Chapter 5

Saving and Investment in an Open Economy
Chapter Overview

In this chapter we explore how desired national saving and desired investment help determine patterns of international trade and lending, we extend the idea of goods market equilibrium, described by the saving-investment diagram, to include a foreign sector.

We show that, unlike the situation in a closed economy, in an open economy desired national saving and desired investment don't have to be equal.

When a country's desired national saving exceeds its desired investment, the country will be a lender in the international capital market and will have a current account surplus. Similarly, when a country's desired national saving is less than its desired investment, the country will be an international borrower and will have a current account deficit. We further examine the role of foreign exchange in an open economy.
Balance of Payment

Examining the factors that affect international trade and lending first requires an understanding of the basics of balance of payments accounting.

A record of all transactions made between one particular country and all other countries during a specified period of time. SBP compares the dollar difference of the amount of exports and imports, including all financial exports and imports. A negative balance of payments means that more money is flowing out of the country than coming in, and vice versa.

Balance of Payment Account

Current Account

Capital and Financial Accounts
Current Account

The current account measures a country's trade in currently produced goods and services, along with unilateral transfers between countries. For convenience we divide the current account into three separate components:

(1) net exports of goods and services,
(2) net income from abroad, and
(3) net unilateral transfers.
## Current Account

<table>
<thead>
<tr>
<th>Current Account</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net exports of goods and services (NX)</strong></td>
<td>-435.5</td>
</tr>
<tr>
<td>Exports of goods and services</td>
<td>971.9</td>
</tr>
<tr>
<td>Goods</td>
<td>682.6</td>
</tr>
<tr>
<td>Services</td>
<td>289.3</td>
</tr>
<tr>
<td>Imports of goods and services</td>
<td>-1407.4</td>
</tr>
<tr>
<td>Goods</td>
<td>-1166.9</td>
</tr>
<tr>
<td>Services</td>
<td>-240.5</td>
</tr>
<tr>
<td><strong>Net income from abroad (NFP)</strong></td>
<td>-11.9</td>
</tr>
<tr>
<td>Income receipts from abroad</td>
<td>244.6</td>
</tr>
<tr>
<td>Income payments to residents of other countries</td>
<td>-256.5</td>
</tr>
<tr>
<td><strong>Net unilateral transfers</strong></td>
<td>-56.0</td>
</tr>
<tr>
<td><strong>Current Account Balance (CA)</strong></td>
<td>-503.4</td>
</tr>
</tbody>
</table>
The Capital and Financial Account

International transactions involving assets, either real or financial, are recorded in the capital and financial account, which consists of a capital account and a financial account. The capital account encompasses unilateral transfers of assets between countries, such as debt forgiveness or migrants' transfers (the assets that migrants take with them when they move into or out of a country). The capital account balance measures the net flow of assets unilaterally transferred into the country.

When the home country sells an asset to another country, the transaction is recorded as a financial inflow and when it buys an asset into another country its called financial outflow
Balance of Payment

Balance of payments is the net increase (domestic less foreign) in a country's official reserve assets. A country that increases its net holdings of reserve assets during a year has a balance of payments surplus, and a country that reduces its net holdings of reserve assets has a balance of payments deficit. This is also called official settlement balance.
Goods Market Equilibrium in an Open Economy

In an Open Economy

• spending need not equal output
• saving need not equal investment
Preliminaries

\[ C = C^d + C^f \]
\[ I = I^d + I^f \]
\[ G = G^d + G^f \]

superscripts:
\[ d = \text{spending on domestic goods} \]
\[ f = \text{spending on foreign goods} \]

\[ EX = \text{exports} = \text{foreign spending on domestic goods} \]
\[ IM = \text{imports} = C^f + I^f + G^f \]
\[ = \text{spending on foreign goods} \]
\[ NX = \text{net exports (a.k.a. the “trade balance”) } = EX - IM \]
GDP = expenditure on domestically produced g & s

\[ Y = C^d + I^d + G^d + EX - IM \]

\[ = (C - C^f) + (I - I^f) + (G - G^f) + EX - IM \]

\[ = C + I + G + EX - IM \]

\[ = C + I + G + NX \]
The national income identity in an open economy

\[ Y = C + I + G + \text{NX} \]

or,

\[ \text{NX} = Y - (C + I + G) \]

net exports

output

domestic spending
Trade surpluses and deficits

\[ NX = EX - IM = Y - (C + I + G) \]

• trade surplus:
  output > spending and exports > imports
  Size of the trade surplus = \( NX \)

• trade deficit:
  spending > output and imports > exports
  Size of the trade deficit = \(-NX\)
Now we will put some light on Saving Investment Identity

- The GDP for an open economy:
  \[ Y = C + I + G + NX \]

Consumption = C
Investment = I
Government purchases = G
Net Exports = NX (Exports less Imports)
National Income Identity

$Y = C + I + G + NX$

$Y - C - G = I + NX$

$S = I + NX \ (Open \ Economy \ Equilibrium)$

Where $S = Y - C - G$ is National Savings
Saving Investment Identity

• *Equilibrium in the product market*: 
  \[ S - I = NX \]
  
  Net Foreign Investment = Trade Balance
  If \( S>I \): foreign *capital outflow*; hence \( NX>0 \): trade surplus
  If \( S<I \): foreign *capital inflow*; hence \( NX<0 \): trade deficit
Saving and Investment in a small open economy

A small open economy is an economy that is too small to affect the world real interest rate. The world real interest rate is the real interest rate that prevails in the international capital market that is, the market in which individuals, businesses, and governments borrow and lend across national borders.

Assumption
Because changes in saving and investment in the small open economy aren't large enough to affect the world real interest rate, this interest rate is Fixed.

The assumption that we make is that residents of the economy can borrow or lend in the international capital market at the (expected) world real interest rate, \( rw \) which for now we assume is fixed. If the world real interest rate is \( rw \) the domestic real interest rate must be \( rw \) as well, as no domestic borrower with access to the international capital market would pay more than \( rw \) to borrow, and no domestic saver with access to the international capital market would accept less than \( rw \) to lend.
Saving and Investment in a small open economy (Lending)

![Graph showing saving and investment in a small open economy with foreign lending at 6% as $4 billion. The saving curve (S) and the investment curve (I) intersect at point E, indicating equilibrium. The desired national saving (S^d) and desired investment (I^d) are measured in billions of dollars.](image)
Saving and Investment in a small open economy

In a closed economy, goods market equilibrium would be represented by point E, the intersection of the curves. The equilibrium real interest rate in the closed economy would be 4% (per year), and national saving and investment would be $3 billion (per year). In an open economy, however, desired national saving need not equal desired investment.

If the small open economy faces a fixed world real interest rate, rw, higher than 4%, desired national saving will be greater than desired investment. For example, if rw is 6%, desired national saving is $5 billion and desired investment is $1 billion, so desired national saving exceeds desired investment by $4 billion.
Question

• Can the economy be in equilibrium when desired national saving exceeds desired investment by $4 billion?

Answer:
In a closed economy it couldn't. The excess saving would have no place to go, and the real interest rate would have to fall to bring desired saving and desired investment into balance.

However, in the open economy the excess $4 billion of saving can be used to buy foreign assets. This financial outflow uses up the excess national saving so that there is no disequilibrium. Instead, the goods market is in equilibrium with desired national saving of $5 billion, desired investment of $1 billion, and net foreign lending of $4 billion.

\[ S = I + NX \]

\[ 5\text{billion} = 1\text{ billion} + 4\text{ Billion} \]
Saving and Investment in a small open economy (borrowing)
Saving and Investment in a small open economy (borrowing)

• The same small open economy shown in 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.

\[ S = I + NX \]

\[ 1\text{billion} = 5\text{ billion} + (-4\text{ Billion}) \]
A temporary adverse supply shock in a small open economy
A temporary adverse supply shock in a small open economy (drought)

Curve S1 is the initial saving curve, and curve I1 is the initial investment curve of a small open economy. With a fixed world real interest rate of \( rw \), 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 51 to 52. National saving decreases to distance \( OD \), and the current account surplus decreases to distance \( AD \).
An Increase in the Expected Future Marginal Product of Capital.

1. Expected future $MPK$ increases

2. Current account surplus falls
An Increase in the Expected Future Marginal Product of Capital.

The small open economy's initial national saving and investment curves are S1 and I1, respectively. At the fixed world real interest rate of rw, there is an initial current account surplus equal to the distance AB. An increase in the expected future marginal product of capital (MPK) shifts the investment curve right, from I1 to I2, causing investment to increase from distance OA to distance OF. The current account surplus, which is national saving minus investment, decreases from distance AB to distance FB.
Further Explanation

• An increase in the MPK raises the capital stock that domestic firms desire to hold so that desired investment rises at every real interest rate. Thus the investment curve shifts to the right, from 11 to 12. The current account and net foreign lending shrink to length FB. Why does the current account fall? Because building capital has become more profitable in the home country, more of the country's output is absorbed by domestic investment, leaving less to send abroad.
Saving and Investment in Large Open Economies

Although the model of a small open economy facing a fixed real interest rate is appropriate for studying many of the countries in the world, it isn't the right model to use for analyzing the world's major developed economies. The problem is that significant changes in the saving and investment patterns of a major economy can and do affect the world real interest rate, which violates the assumption made for the small open economy that the world real interest rate is fixed.

Assumption

An economy large enough to affect the world real interest rate. They determine the world interest rate.
The determination of the world real interest rate with two large open economies
Explanation

• Instead of taking the world real interest rate as given, as we did in the model of a small open economy, we determine the world real interest rate within the model for a large open economy.

• What determines the value of the world real interest rate?

Remember that for the closed economy the real interest rate was set by the condition that the amount that savers want to lend must equal the amount that investors want to borrow. Analogously, in the case of two large open economies, the world real interest rate will be such that Desired international lending by one country equals desired international borrowing by the other country.
• 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 $0.05$, 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).

• We define international equilibrium in terms of desired international lending and borrowing.
The government budget deficit and the current account in a small open economy
Explanation

• An increase in the government budget deficit affects the current account if the increased budget deficit reduces national saving. Initially, the saving curve is S1 and the current account surplus is distance AB. If an increase in the government deficit reduces national saving, the saving curve shifts to the left, from S1 to S2. With no change in the effective tax rate on capital, the investment curve, I, doesn't move. Thus the increase in the budget deficit causes the current account surplus to decrease from distance AB to distance AC.