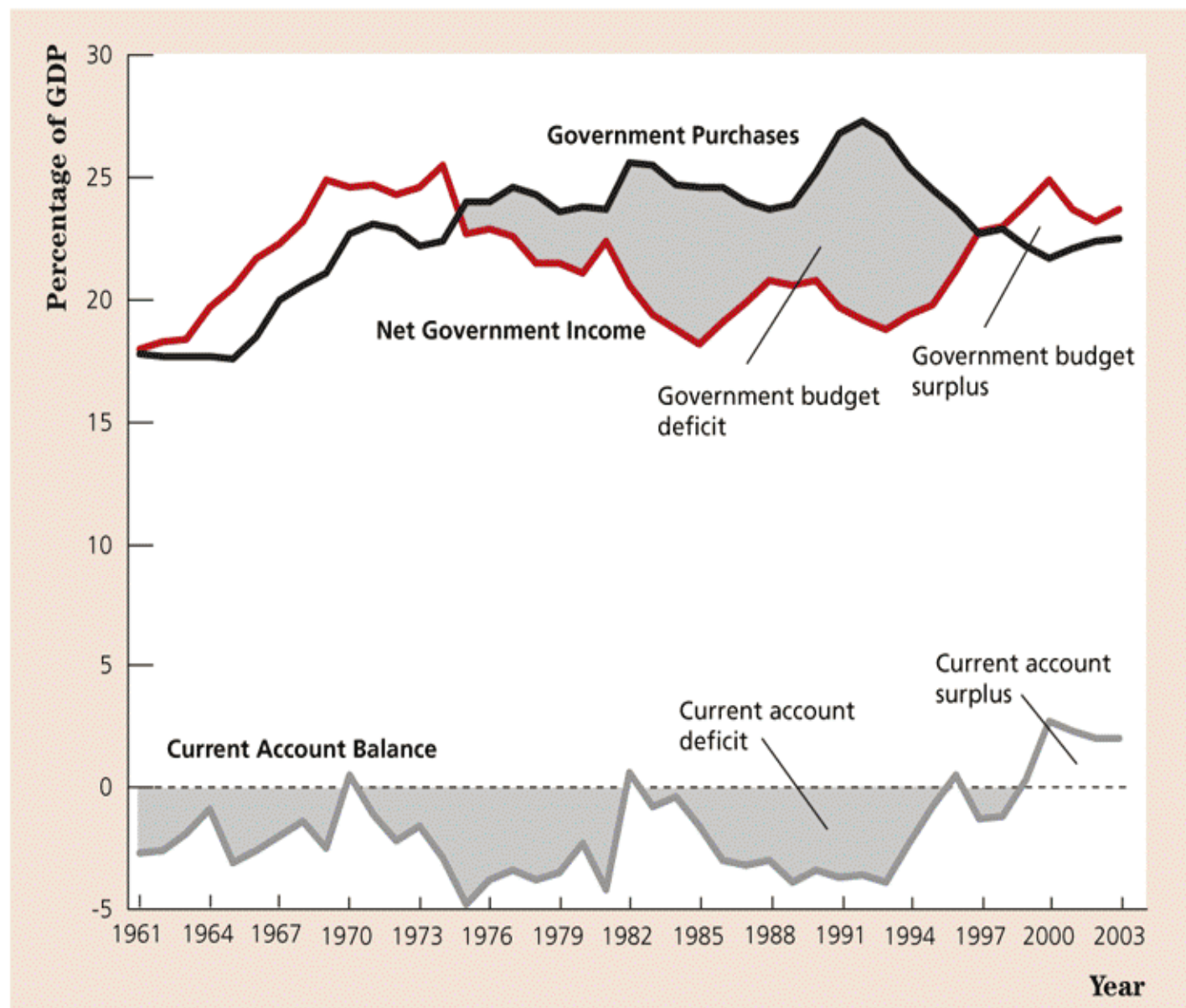
- The deficit caused by cuts in current taxes will cause S^d to fall only if it causes desired consumption to rise.
- Cuts in current taxes do not raise desired consumption when the Ricardian equivalence holds.
- The empirical evidence on the Ricardian equivalence is mixed.
- Hence, twin deficit logic might still hold.

FIGURE 5.9

**THE GOVERNMENT BUDGET
BALANCE AND THE
CURRENT ACCOUNT
BALANCE IN CANADA,
1961–2003**

The figure shows government purchases, net government income (taxes less transfers and interest), and the current account balance for Canada for the period 1961–2003. Government data are for federal, provincial, territorial, and municipal governments, and each series is measured as a percentage of GDP. The government deficit (shaded area) is the difference between government purchases and net receipts. Note the twin deficits during almost the whole period from 1975 to 1998. Since 1998 Canada has experienced twin surpluses.

Sources: Adapted from Statistics Canada, CANSIM II series v113713, v646937, v498327, v498332, v498316, and v498328.



Fiscal Policy and the CA

- Wrapping up: Does government budget deficit cause a CA deficit? It could
- Critical factor: response of national savings
- Government budget deficit will raise the CA deficit only if it reduces S^d

Final Comments

- Next Wednesday we will do 80 minutes of exercises.