In this chapter, look for the answers to these questions

• In an open economy, what determines the real interest rate? The real exchange rate?
• How are the markets for loanable funds and foreign-currency exchange connected?
• How do government budget deficits affect the exchange rate and trade balance?
• How do other policies or events affect the interest rate, exchange rate, and trade balance?
Introduction

- The previous chapter explained the basic concepts and vocabulary of the open economy: net exports ($NX$), net capital outflow ($NCO$), and exchange rates.
- This chapter ties these concepts together into a theory of the open economy.
- We will use this theory to see how govt policies and various events affect the trade balance, exchange rate, and capital flows.
- We start with the loanable funds market...
The Market for Loanable Funds

- An identity from the preceding chapter:
  \[ S = I + NCO \]

- Supply of loanable funds = saving.
- A TL of saving can be used to finance:
  - the purchase of domestic capital
  - the purchase of a foreign asset
- So, demand for loanable funds = \( I + NCO \)
The Market for Loanable Funds

- Recall:
  - $S$ depends positively on the real interest rate, $r$.
  - $I$ depends negatively on $r$.

- What about $NCO$?

Recall:

- When $NCO > 0$, the net purchase of capital overseas adds to the demand for domestically generated loanable funds.
- When $NCO < 0$, the capital resources coming from abroad reduce the demand for domestically generated loanable funds.
How NCO Depends on the Real Interest Rate

The real interest rate, \( r \), is the real return on domestic assets.

A fall in \( r \) makes domestic assets less attractive relative to foreign assets.

- People in Turkey purchase more foreign assets.
- People abroad purchase fewer Turkey’s assets.

\[ NCO \]

\[ NCO \]

\[ r \]

\[ r_1 \]

\[ r_2 \]
The Loanable Funds Market Diagram

\[ D = I + NCO \]

\( r \) adjusts to balance supply and demand in the LF market.

Both \( I \) and \( NCO \) depend negatively on \( r \), so the \( D \) curve is downward-sloping.

\( r \) is the interest rate, \( S \) is saving, \( D \) is the demand for loanable funds, \( I \) is investment, and \( NCO \) is net capital outflow.
Budget deficits and capital flows

Suppose that Turkish government runs a budget deficit (previously, the budget was balanced).

Use the appropriate diagrams to determine the effects on the real interest rate and net capital outflow.
ACTIVE LEARNING 1

A budget deficit reduces saving and the supply of $LF$, causing $r$ to rise. The higher $r$ makes Turkish bonds more attractive relative to foreign bonds, reduces $NCO$. 

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**Loanable funds**

- $r_1$ to $r_2$ on $S_1$ and $D_1$ graph.
- $S_2$ curve.

**Net capital outflow**

- $r_1$ to $r_2$ on $NCO$ graph.
- $NCO_1$ line.

The Market for Foreign-Currency Exchange

- Another identity from the preceding chapter:
  \[ NCO = NX \]

- In the market for foreign-currency exchange,
  - \( NX \) is the demand for TLs:
    foreigners need TL to buy Turkish net exports.
  - \( NCO \) is the supply of TLs:
    Turkish residents sell TL to obtain the foreign currency they need to buy foreign assets.
The Market for Foreign-Currency Exchange

- Recall:
The Turkish real exchange rate \((E)\) measures the quantity of foreign goods & services that trade for one unit of Turkish goods & services.

- \(E\) is the real value of a TL in the market for foreign-currency exchange.
The Market for Foreign-Currency Exchange

\( E \) adjusts to balance supply and demand for TLs in the market for foreign-currency exchange.

An increase in \( E \) makes Turkish goods more expensive to foreigners, reduces foreign demand for Turkish goods—and TLs.

An increase in \( E \) has no effect on saving or investment, so it does not affect NCO or the supply of TLs.
The Market for Foreign-Currency Exchange

- A higher exchange value of TL not only makes foreign goods less expensive for Turkish buyers but also makes foreign assets less expensive.
- This would make foreign assets more attractive. But a Turkish investor will eventually want to turn the foreign asset, as well as any profits earned on it, back into TLs.
- For example, a high value of TL makes it less expensive for a Turkish to buy stock in a Japanese company, but when that stock pays dividends, those will be in yen. As these yen are exchanged for TLs, the high value of TL means that the dividend will buy fewer TLs.
- Thus, changes in the exchange rate influence both the cost of buying foreign assets and the benefit of owning them, and these two effects offset each other.
- Thus E has no effect on NCO, thus no affect on the supply of TL.
FYI: Disentangling Supply and Demand

When a Turkish resident buys imported goods, does the transaction affect supply or demand in the foreign exchange market? Two views:

1. **The supply of TLs increases.**
   The person needs to sell her TLs to obtain the foreign currency she needs to buy the imports.

2. **The demand for TLs decreases.**
   The increase in imports reduces $NX$, which we think of as the demand for TLs.

So, $NX$ is really the net demand for TLs:

$NX=$ foreign demand for TLs to purchase TL exports
   - Turkish supply of TLs to purchase imports.

Both views are equivalent. For our purposes, it’s more convenient to use the second.
FYI: Disentangling Supply and Demand

When a foreigner buys a Turkish asset, does the transaction affect supply or demand in the foreign exchange market? Two views:

1. **The demand for TLs increases.**
   The foreigner needs TLs in order to purchase the Turkish asset.

2. **The supply of TLs falls.**
   The transaction reduces NCO, which we think of as the supply of TLs.

   So, **NCO** is really the *net* supply of TLs:
   
   \[
   NCO = \text{Turkish supply of TLs to purchase foreign assets} - \text{foreign demand for TLs to purchase Turkish assets}
   \]

   Again, both views are equivalent. We will use the second.
Initially, the government budget is balanced and trade is balanced ($\textit{NX} = 0$).

Suppose the government runs a budget deficit. As we saw earlier, $r$ rises and $\textit{NCO}$ falls.

How does the budget deficit affect the Turkish real exchange rate? The balance of trade?
The budget deficit reduces $NCO$ and the supply of TLs.

The real exchange rate appreciates, reducing net exports.

Since $NX = 0$ initially, the budget deficit causes a trade deficit ($NX < 0$).
The "Twin Deficits"

Net exports and the budget deficit often move in opposite directions.

U.S. federal budget deficit

U.S. net exports

Percent of GDP

Years:
- 1961-65
- 1966-70
- 1971-75
- 1976-80
- 1981-85
- 1986-90
- 1991-95
- 1996-2000
- 2001-2005
- 2006-2010
SUMMARY: The Effects of a Budget Deficit

- National saving falls.
- The real interest rate rises.
- Domestic investment and net capital outflow both fall.
- The real exchange rate appreciates.
- Net exports fall (or, the trade deficit increases).
The Connection Between Interest Rates and Exchange Rates

*Keep in mind:*
The LF market *(not shown)* determines *r*. This value of *r* then determines NCO *(shown in upper graph)*. This value of NCO then determines supply of dollars in foreign exchange market *(in lower graph)*.
Suppose the government provides new tax incentives to encourage investment.

Use the appropriate diagrams to determine how this policy would affect:

- the real interest rate
- net capital outflow
- the real exchange rate
- net exports
Active Learning 3 Answers

$r$ rises, causing $NCO$ to fall.

Investment—and the demand for LF—increase at each value of $r$. 

![Graph showing loanable funds and net capital outflow](image)

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$r$ rises, causing $NCO$ to fall. Investment—and the demand for $LF$—increase at each value of $r$. 

**Loanable funds**

- $r_1$ to $r_2$
- $D_1$ to $D_2$
- $S_1$

**Net capital outflow**

- $NCO_1$ to $NCO_2$
The fall in $NCO$ reduces the supply of TLs in the foreign exchange market. The real exchange rate appreciates, reducing net exports.
Budget Deficit vs. Investment Incentives

- A tax incentive for investment has similar effects as a budget deficit:
  - $r$ rises, $NCO$ falls
  - $E$ rises, $NX$ falls
- But one important difference:
  - Investment tax incentive **increases** investment, which increases productivity growth and living standards in the long run.
  - Budget deficit **reduces** investment, which reduces productivity growth and living standards.
Trade Policy

- **Trade policy**: a govt policy that directly influences the quantity of g&s that a country imports or exports

- **Examples**:
  - **Tariff** – a tax on imports
  - **Import quota** – a limit on the quantity of imports
  - “**Voluntary export restrictions**” – the govt pressures another country to restrict its exports; essentially the same as an import quota
Trade Policy

- Common reasons for policies that restrict imports:
  - Save jobs in a domestic industry that has difficulty competing with imports
  - Reduce the trade deficit

- Do such trade policies accomplish these goals?
- Let’s use our model to analyze the effects of an import quota on cars from Japan designed to save jobs in the U.S. auto industry.
Analysis of a Quota on Cars from Japan

An import quota does not affect saving or investment, so it does not affect $NCO$. (Recall: $NCO = S - I$.)
Analysis of a Quota on Cars from Japan

- The supply of loanable funds is saving, which equals \( Y - C - G \). A quota on imports does not affect \( Y \) or \( C \) or \( G \), so it will not affect saving.
- The demand for loanable funds equals \( I + NCO \), neither of which are affected by import quotas. Hence, \( r \) will not change.
- The NCO curve does not shift in response to the import quota. The import quota is a restriction on international trade in goods & services. The NCO curve describes international trade in assets.
- Hence, the equilibrium value of NCO is not affected by the import quota.
Analysis of a Quota on Cars from Japan

Since $NCO$ is unchanged, $S$ curve does not shift.

The $D$ curve shifts:
At each $E$, imports of cars fall, so net exports rise, $D$ shifts to the right.

At $E_1$, there is excess demand in the foreign exchange market.

$E$ rises to restore eq’m.
Analysis of a Quota on Cars from Japan

What happens to $\textit{NX}$? Nothing!

- If $E$ could remain at $E_1$, $\textit{NX}$ would rise, and the quantity of TLs demanded would rise.

- But the import quota does not affect $\textit{NCO}$, so the quantity of TLs supplied is fixed.

- Since $\textit{NX}$ must equal $\textit{NCO}$, $E$ must rise enough to keep $\textit{NX}$ at its original level.

- Hence, the policy of restricting imports does not reduce the trade deficit.
Analysis of a Quota on Cars from Japan

Does the policy save jobs?

The quota reduces imports of Japanese autos.
- U.S. consumers buy more U.S. autos.
- U.S. automakers hire more workers to produce these extra cars.
- So the policy saves jobs in the U.S. auto industry.

But $E$ rises, reducing foreign demand for U.S. exports.
- Export industries contract, exporting firms lay off workers.

*The import quota saves jobs in the auto industry but destroys jobs in U.S. export industries!!*
CASE STUDY: Capital Flows from China

- In recent years, China has accumulated U.S. assets to reduce its exchange rate and boost its exports.
  (As of the end of 2009, China’s total reserves of foreign assets were about $2.4 trillion)

- Results in U.S.:
  - Appreciation of $ relative to Chinese renminbi
  - Higher U.S. imports from China
  - Larger U.S. trade deficit
  - American consumers of Chinese imports benefit from lower prices.
  - Inflow of capital from China lowers U.S. interest rates, which in turn increases investment in the U.S. economy.

- Some U.S. politicians want China to stop, argue for restricting trade with China to protect some U.S. industries.

- Yet, U.S. consumers benefit, and the net effect of China’s currency intervention is probably small.
Political Instability and Capital Flight

  - People worried about the safety of Mexican assets they owned.
  - People sold many of these assets, pulled their capital out of Mexico.

- **Capital flight**: a large and sudden reduction in the demand for assets located in a country

- We analyze this using our model, from the perspective of Mexico.
Capital Flight from Mexico

1. Demand for LF = I + NCO. The increase in NCO increases demand for LF.
2. As foreign investors sell their assets and pull out their capital, NCO increases at each value of r.
3. The equilibrium values of r and NCO both increase.
Political Instability and Capital Flight

- Why does NCO rise?
- \( S = I + \text{NCO} \)
- \( \text{NCO} = S - I \)
- \( \Delta \text{NCO} = \Delta S - \Delta I \)
- Because \( r \) is higher in the new equilibrium,
- \( \Delta S > 0 \) and \( \Delta I < 0 \)
- Hence, it must be true that \( \Delta \text{NCO} > 0 \).
- So, the increase in \( r \) reduces NCO somewhat, but not enough to reverse the initial capital outflow.
Capital Flight from Mexico

4. The increase in $NCO$ causes an increase in the supply of pesos in the foreign exchange market.

5. The real exchange rate value of the peso falls.
Examples of Capital Flight: Mexico, 1994

US Dollars per currency unit
Examples of Capital Flight: S.E. Asia, 1997

- South Korea Won
- Thai Baht
- Indonesia Rupiah

US Dollars per currency unit

1/1/1997 = 100
Examples of Capital Flight: Russia, 1998

US Dollars per currency unit

5/5/1998
6/14/1998
7/24/1998
9/2/1998
10/12/1998
11/21/1998
12/31/1998
Examples of Capital Flight: Argentina, 2002

U.S. Dollars per currency unit

- 7/1/2001
- 9/19/2001
- 12/8/2001
- 2/26/2002
- 5/17/2002
- 8/5/2002
- 10/24/2002
- 1/12/2003
Summary

• In an open economy, the real interest rate adjusts to balance the supply of loanable funds (saving) with the demand for loanable funds (domestic investment and net capital outflow).

• In the market for foreign-currency exchange, the real exchange rate adjusts to balance the supply of dollars (net capital outflow) with the demand for dollars (net exports).

• Net capital outflow is the variable that connects these markets.
Summary

• A budget deficit reduces national saving, drives up interest rates, reduces net capital outflow, reduces the supply of dollars in the foreign exchange market, appreciates the exchange rate, and reduces net exports.

• A policy that restricts imports does not affect net capital outflow, so it cannot affect net exports or improve a country’s trade deficit. Instead, it drives up the exchange rate and reduces exports as well as imports.
Summary

• Political instability may cause capital flight, as nervous investors sell assets and pull their capital out of the country. As a result, interest rates rise and the country’s exchange rate falls. This occurred in Mexico in 1994 and in other countries more recently.